

SYLLABUS FOR THE SUBJECT OF VETERINARY SCIENCE PAPER – I

Total Marks: 100

Anatomy and Physiology

General terms used in Anatomy and Physiology. Anatomy and Physiology of different systems such as Digestive System, Cardiovascular System, Respiratory System, uro-general system, Endocrine Glands, Nervous System, Sense Organs. Comparative Anatomy and Physiology of different systems of various domestic animals.

Pharmacology and Toxicology

Terminology Drug development and drug regulation. Sources of drugs and drugs classification. Physicochemical properties of drugs, Disposition and bioavailability of drugs. Structure activity and dose response relationship, Drug Resistance, Drug safety, adverse effects, tissue residue and public health. Pharmacology of drugs affecting various systems, Chemotherapeutic agents, antibiotics, antifungal, antiviral, antiparasitic drugs. Terms used in toxicology, Forensic toxicology, Sources of poisoning and poisonous plants. Specific and non specific antidote therapy.

Parasitology

Effects of parasites on their host and their economic significance. Immunity and resistance of parasites. Mode of action of anti-parasitic drugs. Parasitic zoonoses examples, Epidemiology, Diagnosis, Pathogenesis and control of various parasites such as Protozoa (Trypanosoma, Toxoplasma, Babesia, Theileria, Coccidia, Etc). Helminthes (Ascariasis, strongylosis, haemonchus, oestertagia, fasciolosis, schistosoma, Ectoparasites (mange, mite, ticks, flies).

Microbiology

General Microbiology, Diversity of Microbes, Prokaryotes Vs Eukaryotes. Physicochemical requirements of microbes. Microbial preservation and microbial genetics. Immunity natural and acquired. Antigen antibody essential features. Macrophage, B and T lymphocytes Immunoglobulin, regulation of immune response. Theories of antibody formation. Vaccines production, vaccination, autoimmunity., autoimmune diseases. Bacteriology and mycology classification, general characters disease association and diagnosis. Virology properties of viruses and classification, Bacteriophages, Physicochemical characteristics, isolation, identification, immunity and disease association, Important viral diseases, rabies, rinderpest, Foot and mouth disease, PRR, BVD, BSE, ND, Avian Influenza, etc.

Pathology

Common terms, cell injuries and cell death. Disturbance of circulation, inflammation, repair and healing of wounds and fractures. Neoplasia its cause and classification. Pathology of different organs. Meat inspection. Characteristics of good quality meat, differentiation of meat of different animals. Objectives of meat inspection Ante-mortem and postmortem examination. Specific and non specific lesions. Disposal of condemned meat. Laws governing meat inspection in Pakistan. Collection preservation and dispatch of laboratory specimens. Hematological examination and its significance. Bone marrow evaluation, urine and faecal examination, liver and kidney function test. Plasma protein profile, electrolyte and acid base balance. Exfoliative cytology.

Reproduction

Regulation of hormones, Physiology of estrous cycle. Fertilization, Implantation, gestation and parturition, male reproductive system. Biotechnology and recent trends. Artificial insemination technique, estrus synchronization, embryo transfer, Genetic engineering, nuclear transfer and cloning. Disease of reproduction, cervicovaginal prolapse, post partum complications, uterine infections, infertility problems, Genetic and acquired abnormalities of testis accessory sex glands and infertility problems in males.

Veterinary Medicine

General Terms (Fever, Toxemia, Septicemia, Anaphylaxis, Shock, etc.) Diseases of different systems: G.I.T. (Acidosis, Tympany, Enteritis, equine colic) Liver (hepatitis, jaundice, cholelithiasis) Respiratory system (rhinitis, laryngitis, bronchitis, pneumonia, hydrothorax, epistaxis, pleurisy). Nervous Systems (encephalitis, meningitis) Urinary System (Nephritis, Urolithiasis, Pyelonephritis, Cystitis) Others (arthritis, Osteomyelitis, Dermatitis, Seborrhea, Photosensitization, Tumors, Cysts, Keratoconjunctivitis, Cataract, Glaucoma, Otitis), Infectious and Non-Infectious diseases of domestic animals.

Surgery

Fluid replacement therapy and blood transfusion. Management of accidents shock and emergency cases. Small/Large Animal Surgery. General Surgical considerations. Fluid therapy in surgical patients, tissue regeneration, wound healing. Scope of radiology in Veterinary Practice X-ray machine and its working. Nature and production X-ray exposure factors. Radiation hazards and protection X-ray film and its type. Processing of Films. Basic principles to study radiograph. Qualities of good radiograph. Shoeing and its evaluation. Blemishes and vices in animals. Soundness examination, colours and marking in equines.

Veterinary Epidemiology

Principles of epidemiology and its relation to public health. Determinants of disease, Vital Statistics, Incidence, Prevalence, Patterns and disease ecology. Surveillance and monitoring, data collection and interpretation. Analytical epidemiology, Cohort or prospective study, case-control or retrospective study. Experimental epidemiology, clinical trials, field trial or community trials. Epidemic investigation. Control and eradication of transboundary and other infectious diseases. Diseases transmissible to human beings through milk and other dairy products, Meat, Poultry and other foods. Urine and faeces of animals. Environment and residues. Sanitary and phyto-sanitary measures for the prevention of disease during export and import livestock products. Role of veterinary public health in producing safe human food according to WTO standards. Personal hygiene and public sanitation. Active and passive surveillance. Writing a research report.

RECOMMENDED BOOKS

1. *Cunningham. I. G. 2002. Text Book of Veterinary Physiology. W. B. Sanders Co. 3rd Edition. USA.*
2. *Adams. H.R., 2001. Veterinary Pharmacology & therapeutics, 8th Ed. Iowa State University Press USA.*
3. *Urquhart. G.M.J. Armour, J.L. Duncan. A.M. Dunna and F.W. Jennings. 2000. "Veterinary Parasitology". Longman Scientific and Technical, UK.*
4. *Quinn, P.J., 2002. veterinary Microbiology and Microbial Disease. 1st. Ed. Blackwell Science, Ltd., USA.*
5. *Latimer, K.S., E.A. Mahaffey and K.W. Prasse, 2003. Duncan & Prasse's Veterinary Laboratory Medicine Clinical Pathology. 4th Ed., Iowa State Press. Ames, Iowa, USA.*
6. *Kumar, V.R.S. Cotran and S.L. Robbins, 2003. Robbins Basic Pathology, 7th Ed., Saunders, Philadelphia, Pennsylvania, USA.*
7. *Hafez, E.S.E., 2000. Reproduction in Farm Animals. 7th Edition., Lea and Febiger, Philadelphia, USA.*
8. *Radosits, O.M., C.C. Gay, D.C. Blood and K.W. Hincheliff, 2000. veterinary Medicine, 9th Ed. Bailliere Tindall, London, U.K.*
9. *Thrusfield, M., 2005, Veterinary Epidemiology, 3rd Ed. Blackwell Science, London, UK.*
10. *Jones, H.J., M. W. Hubbert and H. Hagstard, 200. zoonoses-Recognition. Control and Preventio. Blackwell Science, Ltd., Oxford, UK.*

**ANIMAL HUSBANDRY
PAPER-II**

Total Marks: 100

Animal Nutrition

Basic terms used in Animal Nutrition. Digestion of carbohydrates, proteins and lipids in monogastric and ruminants. Bio-chemical pathways that influence nutrient metabolism. Metabolism of proteins, carbohydrates, lipids as nutrients, energy metabolism, classification, functions and deficiency symptoms of minerals and vitamins factors affecting nutritive value of feeds. Techniques for estimating nutritive value of feed stuffs. Factors effecting the nutritive value of feeds. Measures of food energy; gross energy, metabolisable energy, net energy. Determination of digestibility, digestion coefficient. Calculation of TDN. Nutritive ratio. Role of probiotic in animal nutrition. Feeding of urea to ruminants. Technology for urea. Molasses mineral blocks. Procedure for block making. Feed raw materials handling, storage, grinding, mixing, processing and storage of finished feed. Quality control in feed processing. Feed stuff laws and regulations.

Poultry

Development of poultry industry in Pakistan; present status and future potential of poultry industry; important classes, breeds and varieties of poultry and their characteristics; objectives of poultry breeding for meat and egg production; qualitative and quantitative traits and their heritability estimates, systems of breeding and their significance; pure breed vs present day hybrid used for meat and egg production; the role of selection in genetic improvements. Brooding, rearing and laying house equipments; raising of broilers; rearing of layer chicks; shifting and housing of pullets; cage vs floor management; layer and breeder management; causes of poor performance of layer and breeder flocks and development of managerial strategies for its improvement; factors affecting pullet development; basic principles for site selection; poultry house construction and design; requirements of housing from biological engineering, economic and hygienic point of view.

Livestock Management

Routine practices at dairy and sheep/goat farms. Management of animals at different stages. Housing, Feeding and production management. Management during inclement weather. Management of range livestock. Judging of animals. Breeding practices. Sanitation procedure. Planning for year round feed and fodder supply and preservation. Manure handling and disposal hygienic milk production practices. Maintaining farm records and evaluation. Financial and labor management. Transportation and marketing of animals and their production.

Animal Breeding and Genetics

Genetic and phenotypic correlation. Emerging techniques. Traits of economic importance in farm animals. Use of computer for data handling and analysis. Breeding systems; random mating, inbreeding, line breeding and out breeding; selection of superior animals, principles, basis, kinds and methods; traits of economic importance in cattle, buffalo sheep, goats and poultry; animal genetic resources, their conservation and preservation; emerging breeding technologies; national breeding policy, constraints and future breeding plans.

RECOMMENDED BOOKS

1. *D.N. Panday and Amita Bajpai 2003. Recent Trend in Animal Nutrition and Feed technology for livestock, pets and laboratory animals.*
2. *Sainsbury, D. 1999. Poultry Health and Management; chickens, turkey, ducks, geese and quails, Blackwell scientific publications, London, UK.*
3. *Hunton, P. (Editor). 1995 Poultry production: production system approach. Elsevier science publishers, Amsterdam, the Netherlands.*
4. *Lagates, J.E. and E.J. Warwick, 1990. Breeding and improvement of Farm Animals. McGraw-Hall Publishing Co. New York.*
5. *Bourdon, R.M. 2000. Understanding Animal Breeding. Prentice-Hall, Inc. Upper, Saddle River, New Jersey.*
6. *Jagdish, P. 2005. Principles and practices of Dairy Farm Management. Kalyani publishers Delhi India.*
7. *Shah, S.I. 1994. Animal Husbandry. National Book Foundation, Islamabad, Pakistan.*

SYLLABUS FOR THE SUBJECT OF AGRICULTURE PAPER-I

Total Marks: 100

Natural resources (land, water, biological and climatic) of Pakistan and their impact on crop production. Climatic factors and their relationship with crop growth processes like photosynthesis, respiration and transpiration. Agro-ecological zones of Pakistan and their features. Dry farming. Organic farming for agricultural environmental pollution management. Use of bio-fertilizers, biopesticides and natural products. Biological N₂ fixation and factors affecting biological N₂ fixation. Source-sink relationships in crop plants. Weed-crop interference; competition and allelopathic interactions.

Role of Agri. Extension in current and future agriculture in Pakistan. Methods and steps to evaluate extension activities. Global overview of Agri. extension. Types, principles, strategies and significance of audio-visual aids in Agri. Extension.

Importance, potential and principles of Agro-forestry. Various agro-forestry systems. Forest products and utilization features of range management in Pakistan. Major wildlife species found in Pakistan, their morphological features, behaviour and habitats. National forest policy and other land use policies. Biodiversity, its conservation, threats and losses, Impact of environmental changes on biodiversity.

Role of Indus Basin Irrigation System in the development of agriculture in Pakistan. Current and future scope of farm mechanization in Pakistan.

Food processing and preservation. Food industries of Pakistan and their role in the national economy. WTO implications to food business. Food analysis, contamination of foods business. Food analysis, contamination of foods and its control measures. Processing and uses of dairy products. Basic nutrition requirements of human body and their relationship with nutrition related diseases.

Indicators and issues of agriculture sector in Pakistan and their role in national economy. Land tenure systems and land reforms in Pakistan. Principles, objectives and functions of WTO. Role of IT in agriculture.

SUGGESTED READINGS

1. Afzal, M. 1977. *farming in Pakistan*. Acad. Sci., Islamabad, Pakistan.
2. Anderson, W.P. 1993. *Weed Science Principles*. 2nd ED. West Pub. Co. NY, USA.
3. Andrew, C.O. 1993. *Applied agricultural Research: Foundations and methodology*. Westview Press.
4. Arnon, I. 1992. *Agriculture in dry lands: Principles and Practices*. Elsevier Sci. Pub., London, UK.

5. Awan, J.A, 2005 *elements of food Science and Technology*. Uni-tech communications, Faisalabad, Pakistan.
6. Azhar, B.A. 1996. *Pakistan Agricultural Economics*. NBF, Islamabad, Pakistan
7. Bonner, J. 1995. *Principles of Plant Physiology*. 1st Ed. W.H. freeman, NBF, San Francisco, USA.
8. Byerlee, D. and T. Hussain. 1992. *Farming Systems of Pakistan*. Vanguard Books, Lahore, Pakistan.
9. Eastwood, M. 2003. *Principles of Human Nutrition*. Blackwell Sci. Inc., London, UK.
10. FAO. *Agricultural Extension: A reference manual*. Rome, Italy.
11. Fitter, A.H. and P.K.M. Hay. 1987. *environmental Physiology of Plants*. 2nd Ed. Acad. Press Inc., London, UK.
12. Frazier, W.C. and D.C. Westhoff. 1998. *Food Microbiology*. McGraw Hill Book Co., NY, USA.
13. GoP. 1963. *Forest Policy Statement. 1947-90. All five years plans. Food & Agri. Comm. Report, Pakistan*
14. Greely, B. 1953. *Forest policy*. Min. Food & Agri., GoP, Pakistan.
15. Grey, L., J.M. Rolfe and I. Edgington. 2005. *Living Forests and Forestry* 6th Ed. Holland.
16. Hopkins, G.H. 1999. *Introduction to Plant Physiology*. John Wiley & Sons, NY, USA.
17. Hunter, M.L.Jr. 1996. *Fundamentals of conservation Biology*. Blackwell Sci. Inc., London, UK.
18. Khan, A.H. 1986. *Rural Development in Pakistan*. Vanguard Books Ltd., Lahore, Pakistan.
19. Khan, S.R.A. 2001. *Crop Management in Pakistan With Focus on Soil and Water*. Directorate of Agri. Info., Lahore, Pakistan.
20. Landon, K.C. and J.P. Landon. 1998. *Management information Systems: New approaches to organizations and technology*. Prentice & Hall Int., London, UK.
21. Memon, R.A. and E. Bashir (eds.) 1993. *Extension Methods*. NBF, Islamabad, Pakistan.
22. Nazir, M.S. 1994. *Crop Production*. (eds.). E. Bashir and R. Bantel. National Book Foundation, Islamabad, Pakistan.
23. Nielson, S.S 2003. *Food Analysis Laboratory Manual*. Chips Ltd., USA.
24. Palaniappan and K.Annadurani. 2006. *Organic Farming Theory and Practice*. Sci. Publ., Jodhpur, India.
25. Quraishi, M.A.A., B.S. Khan and S. Yaqoob. 1998. *Range Management in Pakistan* Kazi Publ., Ganpat Road, Urdu Bazar Lahore, Pakistan.
26. Quarishi, M.A.A., S.M.A. Qayume and R.A. Khan 2000. *Practical Manual of Wildlife Management*. Vol. I., Dept. Forestry, Range management and Wildlife, Univ. Agri. Faisalabad, Pakistan.
27. Rafique, M. 2005. *Irrigation and Drainage Practices*. Univ. Agri. Faisalabad, Pakistan.
28. Rees, N. and D. Watson 2000. *International Standards for Food Safety*. Kluwer Sci. Pub., NY, USA.

29. *Taiz and Zager. 2003. Plant Physiology. 3rd Panima Pub. Corps., Banglore, New Delhi, India.*
30. *Tahir, A.R. and M.S. Sabir. 2003. Fundamentals of tractor and Agricultural Machinery. Univ. Agri. Faisalabad, Pakistan.*
31. *Vernam, A.H. and Sutherland J.P. 1994. Milk and Milk Products: Technology, Chemistry and Microbiology. Chapman and Hall, NY, USA.*
32. *Wallar, G.R. 1987. Allelochemical's Role in Agriculture and Forestry. ACS Symp. Series 330. Am. Chem. Soc., Washington DC. USA.*
33. *WTO. 1999. The Legal Test: The results of the Uruguay round of multilateral trade negotiations. Cambridge, UK.*

PAPER-II

Total Marks: 100

Concept of genetics. Role of genetics in crop improvement. Chemical composition of hereditary material. Molecular basis of genetic code. Basic control system in gene expression. Variation-basis of plant breeding, its creation and exploitation. Breeding strategies. Breeding methods of self, cross and asexually propagated crops. Process of variety development.

Concept of modern breeding; doubled haploid breeding, marker-assisted breeding, mutation breeding, heteroploid breeding, hybrid breeding and transgenic breeding. Various techniques of developing transgenic plants and scope of transgenic plants in plant breeding. Impact of cultivation of transgenic crops on biodiversity. Role of agri-biotechnology in crop improvement. Breeding cultivars for marginal lands. Role of edible oilseeds in agriculture and economy of Pakistan. Development of low erucic acid and glucosinolate (double low) varieties in rapeseed and mustard crops.

Resistance breeding. Host-plant genetic resistance. Genetic and physiological mechanisms of stress tolerance in crop plants. Major insect pests of important agricultural crops. Principles and methods of insect control. Entomological industries; Apiculture, Sericulture and Lac-culture. Types of agricultural pollution and its management. Mode of action, hazards and safety measures of insecticides. IPM and economics of pest management.

Causes, nature of losses and economic importance of plant diseases, and principles of their control. Economic importance, transmission and control of plant viruses. Various methods to control and manage plant diseases. Methods of screening of crop germplasm for the sources of disease resistance. Physiological requirements and problems in mushroom cultivation. nutritional value of mushroom and remedial measures of mushroom poisoning.

Classification, propagation, management practices and post harvest handling of Horticultural crops. Role of tissue culture in agriculture. Cultivation, production, chemical and pharmacological properties of medicinal plants. Propagation methods, management practices and marketing of fruit and ornamental plants nurseries.

Soil formation and Soil profile. Types of soil, salt affected and waterlogged soils, and their reclamation and management. Factors affecting crop growth and growth expression models. Sources and significance of organic matter in agriculture. Soil fertility problems in Pakistani soils. Integrated plant nutritional system. Kinds and levels of soil survey, and application of GIS and remote sensing in soil survey. Types, control and management of soil erosion.

SUGGESTED READINGS

1. Agrios, G.N. 1995. *Plant Pathology*. 4th Acad. Press, NY, USA.
2. Anonymous. 2002 *Soil Survey Manual*. USDA, Univ. Press of the Pacific, Washington DC, USA.
3. Aruga, H. 1994. *Principles of Sericulture*. (Translated from Japanese). Oxford & IBH Pub. CO. Pvt. Ltd, New Delhi, India.
4. Atwal, A.S. and S.S. Bains. 2005. *Agricultural Pests of Southeast Asia and their Management*. Kalyani Publ., Ludhiana, India.
5. Bashir, E. and R. Bantel (eds). 1996. *Soil Science*. NBF, Islamabad, Pakistan.
6. Brady, N.C. and R.R. Weil. 2002. *The Nature and Properties of Soils*. 13th Ed. Prentice Hall Inc., Upper Saddle River, NJ, USA.
7. Brooker, R.J. 2005. *Genetics: Analysis and Principles*. 2nd Ed. McGraw Hill, NY, USA.
8. Brown, T.A. 2000. *Essential Molecular Biology: A practical approach*. Vol. I & II. Oxford Univ. Press, NY, USA.
9. Chahal, G.S. and S.S. Gosal. 2002 *principles and procedures of plant Breeding: Biotechnological and conventional approaches*. Alpha Sci. Int. Ltd., UK.
10. Chang, S.T. and W.A Hayes. 1978. *The biology and Cultivation of Edible Mushrooms*. Acad. Press, NY, USA.
11. Elzinga, R.T. 2003 *fundamentals of Entomology*. Prentice Hall, London, UK.
12. Grieve, M. 1992. *A Modern Herbal*. Tiger Book Int., UK.
13. Griffiths, A.J.F J.H. Miller, D.T. Suzuki, R.C. Lewontin and W.M. Gelbart. 2005. *An Introduction to Genetic Analysis*. W.H. Freeman & Co., N.Y., USA.
14. Heyne, E.G (ed). 1987. *Wheat and Wheat Improvement*. 2nd Ed. ASA, CSSA and SSSA.. *Agronomy Monograph 13*, Am. Soc. Agron., Madison, Wisconsin, USA.
15. Joshi, S.G. 2000. *Medicinal Plants*. Oxford & IBH Pub. Co. Pvt. Ltd, New Delhi, India.
16. Khalid, S. 1999. *Research on Plant Virology*. APS Press. The Am. Phytopathol. Soc., St. Paul., USA.
17. Khan, M.A. (ed). 1994. *Plant Breeding*. NBF, Islamabad, Pakistan.
18. Klug, W.S. and M.R. Cummings. 2003. *Concepts of Genetics*. 7th Ed. Pearson Edu., Singapore.
19. Lodish, H. 2004. *Molecular Cell Biology*. 5th Ed. John Wiley & Sons, NY, USA.
20. Lucas, J.A. 1998. *Plant pathology and Plant Pathogens*. Blackwell Sci., USA.
21. Malik, M.N. 1994 *Horticulture*. NBF, Islamabad, Pakistan.
22. Mengel, K. and E.A. Kirkby. 2001. *Principles of Plant Nutrition*. 5th Ed. Kluwer Acad. Publ., Dordrecht, The Netherlands.
23. Napier, T.A. 2000. *Soil and Water Conservation Policies: Successes and failures*. CRC Press, Boca Raton, FL, USA.
24. Nyvall, R.F. 1989. *Field Crop Diseases Handbook*. AVI Pub. Co., NY, USA.
25. Panda, N. and G.S. Khush. 1995. *Host Plant Resistance to Insects*. IRRI, Printed and Bound in UK, Biddles Ltd. Guildford, UK.
26. Poehlman, J.M. and A.D. Sleper. 1995. *Breeding Field Crops*. 4th Ed. Iowa State Univ. Press, Ames, USA.
27. Razdan, M.K. (ed). 2003. *Introduction to Plant Tissue Culture*. 2nd Ed. Intercept, NY, USA.

28. Robbelem, G. and R.K. Downey. 1990. *Oil Crops of the World, their breeding and utilization* . McGraw Hill Pub. Co., NY, USA.
29. Saleem, M.A. and M. Ashfaq. 2004. *Environmental Pollution and Agriculture*. B.Z. Univ. Press, Multan, Pakistan.
30. Singh, B.D. 2003. *Plant Breeding: Principles and Methods*. Kalyani Publ., New Delhi, India.
31. Shah, H.A and M.A. Saleem. 2002. *Applied Entomology*. 2nd Ed. Izhar Sons Printers, Lahore, Pakistan.
32. *Soil Survey of Pakistan Reports, Pakistan*.

SYLLABUS FOR THE SUBJECT OF ARABIC PAPER-I

Total Marks: 100

HISTORY OF ARABIC LITERATURE

- A: The Pre-Islamic Arabic Literature and its salient features.
- B: Al-Quran and its influence on Arabic Literature.
- C: Literary movements, Classical Background, Socio-cultural influences and modern trends in Abbasid period and its literary history.
- D: Contribution of The Arabs in the fields of science Philosophy and linguistics with critical study of the works of Imam Ghazali, Ibn-e-Rashique, Ibn-e-Qutaiba, Al-Jahiz, Ibn-e-Jinay and Khalil Bin Ahmed.
- E: Literary movements in Umlud period.
- F: Origin of modern literary style and its development, including Drama novel, short story and essay, special emphasis on the literature of Al-Mahjer and its outstanding representatives: Fouzi Almaloof, Jabran Khalil Jabran, Mikhail Nuaima and Iliya Abu Medh.
- G: A short introduction to Indo-Pak Arabic Literature in the fields of prose and poetry and extension study of the works of Ghulam Ali Azad Bilgrami and Shah Wali Ullah.

RHETORIC

- A: To explain the meaning of Rhetoric and its Literary aspects and differentiate them.
- B: 1. Al-Tashbee 2. Al-Istiarah 3. Al haqiqah Wal-majaz 4. Al-Kinayah.

LINGUISTICS

- A: Arabic Grammar (Mufrad, Musana, Jamaal Murab Wal Madni, Marifah, Nakrah, Marfooat, Mansoobat, Majroorat).
- B: A detailed study of history of Arabic Language and its characteristics.
- C: Information about the Arab Scholars in the development of various sciences of Arabic Language.

CRITICISM

- A: To explain the meaning of criticisms and literature criticism.
- B: To give through study of history of criticism in various periods of Pre-Islamic and Islamic history.

REFERENCE BOOKS

1. Dr. De Boer The History of Philosophy in Islam
2. Niclson A History of Arabic Literature
3. Gibbs An introduction to the Arabic Literature
4. W. Wright Arabic Grammar.

PAPER-II

Total Marks:100

POETRY

1. Maullqat complete
2. (a) hassan Bin Sabbit: The following two Qasaid from his Daiwan: No. 1 “Ma Balu Aineka” No.2”Lillahi Damu Kaaba”
3. Kaab-Ibn Zuhair and his Qaisaida: “Banat Suaad”.
4. Khansa and her Qaisidatah “Wa Inna Sakhran Lawalina”
5. Al-Mutanabbi, (his first 5 Qasaid) from Diwan al Mutahli Abu-Tmam, (Bab-Alhimasah)
6. Abu-Tmam, (Bab-Alhimasah)
7. Ahmed Shoque and his poetry Al-Hamziah-il-Annbwiah

PROSE

1. Qus-Bin, Saida Alayadi and his Khutban Tareekh-ul-Adab Arabi. Ahmed Hassan Nayat. Page. 30
2. Khutbah Hijjat ul Widda. Al iqd-ul-Fareed.
3. Al-jahiz, “Khutbah Abi Bakr, Khutbah Ali” (Albiyan wal tabyeen)
4. Mahmood Taimoor his novel Anal-Qatil
5. Dr. Taha Hussain, Alwad al haq (Ammar bin Yasir)
6. Dr. Saleem Tariq Khan, Al-Lugha Al-Arbia (I.U.B). B.A
7. Dr. Khaliq Dad Malik, Al-Insha wal Muhadsa.

REFERENCE BOOKS

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|----|-------------|--------------------------------------|
| 1. | Dr. De Boer | The History of Philosophy in Islam |
| 2. | Niclson | A History of Arabic Literature |
| 3. | Gibbs | An introduction to Arabic Literature |
| 4. | W.Wright | Arabic Grammar. |

**SYLLABUS FOR THE SUBJECT OF BOTANY
PAPER-I**

Marks : 100

1. **Algae:** Origin, evolution, distribution and classification with reference to range, structure, life-history, ecology and economic importance of Cyanophyta, Bacillariophyta, Phaeophyta and Rhodophyta, Chlorophyta.
2. **Fungi:** Structure of plant body; development of ascus, basidium and conidium; reproduction; classification; phylogeny, physiology and economic importance of the main groups of fungi. Diseases of economically important plants and their control.
3. **Bryophytes:** Evolution of gametophytes and sporophytes, structure, reproduction, classification and economic importance of various members of Liverworts, Mosses and Hornworts.
4. **Pteridophytes:** Introduction, characteristic features, alternation of generation and evolutionary tendencies of various divisions: Psilophyta, Lycophyta, Sphenophyta and Pterophyta. Evolution of seed.
5. **Gymnosperms:** General characters, life history and evolutionary tendencies of Cycadophyta, Coniferophyta and Ginkgophyta. Structure of seed.
6. **Angiosperms:**
 - a. **Taxonomy:** Introduction to systematic botany; historical background of classification systems, Post evolutionary era and recent developments in classification systems. Plant Nomenclature, Rules of Nomenclature, International Code of Botanical Nomenclature, Concept of taxa, Plant collection and Preparation of herbarium; Botanic Gardens. Modern trends in taxonomy, Biosystematics, Chemotaxonomy and Numerical taxonomy.
 - b. **Anatomy:** Cell wall; Tissues and Tissue systems: Meristematic tissue; Epidermal tissue system; Fundamental or ground tissue system; Mechanical tissue system; Xylem and Phloem as Vascular tissue, Collenchyma, Sclerenchyma; Primary and secondary growth; Cambium, Periderm. Anatomy of leaf, stem and root. Abnormal/Anomalous secondary growth, Ecological anatomy.
 - c. **Embryology:** Introduction; alternation of generation; the flower and its parts; stamen or microsporophyll; carpel or megasporophyll; male gametophyte or microgametophyte, pollination and fertilization; endosperm; embryo and its development (embryogenesis); seed and fruit formation; apomixis; polyembryony.

RECOMMENDED BOOKS

1. Harold C. Bold and Micheals, J. Wynne, 1985. *Introduction to the Algae*. Prentice Hall, Inc, New Jersey.
2. Alexopolous, C.J., Mims, C.W. and Blackwell, C. 1996. *Introductory Mycology (4th Edition)*. Wiley & Sons, New York.
3. Webster, J. 1980. *Introduction to fungi (2nd Ed.)*, Cambridge University Press, London.
4. George N. Agriose 1978. *Plant Pathology*. 4th Edition. Academic Press, London.
5. Scholfield, B.W. *Introduction to Bryology*. MacMillan, New York.
6. Sporne, K.R. (1967). *The Morphology of Gymnosperms*. Hutchinson Univ. Library, London.
7. Smith G.M. 1956. *Cryptogamic Botany vol. I & II 2nd edit*. McGraw Hill.
8. Stuessy, T. F. 1990. *Plant Taxonomy*. Columbia University Press, USA.
9. Lawrence, G. H. M. 1951. *Taxonomy of Vascular Plants*. Macmillan, New York.
10. Jones, S.B. and Luchsinger, A.E. 1987. *Plant Systematics*. Mcgraw-Hill Book company, Singapore.
11. Stace, C.A. 1962. *Plant Taxonomy and Biosystematics*. National Book Foundation Islamabad.
12. Fahn, A. 1990. *Plant Anatomy*. Pergamon Press. Oxford.
13. Esau, K. 1960. *Anatomy of Seed Plants*. John Wiley, New York.
14. Pandey, B.P. 2001. *Plant Anatomy*. S. Chand and company Ltd. New Dehli.
15. Maheshwari, P. 1988. *An introduction to the Embryology of Angiosperms*, 9th Reprint. McGraw-Hill, Inc. New York.

PAPER-II

Total Marks: 100

1. **Plant Physiology:** Plant water relations, osmotic quantities, absorptions, transpiration, role of essential mineral elements, their uptake and distribution. Growth and development, Plant hormones, Photoperiodism, Vernalization, Dormancy and seed germination. Biochemistry of Carbohydrates, Proteins and Fats with reference to plants. Enzymes. Plant pigments. Photophosphorylation; Path of carbon in photosynthesis; Oxidative phosphorylation (respiration), Nitrogen and Fat metabolism.

2. **Ecology:** Influence of climatic, edaphic and biotic factors on plant growth. Sampling techniques. Major formations in relation to climatic zones. Concepts of ecosystems and their productivity, Ecological energetics, pyramids, food chains and trophic levels. Salinity and Waterlogging in Pakistan: Causes and reclamation of salinity, soil erosion, methods of control and conservation. Pollution and conservation of natural resources. Vegetation of Pakistan.

3. **Cytology:** Detailed study of ultra-structure of cell and its components; Chromosomes, Mitosis and meiosis, significance, Cancer and apoptosis.

4. **Genetics:**

a. **Mendelian Genetics:** Linkage, Crossing over, Sex-linked inheritance, Mutation, Polyploidy.

b. **Biochemical Genetics:** Biochemical nature of hereditary material, fine structure of genes: Transduction and Transformation.

c. **Molecular Genetics:** Replication, Transcription, Genetic codes and Translation.

5. **Evolution:** Theories of Evolution, Lamarckism, Darwinism, Neo-Darwinism. Hardy-Weinberg's Law, Gene frequency, Adaptive mutations.

RECOMMENDED BOOKS

1. Taiz, L. and E. Zeiger 2002. *Plant Physiology*. Third Edition sinauers Pub. Co. Inc. California.
2. Salisbury, F.B. and C.W. Ross 1992. *Plant Phsiology*. Wadsworth publishing company, Bemont, California.
3. Odum, E.P. 1985. *Basic Ecology*. W.B. Saunders.
4. Smith, R.L. 1998. *Elements of Ecology*. Harper & Row Publishers, New York.
5. Waisel, Y. 1972. *Biology of Halophytes*.

6. Gardner, E.J., Simmons, M. J. and Snustad, D.P. 1991. *Principles of Genetics*. 8th Edition. John Willey and Sons, New York.
7. Strickberger, M. V. 1985. *Genetics*. 3rd Edition. MacMillan Press Ltd., London.
8. Snustad, D.P. and Simmons, M. J. 2002. *Principles of Genetics*. 3rd Edition. John Willey and Sons, New York.
9. Taylor, T.N. and Taylor, E.D. 1987. *The Biology and Evolution of Fossil Plants*, Prentice Hall.

**SYLLABUS FOR THE SUBJECT OF BUSINESS ADMINISTRATION
PAPER-I**

Total Marks: 100

MANAGEMENT

1. **Management yesterday and today**
 - Historical background of Management
 - Managing in the New Era
The Internet, Globalization, Knowledge Management and Collaboration across “boundaries”.
2. **Planning:** Delivering strategic value, the basic planning process, strategic planning, types of plans and decision making.
3. **Organizing:** Building a dynamic organization, fundamentals of organizing (differentiation & integration), organization structure (vertical & horizontal). Empowerment (Centralization & Decentralization), Co-ordination by (Standardization by plan & by adjustment). (Human Resource Management; (HRM); Planning, Recruitment, Selection and Training etc).
4. **Leading:** Mobilizing People, Human Factors and Motivation, Leading and Managing, Leadership and Followership, Power and Leadership.
5. **Controlling:** Learning and Changing, Basic Control Process, Control Techniques and IT, Organizing for Innovation (Technology, Job Design & HR Development, Project Implementation and Unleashing Creativity)

RECOMMENDED BOOKS

1. *Management: A Global Perspective 11th Ed. Koontz, Harold & Weihrich, Heinz, McGraw-Hill*
2. *Management: 8th Ed. Robbins, Stephen P. & Coulter, Mary, Prentice Hall of India.*
3. *Management: Competing in the New Era. 5th Ed. , Bateman, Thomas S. & Snell, Scott A. McGraw-Hill Irwin*

PAPER-II

Total Marks: 100

**Part-I
MARKETING**

Marks: 50

1. **The Field of Marketing:** Marketing Role and what is it all about: Who Performs Marketing Functions, Marketing and Customer Value, Satisfaction and Loyalty, Global Marketing Systems, 4Ps (Product, Price, Place and Promotion).
2. **The Marketing Environment and Market Selection:** Internal & External Environment, Market Segmentation, Targeting and Positioning, Market Information & Research.
3. **Product:** Product Planning and Development, Product line and Product mix strategies, Branding, Packaging, Other Product Features and Services Marketing.
4. **Price:** Price determination (An Ethical Dilemma, Factors Influencing, and Setting Pricing etc.), Pricing Strategies (Price Vs Non Price Competition, Geographic Pricing, Discount & Allowances, Special Pricing Strategies and Situations etc).
5. **Place:** Middlemen and Distribution Channels, Designing, Selecting and Distribution of Channels, Retailing and Wholesaling.
6. **Promotion:** Marketing Communications Mix (Personal Selling, Advertising, Sales Promotion and Publicity or Public Relations).

RECOMMENDED BOOKS

1. *Principles of Marketing 6th Ed. Kotler, Philip & Armstrong Gary, Prentice-Hall, International, Inc.*
2. *Essentials of Marketing: A Global-Managerial Approach 8th Ed. McCarthy, E. Jerome & Perreault, William D. Irwin McGraw-Hill.*
3. *Basic Marketing: A Global Managerial Approach 14th Ed. McCarthy, E. Jerome & Perreault William D. McGraw-Hill Irwin.*
4. *Marketing 13th Ed., Stanton William J., Etzel, Michael J. & Walker, Bruce J., McGraw-Hill Irwin.*

Part-II
FINANCIAL MANAGEMENT

Marks: 50

1. **Understanding Financial Management:** An Overview of Financial management, Securities markets and Financial institutions, Concept of Time Value of Money, Valuation of Securities (Stocks and Bonds), Measuring the Risks and Returns.
2. **Understanding and Analyzing Financial Statements:** IASB (International Accounting Standard Board) Framework and Fundamental Accounting Concepts, Components of Financial Statements (Preparation and Presentation), Financial Statement Analysis and Interpretation.
3. **Short term Financial Management Decision (investing & financing):** Budgets and Projected Financial Statements, Managing Net Current Assets, Inventory Management, Accounts Receivable Management, Managing Short Term/Spontaneous Finances.
4. **Financing Decisions (Long Term):** Capital Structure Decisions, Leverage Decision, Cost of Capital Decision, Dividend Decisions.
5. **Investing Decisions (Long Term):** Capital Investment Decision, Capital Investment Appraisal Techniques, Risk Management in Capital Investment Appraisal.
6. **Corporate Financing:** Mergers, Acquisitions, Takeovers and Buyouts, Financial Distress and Restructuring, Hedging Decision.

RECOMMENDED BOOKS

1. *Principles of Managerial Finance, Lawrence J. Gitman, Pearson Education Asia*
2. *Intermediate Financial Management, Eugene F. Brigham Gapenski & Daves, The Dryden Press*
3. *Fundamentals of financial Management, James C. Van Horne John M. Wachowicz, Jr., Prentice_Hall International, Inc.*
4. *Advanced Corporate Finance (Policies and Strategies), Joseph P. Ogden Frank C. Jen Philip F. O'Connor, Farhan Raza Printers, Islamabad*

**SYLLABUS FOR THE SUBJECT OF CHEMISTRY
PAPER-I**

Total Marks: 100

(A). Physical Chemistry.

1. Quantum Theory & Atomic Structure

Quantum theory. The Schrodinger Wave Equation, particle in one dimensional box and its application for Hydrogen atom. Quantum Numbers. Chemical Bonding. Eigen Values and Eigen functions. Degeneracy. Tunnel Effect.

2. Chemical Thermodynamics

First Law of Thermodynamic and Enthalpy changes. Entropy and second Law of Thermodynamics. Standard Free Energy and Chemical equilibrium. Concept of Residual Entropy.

3. Electrochemistry

Conductance and its measurement. Activity and Activity coefficients. Measurement of Activity coefficient of strong electrolytes. Debye-Huckel Theory and its applications for strong electrolytes. Electrodes, Electrode Potential and its measurement. Corrosion and its prevention.

4. Nuclear Chemistry

Radioactivity, detection and its measurement, Kinetics of Radioactive decay, Nuclear Fission, Nuclear Fusion, Artificial Radioactivity, uses of Radioactive isotopes and Nuclear Reactors.

(B). Inorganic Chemistry

1. Modern Theory of Chemical Bonding

Modern Theories of Chemical bonding. Valence Bond theory, hybridization of orbital, molecular Orbital theory, comparison of valence Bond and Molecular orbital theories, shapes of inorganic molecules, application of VSEPR concept.

2. Chemistry d-Block Elements

General Characteristics of d-Block elements, Chemistry of First Transition Series, Transition metal complexes, structure of coordinate complex compounds, Postulates and applications of Werner's Chelates, Nomenclature and Isomerism in coordinate compounds.

3. Inorganic Chemical Industries

Sulphuric acid, Chemical Fertilizers, cements, Ceramics, Soda Ash and Caustic Soda.

4. **Environmental Chemistry**

Concept of Environmental chemistry, Environmental Pollution, green House Effect, Air Pollution, Water Pollution and Chemical Toxicology.

PAPER-II

TOTAL MARKS: 100

(A) Organic Chemistry

1. Structure and Reactivity

Inductive effect, delocalized chemical bond, resonance effect, tautomerism, hyper-conjugation, steric effect and hydrogen bonding.

2. UV and IR Spectroscopy

Principle of UV-Visible and IR-Spectroscopy, terms involved in spectroscopy. -max, bathochromic shift, hypsochromic shift, finger print region, overtones and applications in functional group identification of organic compounds.

3. Chemistry of Carbonyl Group

Preparation and properties of Aldehydes and ketones. Acid and base catalyzed Aldol condensation reactions and nucleophilic additions to carbonyl group.

4. Chemistry of Aromatic Compounds

Mechanism and applications of Electrophilic aromatic substitution reactions, Arenium ion mechanism, orientation and reactivity. Aromaticity and condensed simple aromatics systems.

5. Stereochemistry

Stereoisomerism, conformational analysis of cycloalkanes, chirality and optical activity, racemization, epimerization and geometrical isomerism.

(B) Selected Topics in Applied Chemistry

1. Bio-molecules

Introduction, classification, structure and metabolism of carbohydrates. Primary, Secondary & Tertiary structure of Proteins. Lipids and their classification.

2. Chromatography

Principle and types of chromatography. Thin layer and column Chromatography with their applications.

3. Material Chemistry

Introduction and applications of Polymers, Semi-conductors, composites and liquid crystals.

4. **Chemicals in Service of Mankind**
Detergents, Pesticides, Dyes, Cosmetics and Pigments.

RECOMMENDED BOOKS

1. Physical Chemistry by Ira N. Levine, 5th Edition
2. Inorganic Chemistry by James E. Huheey and Richard I. Keiter, 4th Edition.
3. Physical Chemistry by Moore, Walter S, 5th Edition.
4. Mechanism and Structure of Organic Chemistry by Gould, Edward.
5. Essential of Physical Chemistry by G.D.Tuli, Arun Bahl.
6. Advanced Inorganic Chemistry by Cotton F.A & Wilkinson Geoffrey, 3rd Edition
7. Chemistry (Organic & Inorganic) by A.M.H. Shaikh
8. Advanced Chemistry by Philip Matthews.
9. organic Chemistry by Morrison, Robert, Thornton and Boyd. R.N., 2nd Edition
10. Text Book of Inorganic Chemistry for B.Sc. by M. Zafar Iqbal (Revised & Enlarged Edition)
11. Selected topics in Inorganic Chemistry by G.D. Tuli.
12. Physical Chemistry by Gordon M.Barrow, 5th Edition.

**SYLLABUS FOR THE SUBJECT OF COMPUTER SCIENCE
PAPER- I**

Total Marks: 100

SECTION-A

1. Introduction to Computing

Number Systems, Binary numbers, Boolean logic, History Computer system, basic machine organization, Von Neumann Architecture, Algorithm definition, design, and implementation, Programming paradigms and Languages, Graphical programming, Overview of Software Engineering and Information Technology, Operating system, Compiler, Computer networks and Internet, Computer graphics, AI, Social and legal issues.

2. Programming Solving Techniques

Algorithms and problem solving, development of basic Algorithms, analyzing problem, designing solution, testing designed solution, fundamental programming constructs, translation of algorithms to programmes, data types, control structures, functions, arrays, records, files, testing programmes.

REFERENCE MATERIAL:

1. *Computers: Information Technology in Perspective, 9/e by Larry Long and Nancy Long. Prentice Hall, 2002/ISBN: 0130929891*
2. *An Invitation to Computer Science, Schneider and Gersting, Brooks/Cole Thomson Learning, 2000*
3. *Computer Science: An overview of Computer Science, Sherer*
4. *Programme Design with Pseudo-code, Bailey and Lundgaard, Brooks/Cole Publishing, 1988*
5. *Simple Programme Design: A step-by-step approach, 4/e, Lesley Anne Robertson, ISBN: 0-619-16046-2 © 2004.*

SECTION-B

1. Computer Communications & Networks

Analogue and digital Transmission, Noise, Media, Encoding, Asynchronous and Synchronous transmission, Protocol design issues, Network System architecture (OSI, TCP/IP), Error control, Flow Control, Data Link Protocols (HDLC, PPP). Local Area Networks and MAC Layer protocols (Ethernet, Token ring), Multiplexing, Switching and IP Networks, Internetworking, Routing, Bridging, Transport layer protocols TCP/IP, UDP. Network security issues, Programming exercises or projects involving implementation of protocols at different layers.

2. Digital Logic & Computer Architecture

Logic design of Digital Systems, Fundamental and advanced concepts of Logic Designs, Boolean Algebra & functions, Designing and implementation of combinational and Sequential logic, minimization techniques, number representation and basic binary arithmetic Logic families and digital integrated circuits, use of CAD tools for logic designs. Topics of Computer Architecture.

REFERENCE MATERIAL:

1. *Introduction to Computer Networks*, Tanenbaum
2. *Unix Network Programming*, Richard Stevens.
3. *Computer networks: a systems approach*, Larry Peterson, Bruce Davie, Princeton Univ., Princeton.
4. *Digital Design, 2nd Ed.*, M. Morris Mano, Prentice hall, 1991.
5. *Practical Digital Logic Design and Testing*, P. K Lala, Prentice Hall, 1996.

SECTION-C

Data Structures and Algorithms

Topics include arrays, stacks, queues, lists, trees; Tree Traversals, Binary Trees; graphs, graph traversals: Depth First Search, Breadth First Search; Sorting algorithms: Insertion Sort, Selection Sort, Merge-sort, Quicksort, Bucket-Sort, Radix-Sort; Hash Tables: Hash Functions, Data Compression: Applications, Huffman Coding

Reference Material:

- Data Structures and Algorithms in C++ by Michael T. Goodrich, Roberto Tamassia, and David Mount (2nd Edition)
- Data Structures and Algorithm Analysis in C++ by Mark Allen Weiss (2nd Edition)
- Data Structures and Algorithm Analysis in C++. 4th Edition, by Weiss, Mark A.

Operating Systems

Types of Operating Systems, I/O Structure, Storage Structure and Storage Hierarchy, Operating System Services, Process Scheduling Algorithms, Inter Process Communication, CPU Scheduling Algorithms, Dead Lock and Dead Lock Prevention and Avoidance, Hardware Protection, Memory Management, Paging, Segmentation, Paging with Segmentation, Virtual Memory

Reference Material:

- Operating Systems Concepts, 6th Edition, Silberschatz
- Modern Operating Systems, 2nd Edition, Tanenmaum, A. S.

**PAPER II
SECTION- A**

Total Marks:100

1. Theory of Automata and Formal Languages.

Finite State Models: Language definitions preliminaries, Regular expressions/Regular languages, Finite automatas (FAs), Transition graphs (TGs),NF As, kleene's theorem, Transducers (automata with output), Pumping lemma and non regular language *Grammars and PDA:* Context free grammars, Derivations, derivation trees and ambiguity, Simplifying CFLs , Normal form grammars and parsing, Push-down Automata, Pumping lemma and non-context free languages, Decidability, Chomsky's hierarchy of grammars, *Turing Machines Theory:* Turing machines, Post machine, Variations on 1M, 1M encoding, Universal Turing Machine, Context sensitive Grammars, Defining Computers by TMs.

REFERENCE MATERIAL:

1. *Introduction to Computer Theory, Denial Cohen, John Wiley & Sons, Inc.*
2. *Introduction to Automata Theory, Languages and Computation, J Hopcraft, D. Ullman.*
3. *Languages and Machines, An Introduction to the Theory of Comp. Sc., 2/e Thomas A Sudkamp, Addison Wesley.*

2 Compiler Theory & Design

Compiler techniques and methodology. Organization of compilers. Lexical and syntax analysis. Parsing techniques. Object code generation and optimization, detection and recovery from errors. Comparison between compilers and interpreters.

REFERENCE MATERIAL:

1. *Compiler Design and Construction, by Alfred V. Aho, Ravi Sethi, Hardcover 2nd edition, 1987, Van Nostrand Reinhold,. ISBN: 0317636367.*

3. Numerical Methods

Mathematical Preliminaries, Solution of Equations in one variable, Interpolation and Polynomial Approximation, Numerical Differentiation and Integration, Initial Value Problems for Ordinary Differential Equations, Direct Methods for Solving Linear Systems, Iterative Techniques in Matrix Algebra, Solution of non-linear equations, Approximation Theory, Eigenvalues and Eigenvector computation.

REFERENCE MATERIAL:

1. *Elements of Numerical Analysis, Dr. Faiz, M. Afzal*

SECTION -B

I. Data Base Systems

Basic database concepts, Entity Relationship modelling, Relational data model and algebra, Structured Query language, RDBMS; Database design, functional dependencies and normal forms, Transaction processing and optimization concepts, concurrency control and recovery techniques, Database recovery techniques, Database security and authorization. Small Group Project implementing a database. Physical database design: Storage and file structure, indexed files, hashed files, signature files, b-trees, files with dense index, files with variable length records, database efficiency and tuning Data Warehousing and Data Mining, Emerging Database Technologies and Applications.

REFERENCE MATERIAL:

1. *Database Systems, C.J. Date, Addison Wesley Pub. Co. (2004).*
2. *Database Systems: A Practical Approach to Design, Implementation and Management,*
3. *R Connolly and P .Begg, Addison-Wesley Pub. Co (2003).*
4. *Fundamentals of Database Systems, 3/E, Elmasri and Navathe, Addison-Wesley, ISBN: 0-201-74153-9.*

2. Software Engineering

Software Engineering, Process Models, Software verification and validation. Techniques are introduced to evaluate software correctness, efficiency, performance and reliability, integration of these techniques into a verification and validation plan. Technical reviews, software testing, programme verification, prototyping, and requirement tracing. Attitude of industry toward reliability and performance.

REFERENCE MATERIAL:

1. *Software Engineering: A Practioner's Approach, Roger Pressman, McGraw-Hill, 2001.*
2. *Software Engineering, Ian Sommerville, Addison-Wesley 2001, ISBN: 0-201-39815-X.*

SECTION -C

1. Artificial Intelligence

Introduction to Common Lisp. AI classical systems: General Problem Solver, rules, simple search, means-ends analysis. EILZA, pattern matching, rule based translators, OPS-5. Knowledge Representation: Natural language, rules, productions, predicate logic, semantic networks, frames, objects, scripts. Searching, Depth first search, breadth first search, best first search, hill climbing, min-max search. Symbolic Mathematics: student solving algebra problems, translating English equations, solving algebraic equations, simplification rules, rewrite rules, meta-rules, Macsyma, PRESS, ATLAS. Logic Programming: Resolution, unification, horn-clause logic, Prolog, Prolog programming. Sample case studies of shells and Knowledge Based Systems. A brief appreciation of state of the art computational techniques like neural networks, genetic algorithm, fuzzy sets.

REFERENCE MATERIAL:

1. *Artificial Intelligence by Luger, 4th edition, Pearson Education.*

2. Computer Graphics

Graphics hardware, Fundamental algorithms, Applications of graphics. Interactive graphics programming -graph plotting, windows and clipping, and segmentation. Programming raster display systems, panning and zooming. Raster algorithms and software Scan-Converting lines, characters and circles. Region filling and clipping. Two and three dimensional imaging geometry and transformations. Curve and surface design, rendering, shading, colour and animation.

REFERENCE MATERIAL:

1. *Computer Graphics, Principles and Practice, J. D. Foley, A van Dam, S. K. Feiner and J. F. Hughes, Addison-Wesley ISBN: 0-201-12110-7.*
2. *Computer Graphics, F.S.Hi11, Maxwell MacMillan ISBN: 0-02-354860-6.*

FURTHER SUGGESTED READINGS

1. *Computers: Tools for an Information Age, 8th Ed. H I Capron, Adison Wesley, 2003. Paul Wilton.*
2. *Computer Concepts, 3rd Ed, ITP 1998; J.J.Parsond & D. Oja*

3. *Siberschatz. Galvin & Gagne, Operating System Concepts, 6th Ed. 2002. John Wiley & Sons, Inc. ISBN 0-471-41743-2.*
4. *Tanenbaum. A.S., Modern Operating Systems, 2nd. Ed, 2001.*
5. *Deitel & Deitel, C++, How to Program, 4th Ed. Prentice Hall.*
6. *Tocci & Widmer, Digital Systems, Principles and Applications, 8th Ed.. Published by Pearson Education.*
7. *John F. Wakerly, Digital Designs, Principles & Practices, 3rd. Ed. Published by Prentice Hall.*
8. *M. Morris Mano, Digital Logic & Computer Design, Prentice Hall, 1979, ISBN 0-132-14510-3.*
9. *Jim Keogh, C++, Programmers Notebook, 2nd Ed.*
10. *Sipser, Introduction to the Theory of Computation, 2nd Ed. Thomson Course Technology, 2006.*
11. *Ian Sommerville, Software Engineering, 6th Ed. Addison Wesley, 2001*
12. *M. A. Weiss, Data Structures and Algorithm Analysis in C. Pearson Education 2nd Ed. 1997.*
13. *Elmasri & Navathe, Fundamentals of Database Systems, 4th Ed.*
14. *Expert Systems and Applied Artificial Intelligence by Efrain Turban*
15. *Artificial Intelligence by Rich & Knight.*
16. *Artificial Intelligence by George F. Luger.*
17. *Donald Hearn and M. Pauline Baker. Computer Graphics and Open GL, 3rd Ed.*
18. *Foley, Van Dam, Feiner, and Hughes, Computer Graphics Principle & Practices.*
19. *Mathematical Structures for Computer Science, Freeman & Company; G.L.Gersting.*
20. *JavaScript; The Definitive Guide, 2nd Ed, O. Reilly, 1997. D. Flanagan.*
21. *The HTML, Sourcebook, Wiley 1996. I.S. Graham.*
22. *Computer Science; An Overview 6th Ed. Addison Wesley, 1998. J.G. Brookshear.*
23. *Java; An Object First Approach, Addison Wesley, 1996. F. Culwin.*
24. *Web Page Scripting Techniques, Hayden Books, 1996. J. Bloomberg, J. Kawski. J & P. Treffers.*
25. *Kenneth H. Rosen, Discrete Mathematics and its Application, 5th Ed. 2003, McGraw-Hill.*
26. *T.H. Cormen, C.E. Leiserson, R.L. Rivest, and C.D. Stein, Introduction of Algorithms, MIT Press. 2nd Ed. 2001.*
27. *Assembly language programming of IBM PC by Ytha Yu and Charles Marut. McGraw Hill, 1992.*
28. *Saeed Bhatti & Naeem Bhatti, a first course in Numerical Analysis, 4th Ed. 2003.*
29. *David A Patterson, John L. Hennessy, Computer Organization and Design, 3rd Ed.*
30. *Hennessy, J.I. & Patterson .D.A., Computer Architecture; A quantitative Approach, 2nd Ed. Morgan Kaufmann, 1996.*
31. *Introduction to Digital Systems by Ercegovac, Lang & Moreno, Wiley, 1999.*
32. *Introduction to Wireless Systems by P.M. Shankar, John Wiley & Sons, 2002.*
33. *Advanced Digital Designs with the Verilog HDL by Michael D. Ciletti. Prentice Hall, 2003.*

**SYLLABUS FOR THE SUBJECT OF ECONOMICS
PAPER - I
MICROECONOMICS**

Total Marks: 100

Part I

1. **Microeconomics**: Meaning of microeconomics. Choice, scarcity and opportunity cost. Production Possibility frontier. Goals of microeconomic policy: efficiency and equity.
2. **Market economy**: Demand, Supply and Price determination. Individual and market demand. Changes in demand. Individual and market supply. Changes in supply. Market equilibrium and impact of changes in demand and supply on market equilibrium. Elasticity of Supply and Demand. Point and Arc elasticity. Price, income and cross elasticities. Application of the concept of elasticity.
3. **The theory of Consumer Behaviour**: Concept of utility and derivation of Demand curve. Cardinal and ordinal Utility. Consumer's Surplus. Indifference Curves and their shapes. Marginal rate of substitution and convexity of Indifference Curves. The budget constraint and the equilibrium of the consumer. Income-Consumption and the Engel's Curve. Price- consumption and Demand curve. Income and Substitution effects of a price change, the Hicksian method and the Slutsky method. Identification of normal goods, inferior goods and Giffen goods.
4. **The theory of Production**: The concepts of production cost and profit. Production function. The law of variable proportions. Cost curves in the short run and in the long run. Choice of input mix. The principle of Substitution. Iso- quants, Iso-cost line and the condition for cost minimization. The expansion path and returns to scale. Economies of scale. The very long run and the endogenous technical change.
5. **Market structures and behaviour of firms.**

Perfectly competitive markets. Assumptions of the model. The supply curve of a firm and an industry in the short run. Short run and the long run equilibrium of the firm and industry. The shape of the long run industry supply curve and the effects of changing technology. The allocative efficiency of perfect competition.

Monopoly: Shape of the demand curve under monopoly. Elasticity of the demand curve and its implication for a monopolist. Short run and long run equilibrium. Price discrimination and its consequences. Analysis of price discrimination between markets. Dumping. Cartels as monopolies. The allocative inefficiency of monopoly. Comparison between perfect competition and monopoly.

Imperfectly competitive market structures: Monopolistic competition. The concept of industry and group. Short run and long run equilibrium of a firm. Excess capacity. Comparison with perfect competition and monopoly.

Oligopoly and its basic dilemma. Duopoly. Models of Non-collusive oligopoly: Cournot's duopoly model, Chamberlain's oligopoly model, Sweezy's kinked demand model.

Collusive Oligopoly. Cartels: Joint profit maximization and market sharing cartels. Price leadership models. Mergers.

6. **The theory of Factor Pricing** : Demand and Supply of inputs. Input demand in the short run and in the long run. The firm's demand curve. The industry's demand curve for an input. Elasticity of demand for inputs. The supply of inputs. Determination of price, quantity and income of an input. Monopsony.

RECOMMENDED BOOKS:

1. *Lipsey and Chrystal, Economics. 10th edition. Oxford University Press.*
2. *Koutsoyiannis, A., Modern Microeconomics, London, Macmillan.*
3. *Miller, E. and Maddala, G.S., Microeconomics Theory and Applications, McGraw-Hill International.*

PART II
MATHEMATICAL ECONOMICS.

1. Variables, Constants and parameters. Relations and functions. Types of functions: algebraic and non-algebraic. Graphic representation of economic functions. Equations and identities, simultaneous equations. Solution of market models, income determination model and IS-LM analysis.
2. Derivatives and their application in economics. Slope versus elasticity. Price, income and cross elasticities of demand. Income determination, multipliers and comparative statics. Optimization of economic functions. Constrained optimization in economics.

RECOMMENDED BOOKS

1. *Chiang, A.C., Fundamental Methods of Mathematical Economics, McGraw Hill, Kogakusha, Ltd.*
2. *Dowling, E.T., Introduction to Mathematical Economics, Schuam's outlines.*

PAPER - II
MACROECONOMICS

Total Marks: 100

PART I

1. **What is Macroeconomics?**: Major macroeconomic issues. Economic models. Stocks and flows, National income accounting, circular flow of income, real versus nominal GDP, the GDP deflator, the consumer price index, economic growth, actual versus potential output, business cycles and their phases, definition of full employment, unemployment, GDP gap, Inflation.
2. **Classical Macroeconomics**: The classical revolution, production, employment, labour demand and labour supply. Equilibrium output and employment. The quantity theory of money. The Cambridge approach to the Quantity theory. Aggregate Demand and Aggregate Supply in the classical system. The classical theory of rate of interest. Complete classical model and classical dichotomy.
3. **The Keynesian Macroeconomics**: Aggregate expenditure and its components. Consumption function and Savings function. Investment and the real rate of interest. The equilibrium GDP in a closed economy simple multipliers. Government spending and taxes. Tax multiplier. GDP in an open economy. The net export function and the foreign trade multiplier. The augmented saving-investment approach. Fiscal and monetary policies.
4. **Investment and its determinants**: Marginal efficiency of capital and optimal capital stock, the marginal efficiency of investment. The stock market and Tobin's q-theory. Inventory investment and the accelerator model. The interaction of multiplier and accelerator. The derivation of IS- curve and its slope. Factors that shift the IS- curve.
5. **The money market and LM-curve**. Keynes Theory of Liquidity preference. Supply of money. Monetary equilibrium and the rate of interest. Derivation of LM-curve and its slope. Factors that shift the LM-curve. Keynes liquidity trap. Interaction of IS-LM curves. Adjustment to equilibrium in the IS-LM curve model. The algebra of the IS-LM model.
6. **Aggregate Demand and Aggregate Supply**: Macroeconomic equilibrium in the short run. The effect of aggregate demand and aggregate supply shocks on the price level and GDP. Long run consequences of aggregate demand shocks. Long run aggregate supply curve. Inflationary and recessionary gaps. The theory of fiscal stabilization and its effectiveness. Transmission mechanism. Comparison of the Classical and Keynesian models and policy conclusions.
7. **Inflation and unemployment**: Types of inflation, Supply shock and demand Shock. Inflation as a monetary phenomena. Stagflation. The theory of Philip's Curve.

The short run and the long run Philips curve. The expectations augmented Philip's curve. Adaptive expectations. Unemployment. Frictional, structural and cyclical unemployment. Okun's law. Hysteresis and the natural rate hypotheses.

8. **Consumption theories and their implications:** Keynesian absolute income hypothesis, Simon Kuznets findings, Duesenbury's hypothesis, Permanent income hypothesis, life cycle hypothesis, Robert Hall and the Random-walk hypothesis.

RECOMMENDED BOOKS

1. *Lipsey & Chrystal, Economics, Oxford University Press.*
2. *Mankiw, G.N., Macroeconomics, Worth Publishers, New York.*
3. *Froyen, R.T., Macroeconomics, Theories and Policies, Pearson education.*
4. *Glahe, F.R., Macroeconomics, Theory and Policy, Harcourt Brace Jovanovich Inc.*

PART II ECONOMICS OF PAKISTAN

1. Economic Development

Economic Development versus Economic Growth. Measurement of economic development. Characteristics of a developing economy. Obstacles to economic development. Determinants or Pre-requisites of economic development. The state of Pakistan's economy and its comparison with other economies of the world.

2. Strategic Sectors.

Importance and problems of the agricultural, industrial and foreign trade sectors of the economy. WTO and its implications. Foreign direct investment, foreign debt burden and debt servicing problems of Pakistan.

3. Monetary and Fiscal policies.

The role of monetary and fiscal policies in promoting economic growth and tackling the problems of inflation and unemployment in Pakistan. Deficit financing and the annual budget.

RECOMMENDED BOOKS

1. *Nasir, M.S. and Kamal S. Hyder, Economy of Pakistan.*
2. *Zaidi, S. Akbar, Issues of Pakistan's Economy. Oxford Univ. Press.*
3. *Pakistan Economic Survey, Published by the Government of Pakistan.*
4. *Todaro. M.P., Economic Development in the third world. Latest edition. Heinemann. London.*

**SYLLABUS FOR THE SUBJECT OF EDUCATION
PAPER -I**

Total Marks: 100

1. Education in Pakistan

- 1.1 History of Education in Pakistan
- 1.2 Aims of Education
- 1.3 System of Education in Pakistan
- 1.4 Educational Policies and Development Plans
 - 1.4.1 All Pakistan Education Conference 1947
 - 1.4.2 National Commission on Education 1959
 - 1.4.3 The Education Policy 1972-1980
 - 1.4.4 National Education Policies: 1979, 1992, 1998-2010, 2006.
 - 1.4.5 Various development plans
- 1.5 Roles and Responsibilities in Education
 - 1.5.1 Role of Public Sector in Education
 - 1.5.2 Role of Private Sector in Education
 - 1.5.3 Role of NGOs and philanthropists in Education
 - 1.5.4 Role of foreign donor agencies in Education
 - 1.5.5 Role of various stakeholders in Education
 - 1.5.6 Role of Globalization in Education

2. Foundation of Education

- 2.1 Educational Process
- 2.2 Role of education in
 - 2.2.1 Nation Building
 - 2.2.2 National cohesion and integration
 - 2.2.3 Character building
 - 2.2.4 Human resource development
 - 2.2.5 World peace and prosperity
- 2.3 Philosophical Foundations of Education
- 2.4 Psychological Foundations of Education
- 2.5 Sociological Foundations of Education
- 2.6 Islamic Concept of Education

3. Curriculum Development and Implementation

- 3.1 Elements of Curriculum.
- 3.2 Foundations of Curriculum. Philosophical Foundations; Psychological Foundations; Sociological Foundations; Economic Foundations and Technological Foundations.
- 3.3 Relationship of Education and Curriculum

- 3.4 Curriculum Development Process
 - 3.4.1 Need Assessment
 - 3.4.2 Formulation of Aims and Objectives Taxonomies of Educational Objectives
 - 3.4.3 Selection of Content
 - 3.4.4 Development of Curricular Materials
 - 3.4.5 Selection of Teaching-Learning Strategies
 - 3.4.6 Implementation of the Curriculum
 - 3.4.7 Evaluation of Curriculum
- 3.5 Process of Curriculum Development in Pakistan
- 3.6 Process of Development of Test books and National Textbook Policy

4. Learning and the Process of Learning

- 4.1 Principles of Growth and Development
- 4.2 Types of Development: Cognitive; Moral; Emotional; Social
- 4.3 The process of Learning
- 4.4 Theories of Learning
 - 4.4.1 Behaviouristic theories: Classical Conditioning; Operant Conditioning
 - 4.4.2 Cognitive Theories: Jean Piaget's Theory; David Ausubel's Theory; Robert Gagne's Theory
- 4.5 Factors affecting Learning

5. Process of Teaching and Teaching Strategies

- 5.1 Process of Classroom Communication
- 5.2 Factors affecting Classroom Communication
- 5.3 Barriers to Classroom Communications
- 5.4 Use of Instructional Materials and Media
 - 5.4.1 Role of Instructional Material and Media
 - 5.4.2 Audio-Materials: Radio and Tape-Recorder
 - 5.4.3 Visual Materials: Various Boards, Charts, Models, Posters
 - 5.4.4 Projected Materials: Opaque, Overhead, Slide, Filmstrip, Multimedia
 - 5.4.5 Non-Projected Materials
 - 5.4.6 Motion Pictures, T.V., Computer
- 5.5 Information and Communication Technologies (ICTs)

PAPER- II

Total Marks: 100

1. Philosophy of Education

- 1.1 Scope of Philosophy
- 1.2 Western Schools of General Philosophy
 - 1.2.1 Idealism
 - 1.2.2 Realism
 - 1.2.3 Naturalism
 - 1.2.4 Pragmatism
 - 1.2.5 Existentialism
- 1.3 Schools of Educational Philosophy
 - 1.3.1 Perennialism
 - 1.3.2 Essentialism
 - 1.3.3 Progressivism
 - 1.3.4 Reconstructionism
- 1.4 Thoughts of Muslim Philosophers: Imam Ghazali; Ibne-Khaldun; Shah Waliullah; Sir Syed Ahmad Khan; Allama Iqbal

2. Educational Assessment and Evaluation

- 2.1 Concept of Classroom Assessment and Evaluation
- 2.2 Distinction between Assessment, Evaluation and Measurement
- 2.3 Approaches to Evaluation: Formative Evaluation; Summative Evaluation
- 2.4 Types of Tests: Essay Type; Objective Type: Multiple Choice, True-False Items, Matching Type; Principles of Construction of these Tests
- 2.5 Achievement Tests
- 2.6 Standardized Tests
- 2.7 Characteristics of a Good Test: Validity, Reliability, Objectivity, Usability

3. Comparative Education

- 3.1 History of Comparative Education
- 3.2 Development of Comparative Education
- 3.3 Purposes of Comparative Education: Intellectual; Planning; Practicability; Educational Problems in World Perspective; Innovation; International Understanding
- 3.4 Factors of Comparative Education: Economic Factor ; Racial Factor; Linguistic Factor; Philosophical Factor; Moral Factor; Religious Factor

- 3.5 Methods of Comparative Education: Descriptive; Historical; Sociological; Qualitative; Analytical; Synthesis
- 3.6 Comparative Systems of Education in Selected Countries USA, UK, Japan, Canada, China, India, Malaysia, Pakistan
- 3.7 Issues and Problems of Education in Pakistan related to: relevance; Access; Equity; Quality; Human Resources; Financial Resources; Madrassa Education; Medium of Instruction.

4. Research Methods in Education

- 4.1 Scientific Method and its Application in Education
- 4.2 Sampling Techniques
 - 4.2.1 Probability Sampling Techniques: Random Sampling; Stratified Sampling; Cluster Sampling
 - 4.2.2 Non-Probability Sampling Techniques: Systematic Sampling; Convenience Sampling; Purposive Sampling;
- 4.3 Research Instruments: Questionnaire; Interview; Tests; Observation; Rating Scale
- 4.4 Types of Research: Basic/Applied Research; Historical Research; Descriptive Research; Correlation Research; Causal-Comparative Research; Experimental Research; Action Research; Qualitative and Quantitative Research
- 4.5 Research Proposal and Report
 - 4.5.1 Preparing a Research Proposal
 - 4.5.2 Writing a Research Report
 - 4.5.3 Distinction between a Research Proposal and a Report.

5. Educational Administration and Supervision

- 5.1 The Concept of Administration
 - 5.1.1 Process of Administration
 - 5.1.2 Relationship between Administration and Supervision
- 5.2 Educational Planning and Organization in Pakistan
 - 5.2.1 Organizational Pattern of Education in Pakistan
 - 5.2.2 Role of Federal Ministry of Education
 - 5.2.3 Role of Provincial Ministry and its Various Agencies
 - 5.2.4 Educational Statistics and its Role in Planning
 - 5.2.5 Financing Education in Pakistan
 - 5.2.6 Educational Administration Under Devolution Plan
- 5.3 Approaches to Educational Administration: Democratic; Authoritarian; Laissez-faire
- 5.4 Function of Administration
 - 5.4.1 Leadership in Improvement of Educational Institution
 - 5.4.2 Leadership in Improvement of Staff in Educational Institution
 - 5.4.3 Leadership in Parents and Community Relations
 - 5.4.4 Leadership in improving the Educational Programme

- 5.4.5 Leadership in the Evaluation of Educational Institution
- 5.5 Educational Supervision
 - 5.5.1 Process of Supervision
 - 5.5.2 Importance of Supervision
 - 5.5.3 Principles of Supervision
- 5.6 Agencies and Organizations promoting Education in Pakistan
 - 5.6.1 National Commission for human development (NCHD)
 - 5.6.2 National Technical and Vocational Education Authority (NTVEA)
 - 5.6.3 Higher Education Commission (HEC)

RECOMMENDED BOOKS:

1. *Ornstein. Foundations of Education 9th ed. 2006.*
2. *Fraenkel. How to Design and Evaluate Research in Education 6th ed. 2006.*
3. *Briggs. Managing Effective Learning and Teaching 2006.*
4. *Dennis. Child Psychology & the Teacher, 7th edition. 2004.*
5. *JW Best. Research in Education, 7th edition. 2004.*
6. *AV Kelly. The Curriculum Theory & Practice, 5th edition. 2004*
7. *Roblyer. Integrating Educational Technology into Teaching, 2nd ed. 2000*
8. *J.E. Cohen. Educating All Children – A Global Agenda. 2006.*
9. *Robert L. Ebel. Essential Educational Measurement, Prentice Hall. 1991.*
10. *Louis Cohen. Research Methods in Education, Routledge. 2007*
11. *Bloom, B.S., Hastings, J.T., & Madaus, G.F. (1971). Handbook on formative and summative evaluation of student learning; New York: McGraw-Hill.*
12. *Gagne, R.M. (1974). Essentials of learning for instruction. New York: Deyden Press.*
13. *Goodlad, J.I., & Associates. (1979). Curriculum Inquiry: The study of curriculum practice. New York: McGraw-Hill.*
14. *Hass, G. (1987). Curriculum Planning: A new approach (5th ed.). Boston: Allyn & Bacon.*
15. *Saylor, J.G., Alexander, W.M., & Lewis, A.J. (1981). Curriculum Planning for better teaching and learning. (4th ed.). New York: Holt, Rinehart & Winston.*
16. *Slavin, Robert, Educational Psychology, Theory and Practice, 7th ed. Boston: Allyn and Bacon, 2003.*
17. *Woolfolk, Anita, Educational Psychology, 9th ed. Boston: Allyn and Bacon, 2005.*

**SYLLABUS FOR THE SUBJECT OF ENGLISH LITERATURE
PAPER- I**

Total Marks: 100

DRAMA AND POETRY

Description: The readings in this paper focus on selected creative works (Drama and Poetry) written or translated into English language. These readings are wide in scope, offering debate over the contemporary cross-genre and cross-disciplinary interpretations. In general, the candidates are expected to:

1. Display some background historical knowledge and prove their interest in literary writing.
2. Talk about some basic elements/features of drama and poetry through a comprehensive and understandable expression and relate it to the composition of literary sensibility.
3. Comprehend and comment critically and analytically about the suggested readings.
4. Draw on comparisons and contrasts between the classical and the popular, the real and the fantastic, the different and the common, or even between elusive versus illusive and “good” versus “not good”.
5. Form and express an independent viewpoint about these readings.

SELECTED READINGS (Primary Texts)

Drama

1. *Sophocles: Oedipus Rex*
2. *William Shakespeare: The Tempest and Romeo and Juliet*
3. *G.B. Shaw. Pygmalion*
4. *John Osborne: Look Back in Anger*
5. *Eugene O’ Neil: The Hairy Ape*
6. *Arthur Miller: Death of a Salesman*
7. *Marsha Norman: O’ Night Mother*

Poetry

1. *William Shakespeare: Like as the waves make towards the pebble, Sonnet 30*
2. *John Donne: Death be Not Proud*
3. *John Keats: Ode to Nightingale*
4. *William Wordsworth: Ode to Immortality*
5. *Samuel Coleridge: Kubla Khan*
6. *Walt Whitman: One’s Self I Sing*
7. *W.B. Yeats: The Second Coming*
8. *T.S. Eliot: The Wasteland*

9. *Maya Angelou: Women Work*
10. *Robert Frost: Mending Wall, The Road not Taken*
11. *Sameus Heaney: Digging*
12. *Sylvia Plath: Morning Song*
13. *Taufeeq Rafat: The Stone Chat*
14. *Daud Kamal: The Water Carrier*
15. *Alamgir Hashmi: Autumnal, Pakistan Movement*

PAPER- II

Total Marks: 100

Fiction and Non-Fiction

Description: The readings in this paper focus on selected creative works (Fiction [Novel and Short Story] and Non-fiction[Prose(Essays) and Literary Criticism) written or translated into English Language. These readings offer debate over the contemporary cross-genre and cross-disciplinary interpretations. In general, the candidates are expected to:

1. Display some background historical knowledge and prove and interest in wide readings.
2. Talk about some basic elements/features of fictions and non-fictions through comprehensive comments.
3. Express creative and critical ideas about these readings
4. Draw on comparisons and contrasts between the classical and the popular, the real and the fantastic, and the different and the common.
5. Form an independent viewpoint about these readings.

SELECTED READINGS (Primary Texts)

Fiction: Novel/ Short Story

1. *Daniel Defoe: Robinson Crusoe*
2. *Jonathan Swift: Gulliver's Travels*
3. *Jane Austen: Pride and Prejudice*
4. *Charles Dickens: A Tale of Two Cities*
5. *Virginia Woolf: To the Lighthouse*
6. *Rudyard Kipling: Kim*
7. *Earnest Hemingway: A Farewell to Arms*
8. *Chinua Ache be: Things Fall Apart*
9. *Harper Lee: To Kill a Mocking Bird*
10. *Bapsi Sidhwa: Ice Candy Man*
11. *Paulo Coelho: The Pilgrimage*
12. *Oscar Wilde: Rose and the Nightingale (Short Story)*
13. *Naguib Mahfouz: The Mummy Awakens (Short Story)*
14. *Guy de Maupassant: The String (Short Story)*
15. *Kate Chopin: The Story of an Hour (Short Story)*

Non-Fiction: Prose (Essays) / Literary Criticism

1. *Aristotle: The Poetics*
2. *Francis Bacon: On Studies*

3. Charles Lamb: *Chimney Sweeper*
4. Ngugi Wa Thiong' O: *On Abolition of English Department*
5. Dale Spender: *Man Made Language*
6. Frantz Fanon: "On National Culture" from *The Wretched of the Earth*
7. Edward Said; "Introduction" to *Culture and Imperialism*

SOME SUGGESTED SECONDARY READINGS

1. Boris Ford, *The New Pelican Guide to English Literature*. Vol. 1-9. London: Penguin
2. William Henry Hudson, *An Introduction to the Study of Literature*, London, 1963.
3. Rene Wellek and Austin Warren, *Theory of Literature*. London: Penguin, 1982
4. Kitto, H.D. F. *Greek Tragedy*, London and NY: Routledge, 2002.
5. Bradley, A.C. *Shakespearean Tragedy* (22nd Ed.) London: 1929
6. Gassner, John. *Form and Idea in Modern Theatre*. NY: 1954
7. M.H. Abrams, ed., *English Romantic Poets: Modern Essays in Criticism*, 1960
8. Allen, Walter, *The English Novel*. London: Penguin
9. Brogan, H. *Pelican History of the USA*, 1986
10. Loomba, Ania. *Colonialism /Postcolonialism*. London: Routledge, 1998
11. Booker, Keith M.A. *Practical Introduction to Literary Theory and Criticism*. NY: Longman, 1996
12. Longman, 1996
13. D. Pirie, *How to Write Critical Essays*. Methuen, 1985.

SYLLABUS FOR THE SUBJECT OF MASS COMMUNICATION

Paper - I

Media: Functions, Contents and History

Total Marks: 100

1. News: Definition, Structure, Language, Reporting and Sub-Editing
2. Feature, Column and Editorial: Difference of objectives, structure, style and content.
3. Organizational Structures of national newspapers and news agencies
4. Ethics of Journalism and Freedom of the Press
5. Press Laws in Pakistan and Government Media Relationship
6. Role of Sir Syed Ahmed Khan, Maulana Zafar Ali Khan, Muhammad Ali Johar, Hasrat Mohani and Hameed Nizami in Urdu Press of the Sub-Continent
7. Role of Radio, Television, print media and internet in Pakistan
8. Social and Developmental Responsibilities of Pakistani Media
9. Importance of Radio TV Documentary and Live Programmes
10. Difference between the news of print media and electronic media

Paper-II

Communication, Advertising and Public Relations

Total Marks: 100

1. Process of Communication: source-message-channel- Receiver-Noise and Redundancy
2. Barriers to Communication
3. Principles of Effective Communication
4. Development Communication and Development Journalism
5. Difference between Mass Communication, Development Communication, Development Journalism and Development Support Communication
6. Two step flow of communication and Opinion Leaders
7. Public Relations: Definition and Scope- Tools of Public Relations- Public Relations in Pakistan- Difference between PR, Propaganda. Advertising and Publicity.

8. Advertising: Definition-Merits and Demerits- Advertising business in Pakistan-Departments of an Advertising Agency.
9. Importance of research in Advertising and Public Relations
10. Advertising as the lifeblood of media

Recommended Books

1. *Hijazi and Naqqash: Mass Communication Theory and Practice, Lahore, 2005*
2. *Lorenz: News Reporting and Writing. New York. 2005*
3. *Vilanilam: Advertising Basics: London,. 2004*
4. *Treadwell: Public Relations Writing. New York. 2005*
5. *Teeble ed.: Print Journalism. New York. 2005*
6. *Schwartz: Associated Press Reporting Handbook. New York. 2002*
7. *Hijazi and Iftikhar: Mass Communication: Skills, uses and Issues: Lahore.2006*
8. *Shafiq: Journalism and Communication Lahore. 2006*

SYLLABUS FOR THE SUBJECT OF MATHEMATICS

Paper I

Total Marks: 100

Candidates will be asked to attempt three questions from Section A and two questions from section B.

Section A

Limits, Continuity, Differentiability and its Applications, General theorems (Rolle's Theorem, Mean value theorem), Asymptotes, Applications of Maxima and Minima. Definite and Indefinite integrals and their Application, Quadrature, Rectification, Numerical methods of Integration (Trapezoidal and Simpson rule), Multiple integrals and their Applications. Areas and Volumes, Centre of Mass, Reimann-Stijles Integral, Ordinary Differential Equations (O.D.Eqs) and their Applications in Rectilinear motion and Growth/Decay problems. 2nd Order Differential Equations with Applications (Spring Mass and Simple Harmonic Oscillator Problems).

Section B

Sequences and Series, Convergence tests, Power Series, Radius and Interval of Convergence. Complex Analysis, Function of Complex Variable, Demoivre's Theorem and its Application. Analytic Function, Singularities, Cauchy theorem, Cauchy Integral formula.

Conic Sections in Cartesian coordinates, Plane Polar Coordinates and their use to represent the straight line and Conic section. Vector equation for plane and space curves. Tangents and Normals and Binormals, Curvature and torsion, Serre Frenet's Formula.

Recommended Books:

1. Anton, H, *Calculus: A New Horizon, Ed. 6, John Willey, New York, 1999.*
2. Thomas, G. B. Finney. A. R., *Calculus, Ed. 9, John Willey, New York, 2005.*
3. Yusuf, S.M. Amin. M., *Calculus with Analytic Geometry, Ilmi Kitab Khana, Lahore.*
4. Zill, D. G. , Cullen, M.R., *Differential Equations with Boundary Value Problems, Ed. 3. PWS Publishing Co., 1997.*
5. Abell, Braselton, *Modern Differential Equations Ed. 2, Thomas Learning Inc. USA, 2001.*
6. Churchill, R.V., Brawn J.W., *Complex Variables and Applications, Ed. 5, McGraw Hill, New York, 1989.*
7. Ghorl, Q.K., *Mechanics. Ilmi Kitab Khan, Lahore.*
8. Weather burn, C.E., *Differential Geometry, The English Languages Book Society and Cambridge Uni. Press. 1964.*
9. Guggenheinerar, H.W., *Differential Geometry, McGraw Hill, 1990.*

Paper II
Total Marks: 100

Section A

Groups: Definition and examples of Groups, Order of a Group, Order of an element of a Group, Abelian and non-Abelian Groups and Cyclic groups. Lagrange theorem and applications, Normal subgroups, Characteristic Subgroups of a group, Normalizer in a group, Centralizer in a group. Fundamental Theorem of Homomorphism, Isomorphism theorems of groups, Automorphisms

Rings, Fields and Vector Spaces: Examples of Rings, Subrings, Integral domains, Fields, Vector spaces, Linear independence/ dependence, Basis and dimension of finitely generated spaces, Examples of Field extension and finite fields, Examples of finite and infinite dimensional vector spaces.

Section B

Metric Spaces and Topological Spaces: Definition and Examples of Metric spaces and topological spaces, Closed and Open Spheres, Interior, Exterior and Frontier of a Set, Sequences in Metric Spaces, Convergence of Sequences. Definition and examples of Normed Spaces. Inner product spaces, Gram-Schmidt Process of Orthonormalization

Matrices and Linear Algebra: Linear transformations, Matrices and their algebra, Reduction of matrices to Echelon and Reduced Echelon form. Solution of a system of homogenous and Non-Homogenous equations, Numerical methods of solving equations (Gauss-Siedal method, Jaccobi method) Properties of Determinants, Eigenvalues and Eigenvectors and the Diagonalization of the Symmetric Matrices.

Recommended Books:

1. *Nicholson. W.K., Elementary Linear Algebra with Applications, Ed. 2, Prentice Hall, Englewood, USA.*
2. *Herstein, I.N., Topics in Algebra, John Willey and Sons (New York) 1964.*
3. *Rowen, L., Rings (I & II). Academic Press, Ins.*
4. *Dar, K.H., First Step to Abstract Algebra, Feroz Sons Publishers, Lahore (1996).*
5. *Yusuf, S.M., Majeed A., Amin. M., Mathematical Methods, Ilmi Kitab Khana, Lahore.*
6. *Atkinson, K. E., An Introduction to Numerical Analysis, Ed. 2 John Willey, New York, 1989.*
7. *Ahmad. F and Afzal. M, Numerical Analysis, National Book Foundation, Islamabad.*
8. *Simmons, F.J., Topology, McGraw Hill Company, New York.*
9. *Kreyszig, E., Introductory Functional Analysis with Applications, John Willey and Sons, New York, 1978.*
10. *Majeed, A. Elements of Topology and Functional Analysis, Ilmi Kitab Khana, Lahore.*

**SYLLABUS FOR THE SUBJECT OF PERSIAN
PERSIAN PAPER – I**

HISTORY OF PERSIAN LANGUAGE & LITERATURE

Total Marks: 100

A. History of Persian Language 10 Marks

- a. Avesta
- b. Old Persian
- c. Pahalwi
- d. Dari
- e. Modern Persian

B. Persian and Pakistan 10 Marks

- a. Persian's Influence on Urdu
- b. Persian's Importance for Pakistan
- c. Persian's Impact on Culture and Civilization of the sub-continent

C. History of Persian Literature in Iran 20 Marks

- a. Samanids
- b. Ghaznavids
- c. Saljuques
- d. Mangols
- e. Taimurids
- f. Qajars
- g. Safvids

- D. History of Persian Literature in the Sub-continent** **10 Marks**
- a. Ghaznavids
 - b. Sultanates
 - c. Mughuls
- E. Special Study of Iranian Poets and Prose Writers** **15 Marks**
- a. **Poets:**
 - i. Firdousi
 - ii. Jalal-ud-Din Rumi
 - iii. Saadi Shirazi
 - iv. Hafiz Shirazi
 - v. Parveen Iqbal
 - b. **Prose Writers:**
 - i. Attar Nishaburi (Tazkarta-ul-Awliya)
 - ii. Saadi Shirazi (Gulistan)
 - iii. Sadiq Hidayat (As a modern short story writer)
- F. Special Study of the sub-continent's Persian poets and Prose writers** **15 Marks**
- a. **Poets:**
 - i. Masood Saad Salman
 - ii. Amir Khusrav
 - iii. Asad Ullah Khan Ghalib
 - iv. Allama Iqbal
 - b. **Prose Writers:**
 - i. Muhammad Aoufi (Jawam-e-ul-Hikayat)
 - ii. Hassan Sajzi (Faiwaid-ul-Fawad)
- G. Short question and answers from all the course of the "A" paper** **20 Marks**

Recommended Books:

- ☆ آب کوثر، شیخ محمد اکرم، لاہور
- ☆ ادب نامہ ۴ ایران، مقبول بیگ بدخشانی، لاہور
- ☆ بزم تیموریہ، صباح الدین عبدالرحمان
- ☆ بزم صوفیہ، صباح الدین عبدالرحمان
- ☆ بزم مملوکیہ، صباح الدین عبدالرحمان
- ☆ پاکستان میں فارسی ادب، ۶ جلد، ڈاکٹر ظہور الدین احمد، لاہور/اسلام آباد
- ☆ تاریخ ادبیات در ایران، ۵ جلد، ذبیح اللہ صفا، تہران، ۱۳۷۱ ش
- ☆ تاریخ ادبیات ایران، رضا زادہ شفق، تہران، ۶، ۱۳۷۱ ش
- ☆ تاریخ زبان فارسی، پرویز نائل خاٹری، تہران
- ☆ جدید فارسی گرامر، محمد نذیر انجھا، لاہور
- ☆ خود آموز فارسی، ۲ جلد، پروفیسر ایف ڈی رازی، لاہور، ۱۹۷۶ء
- ☆ دستور فارسی، ۲ جلد، حسن انوری/احمد گیوی، تہران، ۱۳۸۱ ش
- ☆ رود کوثر، شیخ محمد اکرم، لاہور
- ☆ شعر الحج، ۵ جلد، شبلی نعمانی، اسلام آباد
- ☆ فارسی گفتاری، ڈاکٹر محمد سلیم مظہر، ڈاکٹر محمد صابر، لاہور، ۲۰۰۷ء
- ☆ مصدر نامہ و لغت نامہ فارسی، ڈاکٹر نجم الرشید، لاہور، ۲۰۰۶ء
- ☆ موج کوثر، شیخ محمد اکرم، لاہور
- ☆ **Grammar of the Persian Language, Part-I, by John T. Plattes & Par-II**
by Georg. S.A Ranking, Oxford, 1911.
- ☆ **Literary History of Persia by E.G. Brown.**
- ☆ **Persian Grammar, by Miss Lanpton.**

PERSIAN PAPER - II

Language and texts

A. Iranian Prose

10 Marks

- a. Tazakrat-ul-Aoulia by Attar Nishaburi (Selection)

-1 ذکر ابراهیم بن ادھم رحمۃ اللہ علیہ

- b. Gulistan-e-Saadi (Chapter 1 & 8 only prose)

- c. She Tar (سہ تار) (Short story by Jalal Aal-e-Ahmad)

B. Sub-continent's prose

10 Marks

- a. Kashf-ul-Mahjub by Ali Hujveri (Bab-ul-Ilm/باب العلم)

- b. Jawamey-ul-Hikayat by Aoufi (selection)

-1 نیکی کن و نیکی اندیش

-2 حق نان و نمک

-3 کریم تر از حاتم طائی

-4 شکر نعمت

-5 ذوالنون مصری

C. Iranian Poetry

10 Marks

- a. Shahnamah of Firdousi (Selection of 1st - 122 Verses)

- b. Poetry of Rumi

- i. Masnavi (نی نامہ، داستان بقال و طوطی)

- ii. Ghazliat

-1 یار مرا، غار مرا، عشق جگر خوار مرا

-2 معشوقہ بہ سامان شد، تا باد چنین بادا

-3 بروید ای حریفان، بکشید یار مارا

-4 بہمای رُخ کہ باغ و گلستانم آرزوست

-5 ای قوم بہ حج رفتہ، کجا اید، کجا اید

c. Ghazliat-e-Hafiz

- 1 الایالہا الساتی اور کاساوتانولھا
- 2 بیا کہ قصر امل سخت سست بنیاد است
- 3 سالا دل طلب جام از مای کرد
- 4 بیا تا گل بر افشانیم وی در ساغرا اندازیم
- 5 ای پادشہ خوبان داد از غم تمھائی

d. Rubaiat-e-Khayyam

- 1 بر خیز بختا بیا بھر دل ما
- 2 آن قصر کہ جمشید در او جام گرفت
- 3 این کوزه چو من عاشق زاری بوده است
- 4 امروز ترا دسترس فردا نیست
- 5 این کہنہ ربا طرا کہ عالم نام است
- 6 ہر ذرہ کہ در خاک زمینی بوده است
- 7 ہر اذ کہ اندر دل دانا باشد
- 8 در کار گاہ کوزی گری رتم دوش
- 9 از کوزہ گری کوزہ خریدم باری
- 10 در پردہ اسرار کسی رارہ نیست

e. Neema Yushij (poem, Aie Aadamha ای آدمھا)

D. Sub-Continent's Poets

10 Marks

a. Ghazals of Amir Khusrou

- 1 ابری بار دامن می شوم از یار جدا
- 2 ولم در عاشقی آوارہ شد آوارہ تر با دا
- 3 خبرم رسید امشب کہ نگار خوانی آمد
- 4 جان زتن بردی و در جانی هنوز
- 5 ہر شب از شوق جامہ پارہ کنم

b. Ghazals of Ghalib

- 1 من آن نیم کہ دگر می توان فریفت مرا
- 2 حق جلوه گرز طرز بیان محمد ﷺ است
- 3 به وادی ای که در آن خضر را عصا خفته است
- 4 بیا و جوش تمنای دیدم بنگر
- 5 بیا که قاعده آسان بگردانیم

E. Iqbal Studies

30 Marks

a. Masnavi-e-Asrar-e-Khudi (مثنوی اسرار خودی)

b.

- 1 تمهید
- 2 در بیان این که خودی از عشق و محبت استحکام می پذیرد
- 3 جاوید نامه (خطاب به جاوید)
- 4 صورت نپرستم من بت خانه شکستم من (غزل از پیام مشرق)
- 5 از ما بگوسلای آن ترک تندخو را (غزل از پیام مشرق)
- 6 آشنا هر خار را از قصه ما ساختی (غزل از پیام مشرق)
- 7 تیر و سنان و خنجر و شمشیرم آرزوست (غزل از پیام مشرق)
- 8 چون چراغ لاله سوزم در خیابان شما (غزل از زبور عجم)

c. Poems

- 1 حور و شاعر (نظم از پیام مشرق)
- 2 طیاره (نظم از پیام مشرق)
- 3 انقلاب (نظم از زبور عجم)

d. Quartrains

- 1 سرور رفته باز آید که ناید
- 2 من اندر مشرق و مغرب غریبم
- 3 خدا آن ملتی را سروری داد

F. Translation of simple one passage from Urdu or English in to Persian

10 Marks

G. Short questions and answers from all the course of "B" paper

20 Marks

Recommended Books:

- ☆ تذکرۃ الاولیاء، فرید الدین عطار نیشاپوری، با مقدمہ میرزا محمد خان قزوینی، تہران
- ☆ تحول موضوع و معنا در شعر معاصر، دکتر محمد ناصر، تہران، ۱۳۸۲ ش
- ☆ دیوان حافظ، حافظ شیرازی، بہ کوشش علامہ محمد قزوینی، تہران
- ☆ دیوان غالب دہلوی (فارسی)، مرزا اسد اللہ خان غالب، مقدمہ تصحیح و تحقیق، دکتر محمد حسن حائری
- ☆ رباعیات حکیم خیام نیشاپوری، بہ اہتمام محمد علی فروغی، تہران، ۱۳۳۹ ش
- ☆ ستار، جلال آل احمد، تہران، ۱۳۷۶ ش
- ☆ شاہنامہ فردوسی، فردوسی طوسی، بہ کوشش مہدی قریب
- ☆ کشف المحجوب، علی بن عثمان جوزیری، مقدمہ، تصحیح و تعلیمات، دکتر محمود عابدی، تہران، ۱۳۸۲ ش
- ☆ کلیات امیر خسرو، امیر خسرو، تصحیح اقبال صلاح الدین، لاہور
- ☆ گزیدہ جوامع الحکایات و لوا مع الروایات، سدید الدین محمد عوفی، بہ کوشش جعفر شاعر، تہران، ۱۳۸۰ ش
- ☆ گزیدہ غزلیات شمس، جلال الدین محمد بلخی، بہ کوشش محمد رضا شفیع کدکئی، تہران، ۱۳۸۳ ش
- ☆ گلستان، سعدی شیرازی، بہ کوشش غلام حسین یوسفی، تہران، ۱۳۸۱ ش
- ☆ مجموعہ کامل اشعار نیما یوشیج، تدوین سیروس طاہباز، تہران، ۱۳۷۰ ش
- ☆ کلیات اقبال (فارسی)، علامہ محمد اقبال، لاہور، ۱۹۷۸ء
- ☆ مثنوی معنوی، مولانا جلال الدین رومی، مطابق نسخہ تصحیح شدہ ریپولڈ نیکلسون، تہران، ۱۳۷۳ ش

SYLLABUS FOR THE SUBJECT OF PHILOSOPHY

Paper – I

Total Marks: 100

Western Philosophy

1. **Introduction:** Nature and Value of Philosophy
2. **Greek Philosophers:**
 - a) Plato: Metaphysics, Theory of Knowledge, Theory of State
 - b) Aristotle: Metaphysics, Theory of Knowledge and Logic
3. **Modern Philosophers:**
 - a) Descartes: Doubt as a key to certainty, Dualism
 - b) Spinoza: Doctrine of substance, Ethics
 - c) Locke: Representative Realism
 - d) Berkeley: Subjective Idealism
 - e) Hume: Skepticism
 - f) Kant: Transcendental Idealism
 - g) Hegel: Dialectical Method, Absolute Idealism
 - h) Nietzsche: Superman, Will to Power
4. **Contemporary Philosophical Movements:**
 - a) Existentialism: Jean Paul Sartre
 - b) Logical Positivism: Criterion of Verifiability, Refutation of Metaphysics
 - c) Neo-Pragmatism:
Richard Rorty: Objectivity, Relativism and Truth

RECOMMENDED BOOKS:

1. *Brooke Noel Moore & Kenneth Bruder [2002] Philosophy: The Power of Ideas, 5th Edition, McGraw Hill, London.*
2. *Bertrand Russell [2003] History of Western Philosophy, Routledge, London & New York.*
3. *Roger Scruton [2002] A Short History of Modern Philosophy, Routledge.*
4. *Frederick Copleston [1993] History of Philosophy, Reprint edition, Image.*
5. *Frank Thilly [1993] A History of Philosophy, Sabharwal Book Whole.*
6. *Jean-Paul Sartre [1977] Existentialism & Humanism, M.S.G. House*
7. *A.J. Ayer [1978] Logical Positivism, Greenwood Press*

Paper – II

Muslim Philosophy

1. Genesis and Development of Theological and Philosophical Thought in Islam
2. **Muslim Theology:**
 - a) Mutazilites: Five Principles, Naturalistic Ethics
 - b) Asharites: Divine Attributes, Createdness / Uncreatedness of the Quran, Human Freedom
3. **Sufism:**
 - a) Origin of Sufism and its Characteristics
 - b) Metaphysics: Wahdat al Wajud and Wahdat al Shuhud
4. **Muslim Philosophers:**
 - a) Ibn Sina: Concept of Being, Doctrine of Emanation, Psychology
 - b) Al Ghazali: Method, Refutation of Philosophers
 - c) Ibn Rushd: Reconciliation between Philosophy and Religion, Theory of Knowledge
 - d) Ibn Khaldun: Concept of History, Refutation of Metaphysics
5. **Modern Reconstructionists of Islamic Thought:**
 - a) Shah Waliullah: Metaphysics, Social Philosophy
 - b) Sir Syed Ahmed Khan: God, Man and Universe, Concept of Religion and Ethics
 - c) Allama Muhammad Iqbal: Epistemology, Doctrine of Ego, Concept of Ijtihad
6. **Contemporary Debates:**
 - a) Religious Modernism
 - b) Religious Fundamentalism
 - c) Islamization of Knowledge

RECOMMENDED BOOKS:

1. *Seyyed Hossein Nasr & Oliver Leaman [1996] History of Islamic Philosophy, Vol. I & II, Routledge, London & New York.*
2. *Majid Fakhari [2004] A History of Islamic Philosophy, 3rd Edition, Columbia University Press, New York.*

3. *M. M. Sharif [1996] A History of Muslim Philosophy Vol. I & II, Royal Book Company, Karachi.*
4. *Abdul Khaliq [2000] Problems of Muslim Theology, Victory Book Bank, Lahore.*
5. *Abdul Khaliq [1966] Sir Sayyid Ahmad Khan: On Nature, Man and God, Bazm-e-Iqbal, Lahore.*
6. *J. M. S. Baldjon [1986] Religion and Thought of Shah Waliullah Dihlawi, Leidan: E.J. Brill.*
7. *Mansoor Moaddel & Kamran Talattof [2002] Modernist and Fundamentalist Debates in Islam, Palgrave Macmillan.*
8. *Ismail Raji – al Faruqi [1988] Islamization of Knowledge: Problems, Principles and Prospective, International Institute of Islamic Thought, Herndon, Virginia, U.S.A.*
9. *Mustansir Mir [2006] Iqbal, Iqbal Academy, Pakistan.*

**SYLLABUS FOR THE SUBJECT OF GEOGRAPHY
PAPER- I
PHYSICAL GEOGRAPHY**

Total Marks: 100

Course Outline:

1. The Universe:-

The solar system and the Earth. Earth's Origin, shape and size, rotation and revolution, distribution of land and water. Geological time scale.

2. Lithosphere:-

Composition and internal structure of the Earth, Rocks-origin, formation and types (igneous, sedimentary and metamorphic), plate tectonics, mountain building geomorphic processes internal and external, earthquakes, volcanic activity, weathering, mass wasting, erosion and deposition, cycle of erosion; landforms produced by surface water, ground water, wind and glaciers.

3. Elements of weather and climate:-

Insolation, global radiation and heat balance, atmospheric temperature, composition and structure of atmosphere, atmospheric pressure and winds air masses and fronts (classification, distribution and associated weather), cyclones, tornadoes, thunderstorms and weather disturbances. Hydrological cycle. Atmospheric moisture and precipitation. Climatic classification: Koppen's classification with special reference to the following types: Af, Am, Bsh, Csa and Dfc. Atmospheric pollution global warming.

4. Hydrosphere:-

Configuration of ocean floor, ocean deposits. Composition, temperature and salinity of ocean water, movements of the ocean water, waves, currents and tides.

5. Biosphere:-

Origin and evolution of life on Earth (with reference to Geological time scale). Formation and types of soils. Eco-Systems and world major Biomes.

6. Study of Maps

Topographical Maps, Aerial Photographs and introduction to Remote Sensing, Weather maps of Pakistan.

Map projection general principles, classification of network by simple graphic methods of the following projections.

Cylindrical, Simple, Equal Area and Mercator's (with table) Conical with one and two standard parallels and Bonne's projections. Zenithal, Gnomonic Stereographic and orthographic (Polar Cases).

7. **Scales: types and their use:-**

8. **Methods of representation of relief:-**

Drawing of composite contour maps with the help of given data and information preparation of distribution maps with the help of symbols line-bar-shade dot and circle. Simple quantitative techniques and their use in geography. Study of frequency distribution average's (mean median and mode), Mean deviation, standard deviation and correlation. Index numbers and time series.

RECOMMENDED BOOKS:

1. Strahler, A.N. (2004) *"Modern Physical Geography"* New York: John Wiley.
2. Gabbler, R.E, Sager, R.J and Wise, D.L (1997) *"Essentials of Physical Geography" Fourth Edition.* Saunders College Publishing, New York.
3. Scott, R.C. (1996) *"Introduction to physical geography"* West Publishing Co., New York.
4. Miller, G.T. (1996) *"Living in the Environment, Principles, Connections and solutions", Ninth Edition,* Wadsworth.
5. Thurman, H.V. & Mexrill (1996) *"Essentials of Oceanography"* Manson, London.
6. Diwan A.P. & D.K. Arora (1995) *"Origin of the Ocean"* Anmol Publisher, Delhi.
7. Mcuveen (1992) *"Fundamentals of Weather and Climate"* Prentice Hall New Hrsey.
8. Kendrew (1961): *"Climate of the continents"* Longman, London. New York.
9. Thorn-bury, W.D. (1969) *"Principles of Geomorphology"* John Willy & Sons, New York.
10. Christopherson, R.W. (2000) *"Geo-Systems" USA,* Prentice-Hall, Inc.
11. Monkhouse, F.J. (1996) *"Principles of Physical Geography"* London Hodder & Stoughton.
12. De Blij, H.J. and Muller, P.O. (1996) *"Principles of Physical Geography of the Global Environment" USA,* John Wiley and Sons Inc.
13. Taylor, J. (1993) *"Integral Physical Geography"* London Longman.
14. Small, R.J. (1989) *"Geomorphology and Hydrology"* London, Longman.
15. Thompson, R.D. et. Al (1986) *"Process in Physical Geography"* London, Longman.
16. Miller, E.W. (1985) *"Physical Geography"* Columbus, Charles E. Merrill.
17. King, CAM (1980) *"Physical Geography"* Oxford, Basil Blackwell.
18. Srahlar, A.N. , Strahlar, A.H. (2004) *"Physical Environment New York"* John Wiley.
19. Christopherson, R.W. (2000) *"Geo-Systems" USA,* Prentice –Hall, Inc.
20. Well & Well and N. (1998) *"Atmosphere and Oceans"* London, Longman.
21. Taylor, J. (1993) *"Integral Physical Geography"* London, Longman.

22. Mcliveen, J.F.R. (1991) *"Fundamentals of Weather and Climate London"* Chapman & Hall.
23. Thompson, R.D. et. Al (1986) *"Process in Physical Geography"* London, Longman.
24. Miller, E.W. (1985) *"Physical Geography"* Columbus, Charles E. Merrill.
25. King CAM (1980) *"Physical Geography"* Oxford, Basil Blackwell.

HUMAN, ECONOMIC AND REGIONAL GEOGRAPHY

HUMAN GEOGRAPHY PAPER-II

Total Marks: 100

Course Outline:-

Man and his habitat: Concepts of Environmentalism and Possibilism, population growth, dynamics, (fertility, mortality, & migration), world society and culture, races, languages and religions, natural resources. World population, distribution, density and growth. Population structure, population change (Natural increase & migration) Migration factors (pull and push) types of migration Settlements: types of settlement, urbanization, rural urban characteristics urban hierarchy, Urban function and problems of urban places the Central Place theory.

BOOKS:

1. Rowntree, L. et. Al(2004) *"Globalization and Diversity: Geography of a Changing World"* New York; Prentice Hall.
2. Neuwirth, R. (2004) *"Shadow Cities: A Billion Squatters, A New Urban World"*, London Routledge.
3. Harper, H.L. (2003) *"Environment and Society: Human Perspectives on Environmental Issues"* (3rd Edition) New York; Prentice Hall.
4. Knox, P.L. & S.A. Marston (2003) *"Places and Regions in Global Context: Human Geography"* (3rd Edition) New York; Prentice Hall.
5. Becker, A.& Secker (2002) *" Human Geography: Culture, Society and Space"* (7th Edition) New York; John Wiley and Sons.
6. DeBlij, H.J. (2002) *" Human Geography: Culture, Society, and Space"* (7th Edition) New York; John Wiley and Sons.
7. Lewis, C.P. Mitchell-Fox & C. Dyer (2001) *" Village, Hamlet and Field: Changing Medieval Settlements in Central England"* London; Windgather Press.
8. Hagget, P. (1997) *"Geography: A Modern Synthesis"* London. Harper International.

ECONOMIC GEOGRAPHY

Course Outline:-

Introduction: Definition, scope, approaches to study and relationship with other disciplines.

Economic activities: Classification and general distribution.

Production and consumption: producer and consumer, decision making, primary, secondary, tertiary, quaternary, quinary.

Historical Evolution of World Economics Systems: Medieval feudal economics, industrial revolution, economic benefits from colonialism. Modern world system.

Various types of agriculture and their distribution, subsistence, primitive, gathering, hunting, herding, cultivation, intensive farming, gathering commercial grain farming, fishing, dairying, mixed farming and plantation farming.

Agriculture conditions of agriculture, the physical constraints on agriculture.

Land factor in agriculture, world agricultural system, problems and policies in agriculture.

The role of selected commodities e.g., wheat, rice, sugarcane, cotton, etc.

Forest resources: world distribution, environmental and economic.

Mineral resources, distribution of important minerals, metalliferous minerals, the non-metalliferous minerals, economic factors in mining.

Power resources, form of power, solid fuels, oil & natural gas, non-exhaustible sources of energy.

Manufacturing: light and heavy industries, locational factors and locational theories, locational analysis of selected industries, iron and steel, textile (cotton, jute, woolen, synthetic) petro-chemical, world industrial regions.

Trade and service function, tertiary activities, distribution of services service industries.

Transport and trade: significance and characteristics of transport system, network, modes of transport, specialization and international trade.

Multilateral and bilateral trade, free trade areas and common markets, balance of trade, factors of trade, world pattern of trade.

BOOKS:-

1. *Alexander, J.W., (1963) "Economic Geography" Prentice Hall New Jersey.*
2. *Alexanderson, G. (1947) "Geography of Manufacturing" Englewood Cliffs.*
3. *Alnwick, H. (1981) "Geography of Commodities" Harrp London.*
4. *Boesch, H. (1964) "A Geography of World Economy" Princeton: D. Van Nostrand.*
5. *Carlson A. S, (1956) "Economic Geography of Industrial Materials" Reinhold publishing Corporation New York.*
6. *Fryer, D.W. (1965) "World Economic Development" McGraw Hill New York.*
7. *Harthorn, T.A. and Alexander, J.W.(1988) "Economic Geography" Today. New Delhi. TTDD.*
8. *Hartshorne T.A. & Alexander J.W. (1988) "Economic Geography" Prentice Hall, Inc. Englewood Cliffs, New York.*

9. Highsmith R.M. (1963) "Geography of Commodity Production" Philadelphia, Lippincott.
10. Hodder, B.W. & Dogar Lee (1974) "Economic Geography" Methuen London.
11. Jones. C.F. & Darken, (1965) "Economic Geography" Macmillan New York.
12. Khan F.K. (1997) "An introduction to Economic Geography" Sir, Syed Academy, Karachi.
13. London, C.E. (1939) "Industrial Geography" John Murray (publishers) Ltd.
14. Norman P. (1981) "Success in Economic Geography" John Murray (publishers) Ltd.
15. Thoman, Conklin & Yeats (1988) "The Geography of Economic Activity" McGraw-Hill Book Company, New York, Inc.
16. Miller E.W. (1962) "A Geography of Manufacturing" Prentice Hall International Inc. London. 28.
17. U.N.O. Statistical Year Books. Latest Editions.29.
18. Luckas. M.R. (1991) "Economic Activity' Longman group UK Limited. Williams. T.R. (1991)
19. Economic Geography: Longman group, New York stamp, L.D. & S Carter 31.
20. Gilmour (1960) "A Handbook of Commercial Geography" Longman London.32.
21. Howard G. Roepke (1967) "Readings in Economic Geography" John Eiley and Sons, New York. 33.
22. Rogen W.E. & N.A. Bengtson (1964) "Fundamentals of Economic Geography" Prentice Hall. 34.
23. Tomes, R.S. & R.J. Hagget (1980) "Models in Geography" Harper and Row Publishers London.

REGIONAL GEOGRAPHY

Course Outline:

Scope, Status and the significance of the regional approach and concept in Geography SAARC Countries with special reference to Pakistan, Environmental setting: physical and climatic. Natural and cultural resources: Vegetation and agriculture, population, hydrology and irrigation, mineral and power resumes, industries (major industries e.g. Iron & Steel textile, cement, chemical, sugar) trade and communication.

BOOKS:-

1. Deblij, H.J.D. & Muller, Peter O-2003 " Geography: Realms, Regions and Concepts" John Wiley and Sons.
2. Knox, P.I. & SA, Marston-2003 "Places and Regional in Global Context: Human Geography" Prentice and Hall.

3. *Deblji, H.J.D2005 "Concepts and Regions in Geography" John Wiley.*
4. *James, Preston, E, 1974 "One World Divided" John Wiley and Sons.*
5. *James and Jones, 1965 "American Geography" Inventory and Prospects Association of American Geographers USA.*
6. *Davidson, A.P. Munir Ahmad (2003) "Privatization and Crisis of Agricultural Extension: The Case of Pakistan (King's Soas Studies in Development Geography)". Ashgate Publishing.*
7. *Abdul Hameed (1972) "Historical and Descriptive geography of Water development in West Pakistan: A case study of the Middle Indus Basin" San Francisco State College.*
8. *Jonson B.L.C. (1969) "South Asia: Selective Studies of the essential geography of India" Pakistan and Ceylon. Heinemann Educational.*
9. *Ahmad, K.S. (1964) "Geography of Pakistan" Oxford University Press.*
10. *Tayyeb, A. (1996) "A Political Geography of Pakistan" Oxford University Press.*
11. *Spate, O.H.K., (1984) "India and Pakistan" Munshiram Moharlal Publications Pvt. Ltd.*
12. *Khan F.K. (1991) "Geography of Pakistan" Oxford University Press, Karachi.*
13. *Burkey, J.S.(1991) "Pakistan the continuing search for nationhood" Western Press, Oxford, UK.*

SYLLABUS FOR THE SUBJECT OF PHYSICS

Paper -1

Total Marks: 100

Mechanics

Vectors -Dots, Cross and triple products, Gradient, divergence and applications. Curl of a vector field; Gauss's Theorem; Stokes theorem

Newtonian laws of motion; motion of charged particles in electric and magnetic fields; Motion in a circle, Law of conservation of energy; Conservation of linear and angular momentum; Dynamics of rigid body; spin and precession; gyroscope; Gravitation; planetary motion including satellite work energy theorem.

Special theory of relativity. Michelson - Morley experiment, Einstein's postulates; Lorentz transformation; time dilation, length contraction; equivalence of mass and energy.

Fluid Mechanics

Surface tension; Viscosity; elasticity; fluid motion and Bernoulli's theorem.

Waves and Oscillation

Free oscillation with one and two degrees of freedom; free and forced oscillations, Lissajous figure, Coupled oscillations, Travelling waves and transmission of energy; Phase and Group velocity; Standing waves Longitudinal waves.

Reflection, Refraction, Interference, Diffraction and Polarization of waves; interferometer and Newton's rings; Diffraction Gratings and their resolving power; Spectrometers. Electromagnetic wave equation; Normal and anomalous dispersion; Coherence, lasers and its application.

Heat and Thermodynamics

Perfect gas and Vander Waals equation; Three Laws of Thermodynamics; Entropy, entropy of an ideal gas; Helmholtz function, Gibbs function; Maxwell's equations; Enthalpy, Thermal properties of Simple system; Production and measurement of low temperatures; Kinetic theory of gases; Maxwellian distribution of molecular velocities; Brownian motion; Transport phenomena. Classical Maxwell-Boltzmann Statistics and its applications, Quantum Bose-Einstein and Fermi-Dirac Statistics.

Electricity and Magnetism

Electric field due to point charges, Gauss' law Electric potential and Poisson and Laplace's equation Dielectric medium and Polarization; Capacitance; Moving charges and magnetic field Ampere's law; Vector potential; Magnetic properties of matter; Transient current; Faraday's law of electromagnetic induction; Alternating current and LRO circuit. Maxwell's equations; poynting theorem and poynting Vector.

Electronics

Thermionic emission; Space charge; Diode. Triode Tetrode; Pentode and their static and dynamic characteristics; Amplitude modulation and demodulation or detection; Various basic circuits for rectification, amplification modulation and detection connected with radio receivers and transmission; n and p type semiconductors; Biased function; Transistors; Common base, common emitter and common collector configurations OP Amplifier; characteristics, modes of operation, applications number systems: decimal, octal and Hexadecimal; Binary code, Binary arithmetic, BCD code, and parity logic gates Boolean identities; De Morgan's theorems: logic simplification; Combinational logic circuits: decoders, parity generator and checker circuits, flip flops:RS, JK and D-type.

Atomic Physics

Bohr theory and quantum numbers including electron spin; Pauli's exclusion principle; Spectra of simple systems with one or two valence electrons. Photo electric effect Compton scattering; pair production; Lande's g factor and Zeeman effect; Waves and particles and De Broglie's Hypothesis; Schrodinger wave equation and its application to one dimensional harmonic oscillator. Heisenberg's uncertainly principle.

Nuclear Physics

Structure of Nuclei; Radioactivity α , β , and decay. Methods of detection, Mass Spectrometer. Accelerators. Phenomenon of fission; reactor and nuclear power, nuclear fusion and its application; Nuclear models; Elementary particles and their properties.

SUGGESTED READINGS

1. *Perspectives of Modern Physics, A.Beiser.*
2. *Fundamentals of Physics, Halliday & Resnick.*
3. *Introduction to Electromagnetic fields and Waves. D. Corson & P .Lorrain.*
4. *Engineering Electronics. J.D. Ryder.*
5. *Semiconductor Electronics. J.F.Gibbons.*
6. *Physics Course. Berkley.*
7. *Heat and Thermodynamics. W. Zemanasky.*
8. *Nuclear Physics, W.E. Burcham.*
9. *Nuclear Phycis, Kaplan*
10. *Fundamentals of digital electronics, Floyd*
11. *Waves & Vibrations, Pain*

SYLLABUS FOR THE SUBJECT OF PHYSICS

Paper -1

Total Marks: 100

Mechanics

Vectors -Dots, Cross and triple products, Gradient, divergence and applications. Curl of a vector field; Gauss's Theorem; Stokes theorem

Newtonian laws of motion; motion of charged particles in electric and magnetic fields; Motion in a circle, Law of conservation of energy; Conservation of linear and angular momentum; Dynamics of rigid body; spin and precession; gyroscope; Gravitation; planetary motion including satellite work energy theorem.

Special theory of relativity. Michelson - Morley experiment, Einstein's postulates; Lorentz transformation; time dilation, length contraction; equivalence of mass and energy.

Fluid Mechanics

Surface tension; Viscosity; elasticity; fluid motion and Bernoulli's theorem.

Waves and Oscillation

Free oscillation with one and two degrees of freedom; free and forced oscillations, Lissajous figure, Coupled oscillations, Travelling waves and transmission of energy; Phase and Group velocity; Standing waves Longitudinal waves.

Reflection, Refraction, Interference, Diffraction and Polarization of waves; interferometer and Newton's rings; Diffraction Gratings and their resolving power; Spectrometers. Electromagnetic wave equation; Normal and anomalous dispersion; Coherence, lasers and its application.

Heat and Thermodynamics

Perfect gas and Vander Waals equation; Three Laws of Thermodynamics; Entropy, entropy of an ideal gas; Helmholtz function, Gibbs function; Maxwell's equations; Enthalpy, Thermal properties of Simple system; Production and measurement of low temperatures; Kinetic theory of gases; Maxwellian distribution of molecular velocities; Brownian motion; Transport phenomena. Classical Maxwell-Boltzmann Statistics and its applications, Quantum Bose-Einstein and Fermi-Dirac Statistics.

Electricity and Magnetism

Electric field due to point charges, Gauss' law Electric potential and Poisson and Laplace's equation Dielectric medium and Polarization; Capacitance; Moving charges and magnetic field Ampere's law; Vector potential; Magnetic properties of matter; Transient current; Faraday's law of electromagnetic induction; Alternating current and LRO circuit. Maxwell's equations; poynting theorem and poynting Vector.

Electronics

Thermionic emission; Space charge; Diode. Triode Tetrode; Pentode and their static and dynamic characteristics; Amplitude modulation and demodulation or detection; Various basic circuits for rectification, amplification modulation and detection connected with radio receivers and transmission; n and p type semiconductors; Biased function; Transistors; Common base, common emitter and common collector configurations OP Amplifier; characteristics, modes of operation, applications number systems: decimal, octal and Hexadecimal; Binary code, Binary arithmetic, BCD code, and parity logic gates Boolean identities; De Morgan's theorems: logic simplification; Combinational logic circuits: decoders, parity generator and checker circuits, flip flops:RS, JK and D-type.

Atomic Physics

Bohr theory and quantum numbers including electron spin; Pauli's exclusion principle; Spectra of simple systems with one or two valence electrons. Photo electric effect Compton scattering; pair production; Lande's g factor and Zeeman effect; Waves and particles and De Broglie's Hypothesis; Schrodinger wave equation and its application to one dimensional harmonic oscillator. Heisenberg's uncertainly principle.

Nuclear Physics

Structure of Nuclei; Radioactivity α , β , and decay. Methods of detection, Mass Spectrometer. Accelerators. Phenomenon of fission; reactor and nuclear power, nuclear fusion and its application; Nuclear models; Elementary particles and their properties.

SUGGESTED READINGS

1. *Perspectives of Modern Physics, A.Beiser.*
2. *Fundamentals of Physics, Halliday & Resnick.*
3. *Introduction to Electromagnetic fields and Waves. D. Corson & P .Lorrain.*
4. *Engineering Electronics. J.D. Ryder.*
5. *Semiconductor Electronics. J.F.Gibbons.*
6. *Physics Course. Berkley.*
7. *Heat and Thermodynamics. W. Zemanasky.*
8. *Nuclear Physics, W.E. Burcham.*
9. *Nuclear Phycsis, Kaplan*
10. *Fundamentals of digital electronics, Floyd*
11. *Waves & Vibrations, Pain*

COMPARATIVE POLITICS

PAPER - II

Total Marks: 100

Taking contemporary state as a dynamic phenomenon, having its own system structures and assigned functions, a comparative analysis of some outstanding developed and developing state systems is made here. The emphasis is equally on Pakistan as an emerging political system of the world.

PART: A Political Systems

8. Concept of Political System: i) Easton on Behaviorism
ii) Almond on Functionalism
9. Developed Political Systems: Main constitutional features of USA, UK, France and former USSR
10. Developing Political Systems: Main constitutional features of Turkey, India and China.

PART: B Pakistan

11. Pakistan as a Nation-State: Rise of Muslim Nationalism in South Asia under the dynamic leaderships of Sir Syed Ahmad Khan, Allama Iqbal and Quaid-e-Azam Mohammad Ali Jinnah
12. Political System of Pakistan: Comparative and critical analysis of the Constitutions of 1956, 1962 and 1973 (with amendments)

RECOMMENDED BOOKS

Paper: I POLITICAL SCIENCE: BASIC PRINCIPLES

Part: A Political Theory

1. *M.M. Sharif, History of Muslim Philosophy*
2. *Rosenthal, Political Thought in Medieval Islam*
3. *Haroon Khan Sherwani, Muslim Political Thought and Administration*
4. *George H. Sabine, History of Political Thought*
5. *Judd Harmon, Political Thought: From Plato to Present*

Part: B Individual and State

6. *Rodee and Anderson, Introduction to Political Science*
7. *Mazharul Haq, Theory and Practice in Political Science*
8. *Rosenthal, Modern Islamic State*
9. *Samuel Beer and Adam Ullam, Patterns of Government*
10. *V.O. Key, Politics, Parties and Pressure Groups*
11. *Earnest Barker, Reflections on Government*

Paper: II COMP ARA TIVE POLITICS

Part: A Political Systems: Developed and Developing

12. *Almond and Powell, Comparative Politics*
13. *Almond and Coleman, Politics of Developing Areas*
14. *Roy C. Macridis, Comparative Politics*
15. *Macridis and Wards, Modern Political Systems (Asia)*
16. *J. M. Coleman, Political Institutions in Europe*
17. *P. G. Cocker, Contemporary British Politics and Govt.*
18. *Thomas Patterson, The American Democracy*

Part: B Pakistan

19. *Keith Callard, Pakistan: A Political Study*
20. *Khalid Bin Sayeed, Pakistan: The Formative Phase*
21. *Khalid Bin Sayeed, Politics in Pakistan*
22. *Lawrence Ziring, Pakistan in the Twentieth Century*
23. *G. W. Chaudhry, Constitutional Development in Pakistan*
24. *Pakistan Historical Society, History of Pakistan*
25. *Jamil-ud-Din Ahmad, Speeches and Writings of M.A. Jinnah*
26. *M. Saeed Sheikh, Allama Iqbal: The Reconstruction of Religious Thought in Islam*
27. *Mushtaq Ahmad, Government and Politics in Pakistan*

**SYLLABUS FOR THE SUBJECT OF PRINCIPLE OF ENGINEERING
PAPER- I
Fundamentals of Engineering**

Total Marks: 100

1 Applied Physics:

Classical mechanics: Density, Dimension, Gravity, Motion, Position, Velocity, Acceleration, Mass, Momentum, Force, Energy, Angular momentum, Torque, Conservation law, Wave, Work, Power.

Quantum mechanics: Matrix Mechanics, Planck's constant, Quanta, Quantization, Quantum harmonic oscillator, Quantum number, Spin, Wave-function, Wave mechanics, Wave-particle duality, Zero-point energy, Pauli Exclusion Principle, Heisenberg Uncertainty Principle.

Theory of relativity: General principle of relativity, Gravity, Inertial frame of reference, Invariance, Length contraction, Principle of Relativity, Reference frame, Rest energy, Rest mass, Speed of light, Stress-energy tensor, Time dilation.

Optical Physics: Aberrations, Diffraction, Dispersion, Optical Resolution, Polarization, Ray (optics), Reflection, Refraction, Scattering, Wave, Lenses, Mirrors, Optical instruments, Prisms

Particle Physics: Fundamental force (gravitational, electromagnetic, weak, strong), Elementary particle, Spin, Antimatter, Quantum gravity, Vacuum energy

Solid State Physics: Amorphous solid, Crystal Structure, Free electron model, Energy band gap, conduction band, electron hole, excitation, valence band, Superconductivity, crystal optics.

RECOMMENDED BOOKS:

1. *Sears and Zemansky's University Physics by Hugh D. Young, Roger A. Freedman, T.R. Sandin and A. Lewis Ford*
2. *Basic Physics by Karl F. Kuhn*

2. Applied Chemistry:

Electro-Chemistry: Electrolysis, Electrolytic conductance, Migration of ions, Galvanic Cells, reversible and Irreversible cells, Standard electrode potentials, Buffer solutions.

Solutions: Ideal and non-ideal solutions, Raoult's and Henry's Laws, Solubility curves, Heat of solutions.

Liquids and their properties: Vapor pressure, vapor pressure and boiling point, surface tension, viscosity, Refractive index and its measurement, Polarimetry, Intermolecular and intermolecular forces amongst liquid molecules.

Solid State: Crystalline structure, different properties of crystals, X-rays and crystal structures, production of X-rays, Heat capacities of solids.

Gases: Boyle's Law, Charles's Law, Gas constant, Dalton's Law of Partial Pressure, Graham's Law of Diffusion, Kinetic theory of Gases, Heat Capacity of Gases.

3. **Applied Electricity & Electronics:**

Electricity & Magnetism; Electrical potential, Resistance, Laws of resistance, Conductance, Conductivity, Impedance, Ohm law, Resistance in series and in parallel, practical resistors, work, power, Energy, Joule's law of electric field intensity, Gauss's Theorem, Capacitor, Capacitance, Capacitors in parallel and series. Force on a conductor in a magnetic field, electrical and magnetic circuits, leakage flux, Relation between magnetism and electricity, Induced emf, induced current and directions, Faraday's laws of electromagnetic inductions, Lenz's law, dynamically induced emf, Self inductance, mutual inductance and inductance in series/parallel, magnetic hysteresis, Energy stored in magnetic field, Generation of alternating currents and voltages.

Electrical Machines:

DC Motors: Shunt, Series and Compound Motors, Speed and Torque Relations. Transformers: Principle, Construction, Voltage transformation ratio, Step-up/step-down transformers, Copper & Iron Losses, Transformer connections; delta and star.

AC Motors: Induction motor, Synchronous motor, Performance, Efficiency. Single phase and three phase Motors.

Generators: Principle, Construction, Different components of generators. AC Generators, DC Generators.

Electronics:

N-type material, P-type material, diodes, junctions, P-N junction, forward bias, reverse bias.

Transistors: types, calculations of voltages and currents in simple transistor circuits.

Amplifier & Oscillators: Working and classification of amplifiers, Class A and Class B Amplifiers, Feedback Amplifiers, Types of Feedback, RC Oscillators.

Integrated circuits: OP Amps, timers, flip flop, converters, filters.

Telecommunications: EM theory, antennas, antenna gain, free space loss, fading. Modulations (AM, FM, PM, PWM, Delta, FSK, ASK, PSK), Error correction, Demodulation, Detectors, Transmitter, Receivers.

DSP and Controls; filters, stability, Z-transform, Nyquist criteria, S domain, transfer functions.

Introduction to Computing; History and evolution of computers, central processing unit, data storage, input/output devices, multimedia, operating systems, programming languages, networking, the internet, system analyses and design, management information system, electronic commerce, security and privacy issues, ethical issues and the computing profession,

Power Systems: power network analysis, Polyphase circuits, Transients, Transmission Lines, Losses.

RECOMMENDED BOOKS:

1. *Electrical Technology by B.L. Tharaja*
2. *Electronic Devices and Circuits by Bogart.*
3. *DC Machines by P.C. Sen*
4. *Semiconductors by Manzar Saeed*
5. *Modern Digital and Analog Communication by B.P.Lathi*
6. *Introductory Electronic Devices and Circuits by Paynter*
7. *Network analysis, by Van Belkernberg.*
8. *Wireless Communication by Willium Stallings.*
9. *Computers, tools for an information age, 8th ed. H.L. Captron, Addison Wesley, 2003*

4. **Mechanical Engineering Fundamentals**

Mechanics and Strength of Materials: Concept of Stress and Strain, bending, torsion, geometric properties of areas, principal stresses, Tensile testing, Stress-Strain curve, Difference between Engineering and True stress & Strain, Shear Stress & Strain, Concept of elastic and plastic deformation, Yield & ultimate Tensile strengths, Elongation, Toughness and Resilience, Ductility and Malleability, Hardness Testing, Brinell and Rock well Hardness test, bending moment,

Fluid Mechanics; Properties and basics of fluid mechanics, loss of head, power transformation by fluids, pumps, turbines. Fluid static's, Fluid dynamics, Types of flow: Turbulent and Laminar, Reynold's number.

Thermodynamics and Heat Transfer. (Basics of thermodynamics, properties of fluids and steam, steam turbines, power plants. First and second Laws of Thermodynamics, Enthalpy, Entropy, Heat Capacity, Carnot cycle, Gibbs free energy, Equilibrium, PV – diagrams, Refrigeration and Air conditioning, principle and models of heat transfer, Evaporators, Condensers, Heat engines, Engines (2 and 4 strokes).

Manufacturing: Different manufacturing processes like Casting, Forging, Machining, Rolling, Extrusion, Wire-drawing, welding, Turning(lathe), Milling, Shaping, Gear cutting, Drilling, Fitting.

RECOMMENDED BOOKS:

1. *Schaum Outline Series; Strength of Materials by Williyam A. Nash 3rd Ed 1994, McGraw Hill Edition.*
2. *Fluid Mechanics by Lewitt*
3. *Fluid Mechanics by Daugherity*
4. *Engineering Mechanics (Statics) by J.L. Merriems.*
5. *Engineering Mechanics (synamics)by J.L. Merriems*
6. *Strength of Materials by Singer for Mechanics of Materials*
7. *Testing of metals by Fazal Karim*
8. *Manufacturing Processes for Engineering Materials by Kalpakgian*

5. **Materials Engineering:**

Introduction to Materials; Types of Materials. Structure of an atom, Metallic bonding, Crystal Structures and geometry,
Metallic Materials: Mechanical properties of Metals and alloys, Ferrous and non-ferrous metals & alloys, Applications of Different metals and alloys in industry

Polymeric and Ceramic Materials: Polymerization, General purpose and Engineering thermo-plastics, thermosetting plastics, Rubbers.

Traditional and engineering ceramics, Processing of ceramics, Electrical properties of ceramics, Mechanical properties of ceramics, Thermal properties of ceramics, Glasses.

RECOMMENDED BOOKS:

1. *Principles of Materials Science and Engineering by William F. Smith*
2. *Introduction to Physical Metallurgy by Sydney H. Avner*

6. Civil Engineering Fundamentals:

Structures; stress, strain, shearing force and bending moment concepts, beams, columns, footing. Simply supported and Cantilever beams, Pulleys and gears.

Transportation Engineering: Introduction, highway administration, scheme preparation, traffic appraisal, environmental appraisal, highway geometry, drainage, lighting, signing, communications and safety, roads and traffic in urban areas, highway maintenance, low cost roads in developing countries.

Environmental Engineering: Environmental impacts on water resources projects, transportation engineering projects, waste water treatment and management, water supply and distribution.

Fundamentals of Hydraulic Engineering: Properties of fluid mechanics, pressure measuring devices, flow measuring devices, losses in pipelines, open channels, barrages and dams.

RECOMMENDED BOOK:

1. *Properties of Concrete* by A.M. Neville.
2. *Plain and reinforced concrete* by Nilson.
3. *Strength of material* by Andrew Pytel and Singer.
4. *Transportation Engineering, Planning and design* by Paul Wright.
5. *Civil Engineer's Reference Book* by LS Blake 4th Ed.
6. *Surveying and Leveling* by T.P Kanetaker.
7. *Public Health Engineering* by STEEL.
8. *Fluid mechanics with engineering applications, 10th Ed* by Finnemore/Franzini.

SYLLABUS OUTLINES-ENGINEERING MANAGEMENT

PRINCIPLE OF ENGINEERING PAPER II

Paper II will comprise EIGHT questions including One Compulsory MCQ type question containing 20 parts of one mark each (1/2 marks will be deducted for each wrong answer). Candidates will be required to attempt total FIVE questions including the compulsory question. Each question will carry 20 marks.

1. **Engineering Economics:** cost analysis, purchasing power parity, supply and demand, macro economics, monopoly and oligopoly.
2. **Costing, Accounting and Budgeting:** Net present value, Net future value, cash flows, auditing, income statement, balance sheet, taxation, financial risk management, cost analysis.
3. **Testability and Test Planning:** Black box testing, White box testing, test plans, test executions, regression testing, destructible and non destructible testing, test reports.
4. **Project Management:** time lines, milestones, resources allocation, dependency, Gant Charts,
5. **Inventory Management:** FIFO models, LIFO models, Identification Schemes, Inventory management systems.
6. **Quality Management Systems:** QA models. Deming, Juran Crosby, Quality circles, management responsibility, quality planning, purchasing, design process and design validation, quality audit, corrective and preventive measures.
7. **Time analysis and Manufacturing Management:** Managerial issues, manufacturing systems, process optimization, mathematical modeling, time management, resource allocation, raw material, production analysis.
8. **Problem analysis and Decision tree:** decision support system, decision tree, design of experiments.
9. Production and operation management
10. Management tools

RECOMMENDED BOOKS:

1. *Handbook of Engineering Management by Dennis Lock.*
2. *Total Quality Management by Dale H. Besterfield, Carol Besterfield-Michna, Glen H. Besterfield, Mary Gesterfield-Sacre*
3. *Manufacturing Processes and systems by Ostwalds*
4. *Handbook of Reliability Engineering and Management by W. Grant Ireson, Clyde F. Coombs, Richard Y. Moss.*

SYLLABUS FOR THE SUBJECT OF PSYCHOLOGY

PAPER- I

Total Marks : 100

I. Introduction to Psychology

Definition, Evolution and Scope of Psychology
Schools of Psychology: Behaviorism, Psychoanalysis, Humanistic/ Existential, Cognitive and Biological School
Recent Trends and Specialties in Psychology

II. Sensation and Perception

Sensory Processes

Theories of Vision and Hearing
Theories of Taste Smell and Position
Senses of Touch Position and Balance

Nature of Perceptual Organization

Perception of Distance, Movement, Space, Depth, Color
Perceptual Constancy
Perception and Optical Illusions
Extrasensory Perception
Perceptual Development

III. Learning, Memory and Intelligence

Learning

Different Types of Learning:
Classical Conditioning
Operant Conditioning
Observational Learning

Memory

Short Term and Long Term memory
Information Processing Theory
Encoding, Storage and Retrieval
Forgetting

Intelligence

Extremes of Intelligence: Mental Retardation and Giftedness
Theories of Intelligence
Intelligence and Psychological Testing

IV. Biological Foundations of Behavior

Components of Nervous System
Structure and Functions of the Brain
Brain and Behavior
Endocrine System
Genetic Influences on Behavior
Nature, Nurture and Human Diversity

V. Child Development

Introduction to Child Development
Historical and Modern Views
Domains of Development
Theories of Child Development
Biological Development
Cognitive Development
Psychological Development

VI. Motivation

Nature of Motives
Needs, Drives and Motivations
Concept of Homeostasis
Types of Motivation
Theories of Motivation
Role of Culture in Motives

VII. Emotions

Nature and Types of Emotions
Theories of Emotions
Biological and Psychological Changes in Emotions
Role of Endocrine Glands
Situational Influences and Cultural Practices
Frustration and Conflict

SUGGESTED READINGS

1. *Psychology; Themes and Variations 5th Ed., Wayne Weiten*
2. *Psychology 5th Ed., Benjamin b. Lahey*
3. *Psychology & Life 17th Ed., Richard J. Gerrig, & Philip G. Zimbardo*
4. *Introduction to Psychology 6th Ed., John W. Santrock*
5. *Psychology & Life 7th Ed., Floyd I. Ruch*
6. *Life-span Development 9th Ed., John W. Santrock*
7. *Understanding Psychology 6th Ed., R. S. Feldman*
8. *Psychology 6th Ed., David G. Myers*
9. *Abnormal Psychology 4th Ed., Barlow & Durand*
10. *Social Psychology 7th Ed., David G. Myers*
11. *Principles of Human Neuropsychology, G. Dennis Rains*
12. *An introduction to the History of psychology, Hergenhahn*

PAPER-II

Total Marks: 100

I. Health, Stress and Coping

Health Impairing Behaviors:

Smoking, Alcoholism, Poor Nutritional Habits, Lack of Exercise, Behavioral Aids. Stress and its Impact on Health

Major Types of Stress

Physiological & Psychological Reactions to Stress

II. Personality Theories and Assessment

Definition of Personality

Theories of Personality Development

Psychoanalytical Theory

Social Learning Theory

Humanistic Theory

Traits Theory and Situations

Human Diversity

Personality Assessment

III. Psychological Disorders and their treatment

Abnormal Behavior; Myths, Realities and

Controversies Criteria of Abnormal Behavior

The Classification of Disorders

Diagnostic and Statistical Manual of Mental Disorders (DSM)

Anxiety Disorders, Mood Disorders and Personality Disorders

Treatment and Intervention

Stages of Psychotherapy

Goals of Psychotherapy

Family & Group Therapies

IV. Social Processes, Society and Culture

Social Roles and Rules

Social Norms and Conformity

The Process of Socialization and Attitude Development

Situational Effects on Social Behavior

Social Cognition and Relationships

V. Behavior and Group Dynamics

Leaders, Groups and Decision Making
Aggression, Altruism and Pro-social Behavior
Situational Influences and Cultural Constraints
Prejudice and Stereotypes
The Psychology of Conflict and Peace

VI. Research Methods in Psychology

Scientific Research in Psychology

Types of Research:

Experimental Studies: Placebo Effect and Use of Placebos in Experiments
Correlational Studies
Descriptive Studies
Case Studies
Surveys

VII. Ethical issues in Psychology

Confidentiality
Informed Consent
Relationships with Vulnerable Individuals
A General Concern for Ethical Practice

SUGGESTED READINGS

1. *Clinical Psychology*, E.G. Plante
2. *Introducing Psychology* 4th Ed., Rex Knight
3. *Psychology & Life* 17th Ed., Richard J. Gerrig, & Philip G. Zimbardo
4. *Introduction to Psychology* 6th Ed., John W. Santrock
5. *Psychology & Life* 7th Ed., Floyd I. Ruch
6. *Psychology; Themes and Variations* 5th Ed., Wayne Weiten
7. *Understanding Psychology* 6th Ed., R. S. Feldman
8. *Psychology* 6th Ed., David G. Myers
9. *Abnormal Psychology* 4th Ed., Barlow & Durand
10. *Social Psychology* 7th Ed., David G. Myers
11. *Advanced Social Psychology*, Abraham Tesser
12. *Health psychology* 4th Ed., Shelly Tylor

SYLLABUS FOR THE SUBJECT OF PUBLIC ADMINISTRATION PAPER- I

Total Marks: 100

1. **Public Administration: Definition, Concepts, Approaches and Context**

Definitions; Role and Scope of Public Administration in Society; Issues in Public Administration Theory and Practice – Democracy versus Bureaucracy, Politics versus Administration, Efficiency versus Equity; Core Values of Public Administration – Rule of Law, Efficiency, Equity and Fairness, Responsiveness; Traditional Public Administration; New Public Management; New Public Management; New Public Service; Governance Approach to Public Administration; Islamic Concept of Public Administration.

2. **Public Organization: Classical and Contemporary Theories and Concepts**

Bureaucracy; Scientific Management; The Human Relations; Leadership, Motivation, Network; Governance; Strategic Management; Public Choice; Administrative Culture; Types of Organizational Structure; Organization of Federal, Provincial, and Local Government; Administrative Culture.

3. **Public Policy Planning, Implementation and Evaluation**

Strategic Planning and Management; Planning Process; Policy Analysis; Policy Implementation; Program Evaluation; Planning Machinery; Role of Donors and International Institutions in Public Polity and Management.

4. **Budgeting and Financial Management**

The Budget as a Policy Tool; The Budget as a Managerial Tool; Principles of Budgeting, Auditing and Accounting in Government; The Line-Item Budget; The Performance Budget; Program Budgeting; Zero-Base Budgeting; Outcome-Based Budgeting.

5. **Managing Human Resources**

Spoil versus Merit System in Public Employment; Personnel versus Human Resources Management; Close versus Open System of Public Employment; Functions of Human Resources Management; Challenges of Adopting HRM in Public Sector.

6. **Public Management Skills**

Communication; Decision Making, Conflict Management; Leading, Administrative Buffering; Managing Change; Managing Diversity; Stress Management; Delegation and Motivation; Creativity and Problem Solving; Issues of Public Management.

7. **Governance and Administrative Reforms**

Theories of Administrative Reforms; Types of Administrative Reforms – Privatization, Regulation, De-regulation, Decentralization, Business Re-engineering, Quality Assurance.

8. Public Administration and Citizens

Bureaucratic Responsiveness; Representative Bureaucracy; Citizens Engagement in Public Service; The Concept and Approaches to Public Accountability of Public Service; Institutional Framework for Administrative Accountability; Administrative Corruption; Role of Civil Society in Good Governance.

9. Public Administration and Development

Role of Public Administration in Development; Concept of Development Administration; Difference Between Development Administration and Development Management; Changing Role of Public Administration in Development.

1 - Organizational Structure of Federal Government and Administration

Constitutional Framework for Federal Government; Organization and Functions of Federal Secretariat; Organization and Functions of Federal Agencies Relationship between Ministries and Federal Agencies/Authorities; Inter-ministerial Coordination; Organization and Functions of Regulatory Agencies.

2 - Organization of Provincial and Local Government

Governance Structure of Provincial Administration; Organization of Provincial Secretariat; Organization and Functions of Provincial Authorities and Agencies and their Relationship with Government Departments; Post-devolution Local Governance; Organization and Functions of District Government and Administration; Organization and Structure of City District Government; Issues and Challenges of Local Governance.

3 - Intergovernmental Relationship

Administrative Relationship between Federal Government and Provincial Government; Fiscal Relationship between Federal Government and Provincial Government; Administrative and Fiscal Relationship between Provincial Government and District Government.

4 - The Civil Service

Historical Background of Civil Service, The Structure of civil Service; History of Civil Service Reform; Management of Civil Service; Institutional and Cultural Context of Civil Service; Role of Civil Service in Good Governance, Women and Civil Service.

5 - Public Policy and Planning

Institutional Framework for Policy Coordination and Planning; Policy and Planning Process; Role of Planning Commission in Policy and Planning; Strategic Planning in Federal, Provincial Government and Local Government; Role of International Donors in Policy Formulation; Public Policy and Implementation in Key Sectors (i.e., Health, Education).

6 - Financial Administration

Structure and Functions of Revenue Administration; Budgetary Process in the Federal, Provincial and Local Government; Tax Administration; Accounting and Auditing System; Issue and Challenges of Fiscal Decentralization.

7 - Managing Human Resources

Institutional Framework for Recruitment and Training of Government Employees; Labor Laws; The System of Compensation, and Performance Evaluation of Government Employees; Management of Human Resources in Public Enterprises.

8 - Development Governance and Management

Approaches to Managing Development; History of Development and Public Administration with Particular Reference to Pakistan; Changing Role of Bureaucracy in Development; Role of Civil Society in Development; Role of International Institutions in Development Policy and Management.

RECOMMENDED BOOKS

1. *Denhardt, R., Public Administration, Belmont, CA: Wadsworth, 1995.*
2. *David H. Rosenbloom, Public Administration – Understanding Management, Politics and Law in the Public Sector, Second Edition, 1989.*
3. *Caiden, Gerald. E, Public Administration. 1982.*
4. *Cooper et al, (1998) Public Administration for the Twenty-First Century.*
5. *Harmon, Michael M. & Mayer. Richard T, Organization Theory for Public Administration, Little Brown and Company 1986.*
6. *Nicholas Henry, Public Administration and Public Affairs, Sixth edition*
7. *Shafritz, J. and Hyde, A., Classics of Public Administration, Pacific Grove: Brooks – Cole, 1987.*
8. *Candler, R. & Plano, J., (1983) Public Administration Dictionary, John Wiley, New York.*
9. *Osbourne, D. and Gaebler, I. (1992) Reinventing Government, Reading, MA: Addison Wesley.*
10. *Wilson, J. Q., (1989) Bureaucracy, Basic Books, New York.*
11. *Braibanti, Ralph (1987) Evolution of Pakistan's Administration System. (Jameelur Rehman ed.) Government of Pakistan Public Administration Research Centre.*
12. *Khadija Mahbug-ul-Haque (1999) Human Development in South Asia: The Crises of Governance, Oxford University Press, Karachi.*
13. *Kennedy, Charles H., (1987) Bureaucracy in Pakistan, Oxford University Press, Bombay, India.*
14. *Beckett, Julia & Koenig Heidi O., (2005) Public Administration and Law, M.E. Sharpe, London.*
15. *Heady, Ferrel. (2001) Public Administration: A comparative Perspective, 6th ed. Marcel Dekker, New York.*
16. *Lane, Jan-Erik (2005) Public Administration and Public Management: The Principle Agent Perspective, Routledge, London.*
17. *Hasnat Abdul Hye, (2001) Governance: South Asian Perspective, Oxford University Press, London.*
18. *Abdus Samad. (1993) Governance, Economic Policy and Reform in Pakistan: essays in political economy, Vanguard Book, Lahore.*

19. *Government and Administration in Pakistan (1987). Jameelur Rehman Khan (Ed.) Pakistan Public Administration Research Centre O & M Division, Cabinet Secretariat.*
20. *Sultan Khan. (2006) Public Administration: with special reference to Pakistan. Famous Books, Lahore.*
21. *Hoshiar Singh. (1995) Public Administration in India. Sterling Publishers. UK.*
22. *Kalyanaraman Srinivasan (1991) Public Administration in Asia, Vol. I, II Ashish Publishing House, New Delhi, India.*

SYLLABUS FOR THE SUBJECT OF SOCIAL WORK

Paper-I

Total Marks: 100

1. Introduction To Social Welfare

- a) Definition and Scope
- b) Historical Perspective of Social Welfare in Pakistan

2. Pakistani Society

- a) Definition and description of the term "Society"
- b) Characteristics of Pakistani Society
- c) Comparison of Rural and Urban Communities

3. Culture

- a) Definition and description of the term "Culture" and its importance
- b) Characteristics of Pakistani Culture
- c) Influence of allied cultures on Pakistani Culture
- d) Social norms-definition and stages (i.e. folkways, more and laws)
- e) Socialization-definition and description and factors of socialization (i.e. Family, Neighborhood, Peer group, Religious Institute. Educational Institutions, Mass media and Communication.

4. Social Institutions

- a) Definition and description of "Social Institutions"
- b) Types of Social Institutions: Primary, Secondary
- c) Functions of the following:
 - Family Institution
 - Political Institution
 - Educational Institution
 - Religious Institution
 - Economic Institution
 - Recreational Institution
- d) Importance of social institutions.

5. Social Change

- a) Definition and area of "Social Change"
- b) Process and effects of social change on Society
- c) Factors which promote and hinder social change

6. Social Problems of Pakistan

- a) Major and explanation of social problems
- b) General causes of social problems
- c) Major social problems of Pakistan (An orientation)

- | | |
|---------------------------|---------------|
| - Drug addition | - Illiteracy |
| - Over population | - Beggary |
| - Juvenile delinquency | - Environment |
| - Crime | - Violence |
| - Child labor | |
| - Child abuse and neglect | |
| - Bonded labor | |
| - Poverty | |
| - Unemployment | |

RECOMMENDED BOOKS:

1. *W.A. Friedlander, Introduction to Social Welfare. Prentice-Hall, Englewood Cliffs, U.S.A.*
2. *A.S. Livingston, Social Work in Pakistan, Lahore, West Pakistan Social welfare Council.*
3. *Arthur C. Fink, The field of Social work, new Your, Hold, Rinehart, 6th Ed. 1974.*
4. *Skidmore Thackeray, Introduction to Social Work, New Jersey, Prentice-Hall, 1964.*
5. *Elizabeth A. Ferguson, Social Work, an Introduction. New York, Lippinco H. 1969.*
6. *Ogburn Nimkoff, Hand Book of Sociology, London Rout ledge and Kegan Paim.*
7. *Sociology and Social Change, Amanda Coffey, open University Press, Celftic Court 22 Ball moor Buckingham MK 18 IXW.*
8. *Paul. B. Horton, The Sociology of Social Problems, New York Prentice Hall.*
9. *Prof. Abdul Hameed Taga, 1999, Sociology & Problems, Abdul Hameed & Sons, Publisher, Lahore.*
10. *M. Khalid, Social Work methods and Practical, Kifayat Academy Karachi, 1995.*

1. Nature and Philosophy of Social Work

- a. Definition and philosophical base of social work
- b. Objectives of social work practice
- c. Basic principles of social work
- d. Professional and voluntary social work

2. Islam and Social Work

- a. Islamic concept of social welfare and professional social work.
- b. Worth and dignity of individual.
- c. Rights and responsibilities of individuals in Islamic Society.
- d. Social relationship in Islam i.e. Family, Neighborhood, Mosque.

3. Methods of Social Work

PRIMARY METHODS

i. Social Casework

- a) Definition and description of social case work
- b) Elements/Components of social case work (person, problem, place, professional person and process)
- c) Principles of social case work
- d) Phases/steps in social case work
- e) Fields of application of social case work practice
- f) Role of Professional worker in case work practice

ii. Social Group work

- a) Definition and description of social group
- b) Types of social groups (primary and secondary, formal and informal groups)
- c) Stages of group development
- d) Definition of social group work and its philosophy
- e) Objectives of social group work
- f) Components of social group work (group, agency, and group worker)
- g) Principles of social group work
- h) Fields of application of group work practice
- i) Role of professional worker in-group work practice

iii. Community Development

- a) Definition and description of community
- b) Definition of community organization and development
- c) Objectives of Community Development
- d) Phases/steps in community development (study of monitoring and evaluation)
- e) Principles of community development
- f) Role of professional worker in community

SECONDARY METHODS

i) Social Research

- a) Definition and description of social research
- b) Phases/steps in social research
- c) Tools of data collection (questionnaire, interviewing schedule, Interview guide and observation)

ii) Social Action, Policy and Administration

- a) Definition and description of social welfare administration
- b) Importance of social welfare administration in social work

iii) Social Action

- a) Definition and description of social action
- b) Importance of social action in social welfare

4. Fields/Area of Social Work

- a) School social work
- b) Medical social work
- c) Community development
- d) Child welfare
- e) Youth welfare
- f) Women welfare
- g) Welfare of the Physically disabled
- h) Welfare of the mental retarded
- i) Welfare of the socially dis-advantaged
- j) Welfare of the Juvenile Delinquents and Adult Criminals

5. Role of Voluntary Social Welfare Agencies in Socio-Economic Development

- a) Definition and description of social welfare agency
- b) Types of social welfare agencies (government, semi-government, voluntary/NGOs)
- c) Role of the voluntary social welfare agencies, socio-economic development

RECOMMENDED BOOKS

1. *Friendlander M. Der. Concepts and Methods of social work, Prentice-Hall, N.W. Jersey.*
2. *Hamilton, Gordon, Principles of Case, Recording, New York Columbia University Press.*
3. *Perelman, Halen, Social Case Work, A Problem solving process, Chicago The University of the Chicago Press.*
4. *Richmond, Mary, E. Social Diagnosis, New York, Russell Foundation*
5. *Douglas Tom, Group Work Practice, Cambridge, Tailstock publication, 1976*
6. *Arthur Dunham, 1958, Community Welfare Organization Principles & Techniques Practices. Thomas Y. Crowell Company, New York, p-14*
7. *Arthur Dunham, 160. Community Development, p.p. 178-186 in social Work Year Book, Edited by Russell H. Kurtz, New York, national Association of Social Workers.*

SYLLABUS FOR THE SUBJECT OF SOCIAL WORK

Paper-I

Total Marks: 100

1. Introduction To Social Welfare

- c) Definition and Scope
- d) Historical Perspective of Social Welfare in Pakistan

2. Pakistani Society

- d) Definition and description of the term "Society"
- e) Characteristics of Pakistani Society
- f) Comparison of Rural and Urban Communities

3. Culture

- f) Definition and description of the term "Culture" and its importance
- g) Characteristics of Pakistani Culture
- h) Influence of allied cultures on Pakistani Culture
- i) Social norms-definition and stages (i.e. folkways, more and laws)
- j) Socialization-definition and description and factors of socialization (i.e. Family, Neighborhood, Peer group, Religious Institute. Educational Institutions, Mass media and Communication.

4. Social Institutions

- e) Definition and description of "Social Institutions"
- f) Types of Social Institutions: Primary, Secondary
- g) Functions of the following:
 - Family Institution
 - Political Institution
 - Educational Institution
 - Religious Institution
 - Economic Institution
 - Recreational Institution
- h) Importance of social institutions.

5. Social Change

- d) Definition and area of "Social Change"
- e) Process and effects of social change on Society
- f) Factors which promote and hinder social change

6. Social Problems of Pakistan

- d) Major and explanation of social problems
- e) General causes of social problems
- f) Major social problems of Pakistan (An orientation)

- | | |
|---------------------------|---------------|
| - Drug addition | - Illiteracy |
| - Over population | - Beggary |
| - Juvenile delinquency | - Environment |
| - Crime | - Violence |
| - Child labor | |
| - Child abuse and neglect | |
| - Bonded labor | |
| - Poverty | |
| - Unemployment | |

RECOMMENDED BOOKS:

1. *W.A. Friedlander, Introduction to Social Welfare. Prentice-Hall, Englewood Cliffs, U.S.A.*
2. *A.S. Livingston, Social Work in Pakistan, Lahore, West Pakistan Social welfare Council.*
3. *Arthur C. Fink, The field of Social work, new Your, Hold, Rinehart, 6th Ed. 1974.*
4. *Skidmore Thackeray, Introduction to Social Work, New Jersey, Prentice-Hall, 1964.*
5. *Elizabeth A. Ferguson, Social Work, an Introduction. New York, Lippinco H. 1969.*
6. *Ogburn Nimkoff, Hand Book of Sociology, London Rout ledge and Kegan Paim.*
7. *Sociology and Social Change, Amanda Coffey, open University Press, Celftic Court 22 Ball moor Buckingham MK 18 IXW.*
8. *Paul. B. Horton, The Sociology of Social Problems, New York Prentice Hall.*
9. *Prof. Abdul Hameed Taga, 1999, Sociology & Problems, Abdul Hameed & Sons, Publisher, Lahore.*
10. *M. Khalid, Social Work methods and Practical, Kifayat Academy Karachi, 1995.*

1. Nature and Philosophy of Social Work

- a. Definition and philosophical base of social work
- b. Objectives of social work practice
- c. Basic principles of social work
- d. Professional and voluntary social work

2. Islam and Social Work

- a. Islamic concept of social welfare and professional social work.
- b. Worth and dignity of individual.
- c. Rights and responsibilities of individuals in Islamic Society.
- d. Social relationship in Islam i.e. Family, Neighborhood, Mosque.

4. Methods of Social Work

PRIMARY METHODS

i. Social Casework

- g) Definition and description of social case work
- h) Elements/Components of social case work (person, problem, place, professional person and process)
- i) Principles of social case work
- j) Phases/steps in social case work
- k) Fields of application of social case work practice
- l) Role of Professional worker in case work practice

ii. Social Group work

- j) Definition and description of social group
- k) Types of social groups (primary and secondary, formal and informal groups)
- l) Stages of group development
- m) Definition of social group work and its philosophy
- n) Objectives of social group work
- o) Components of social group work (group, agency, and group worker)
- p) Principles of social group work
- q) Fields of application of group work practice
- r) Role of professional worker in-group work practice

iii. Community Development

- g) Definition and description of community
- h) Definition of community organization and development
- i) Objectives of Community Development
- j) Phases/steps in community development (study of monitoring and evaluation)
- k) Principles of community development
- l) Role of professional worker in community

SECONDARY METHODS

i) Social Research

- a) Definition and description of social research
- b) Phases/steps in social research
- c) Tools of data collection (questionnaire, interviewing schedule, Interview guide and observation)

ii) Social Action, Policy and Administration

- c) Definition and description of social welfare administration
- d) Importance of social welfare administration in social work

iii) Social Action

- c) Definition and description of social action
- d) Importance of social action in social welfare

4. Fields/Area of Social Work

- k) School social work
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- m) Community development
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- o) Youth welfare
- p) Women welfare
- q) Welfare of the Physically disabled
- r) Welfare of the mental retarded
- s) Welfare of the socially dis-advantaged
- t) Welfare of the Juvenile Delinquents and Adult Criminals

5. Role of Voluntary Social Welfare Agencies in Socio-Economic Development

- d) Definition and description of social welfare agency
- e) Types of social welfare agencies (government, semi-government, voluntary/NGOs)
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RECOMMENDED BOOKS

1. *Friendlander M. Der. Concepts and Methods of social work, Prentice-Hall, N.W. Jersey.*
2. *Hamilton, Gordon, Principles of Case, Recording, New York Columbia University Press.*
3. *Perelman, Halen, Social Case Work, A Problem solving process, Chicago The University of the Chicago Press.*
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7. *Arthur Dunham, 160. Community Development, p.p. 178-186 in social Work Year Book, Edited by Russell H. Kurtz, New York, national Association of Social Workers.*

SYLLABUS FOR THE SUBJECT OF SOCIOLOGY
PAPER – I
PRINCIPLES OF SOCIOLOGY

Total Marks: 100

1. INTRODUCTION

- i. Definition of Sociology
- ii. Culture and Society
- iii. Socialization, Norms, Values, Status and Roles
- iv. Sociological Perspectives
 - a. Structuralism
 - b. Interpretive theories
 - c. Modernism And Postmodernism

2. FAMILIES AND HOUSEHOLDS

- i. Sociological perspectives on the family
 - a. The functionalist perspective
 - b. The traditional Marxist perspective
 - c. Marxist feminist and radical feminist perspective on the family
- ii. Family ideology
- iii. Politics, Social Policy and the family
- iv. Is the family a declining social institution?

3. SEX AND GENDER

- i. Sex: A Biological Distinction
- ii. Gender: A Cultural Distinction
 - a. Gender in global perspective
 - b. Patriarchy and sexism
- iii. Gender Socialization
 - a. Gender and the family
 - b. Gender and the peer group
 - c. Gender and schooling
 - d. Gender and the mass media

- iv. Gender Stratification
 - a. Working men and women
 - b. Housework: women's "second shift"
 - c. Gender, income and wealth
 - d. Gender and education
 - e. Gender and politics
 - f. Gender and the Military
 - g. Are women a minority?
 - h. Minority women
 - i. Violence against women

- v. Theoretical analysis of gender
 - a. Structural-Functional Analysis
 - b. Social-conflict analysis

- vi. Feminism
 - a. Basic feminist ideas
 - b. Variations within feminism
 - c. Opposition to feminism

4. Health

- i. What is meant by 'health', 'illness' and 'disease'?
- ii. Disability
- iii. The medical and social models of health
 - a. The medical (biomedical) model of health
 - b. The social model of health

- iv. Becoming a health statistic
- v. Medicine and social control; the sick role
 - a. Features of the sick role
- vi. The power of the medical profession
 - a. Protecting the patient
 - b. Criticisms of the medical professions
 - c. The erosion of medical power?
- vii. Marxist approaches to health and medicine
- viii. How society influences health
 - a. Improvements in health in the nineteenth and early twentieth centuries
- ix. The new 'disease burden'
 - a. What are the causes of these new diseases?

- x. Inequalities in health
 - a. Social class inequalities in health
 - b. Gender differences in health

- xi. Inequalities in health
 - a. Funding
 - b. Geography
 - c. Social Class
 - d. Disability

- xii. Mental illness
 - a. What is mental illness?
 - b. Care in the community
 - c. The biomedical approach to mental illness
 - d. The social construction of mental illness

5. THE MASS MEDIA

- 1) The power of the media
- 2) Ownership of the mass media
- 3) The mass media and ideology
- 4) Do the owners of the media control their content?
 - a. The manipulative or instrumentalist approach
 - b. The dominant ideology or hegemonic approach
 - c. The pluralist approach
- 5) Violence and the media
- 6) What affects the content of the media? Bias in the media
 - a. The owners
 - b. Making a profit
 - c. Organizational constraints
 - d. Agenda-setting
 - e. Gate-keeping
 - f. Norm-setting
- 7) The presentation and social construction of the news
 - a. Inaccurate and false reporting
 - b. News values and 'newsworthiness'

- c. The assumptions and activities of journalists

- 8) The media, crime and deviance
- 9) Media Representation and Stereotyping
 - a. Media representations of age
 - b. Media representations of social class
 - c. Media representations of ethnicity
 - d. Media representations of gender
 - e. Media representations of disability
- 10) The mass media and mass culture
 - a. 'Mass culture'
 - b. 'High culture'
 - c. A Marxist view of mass culture
 - d. Criticism of the idea of a 'mass culture'

6. EDUCATION

- 1. The Function of Schooling
 - a. Socialization
 - b. Culture Innovation
 - c. Social Integration
 - d. Social Placement
 - e. Latent Functions of Schooling
- 2. Schooling and social Inequality
 - a. Social control
 - b. Standardized testing
 - c. School tracking
 - d. Inequality among schools
 - e. Access to higher education
 - f. Credentialism
 - g. Privilege and personal merit

7. COLLECTIVE BEHAVIOR AND SOCIAL MOVEMENTS

1. Localized Collectives: Crowds
 - a. Mobs and riots
 - b. Crowds, mobs and social change
 - c. Explaining crowd behavior
2. Dispersed collectives: mass behavior
 - a. Rumor and gossip
 - b. Public opinion and propaganda
 - c. Panic and mass hysteria
 - d. Fashions and fads
3. Social Movement
 - a. Types of social movements
 - b. Explaining social movements
 - c. Gender and social movements
 - d. Stages and social movements
 - e. Social movements and social change
 - f. Social engineering

8. ENVIRONMENT AND SOCIETY

1. Ecology: The study of the natural environment
 - a. The role of sociology
 - b. The global dimension
 - c. The historical dimension
 - d. Population increase
 - e. Cultural patterns: growth and limits
2. Environmental Issues
 - a. Solid waste: the disposable society
 - b. Preserving clean water
 - c. Cleaning the air
 - d. Acid rain
 - e. The rain forests

3. Society and the environment: theoretical analysis
 - a. Structural-functional analysis
 - b. Cultural ecology
 - c. Social-conflict analysis
 - d. Alternative dispute resolution
 - e. Environmental racism

9. RELIGION IN MODERN SOCIETY

- a. Sociological theories and ideas
 - a. Sociological study of religion
 - b. Theories of religion
- b. Real world religions
 - a. Totemism and animism
 - b. Judaism, Christianity and Islam
 - c. The religions of the Far East
 - d. Religious organizations
- c. Secularization and religious revival

10. POLITICS AND GOVERNMENT

1. Power and Authority
 - i. Traditional authority
 - ii. Regional-legal authority
 - iii. Charismatic authority
2. Politics in global perspective
 - i. Monarchy
 - ii. Democracy
 - iii. Authoritarianism
 - iv. Totalitarianism
 - v. A Global political system?

3. Theoretical analysis of power in society
 - i. The pluralist model: the people rule
 - ii. The Power-elite model: a few people rule
 - iii. The Marxist model: bias in the system itself
4. Power beyond the rules
 - i. Revolution
 - ii. Terrorism
5. War And Peace
 - i. The causes of war
 - ii. The costs and causes of militarism
 - iii. Nuclear weapons
 - iv. The pursuit of peace

11. POPULATION AND URBANIZATION

1. Demography: the study of population
 - i. Fertility
 - ii. Mortality
 - iii. Migration
 - iv. Population growth
 - v. Population composition
2. History and Theory of Population Growth
 - i. Malthusian theory
 - ii. Demographic transition theory
 - iii. Global population today: a brief survey

PAPER-II
APPLIED SOCIOLOGY

Total Marks: 100

1. SOCIOLOGICAL METHODS

- 1) Influences on the choice of research method
 - a. Positivism and research methods
 - b. Interpretive research methods
 - c. Other influences on the choice of research methods
- 2) Key issues in social research
 - a. Validity
 - b. Reliability
 - c. Ethics
- 3) Primary and Secondary data
- 4) Qualitative secondary sources
 - a. The advantage and uses of qualitative secondary sources
 - b. The disadvantages and limitations of qualitative secondary sources
 - c. Content analysis
- 5) Quantitative secondary sources
 - a. The advantages and uses of official statistics
 - b. The problems and limitations of official statistics
- 6) The experimental (laboratory) methods of research
 - a. Problems of using the experimental method in sociology
 - b. Field experiments
- 7) The Comparative methods
- 8) Surveys and sampling methods
 - a. Who uses the survey method?
 - b. Representativeness and sampling
 - c. The stages of a survey
 - d. Problems of the social survey

9) Questionnaires

- a. The nature and use of questionnaires
- b. Questionnaire design: principle and problems
- c. Types of questionnaires
- d. The validity of questionnaire research

10) Interviews

- a. Structure of formal interviews
- b. Unstructured or informal interviews
- c. General problems of interviews
- d. Concluding remarks on interviews

11) Participant observation

- a. The theoretical context of participant observation
- b. The stages of participant observation and related problems
- c. The strengths and weakness as of participant observation
- d. Internal and external consistency in participant observation

12) Non-participant observation

13) Longitudinal studies

14) Case studies and life histories

15) Methodological pluralism and triangulation

16) Doing your own research

- a. Hypothesis or aim
- b. Context and concepts
- c. Main research methods and reasons for their use
- d. Potential problems

17) An example of coursework proposal

2. GLOBALIZATION AND SOCIAL CHANGE

1. Globalization
 - i. Factors contributing to globalization
 - ii. The globalization debate
 - iii. The impact of globalization
 - iv. Global Interdependence
2. What is Social Change?
 - a. Globalization: Essential Features
 - b. Causes and consequences of social change
 - c. Factors contributing to globalization
 - d. The globalization debate
 - e. The impact of globalization
3. Innovations
 - i. International tourism
 - Changes in the ways people relate to information
 - The cultural base and the rate of change
 - Cultural lag
 - Revolutionary ideas
 - ii. Conflict
 - The cold war origin of the internet
 - iii. The pursuit of profit
 - World system theory
 - Responses to economic stagnation

3. GLOBAL INEQUALITY

1. Global economic inequality
 - i. High-income countries
 - ii. Middle-income countries
 - iii. Low-income countries

- iv. Is global economic inequality increasing?
2. Life in rich and poor countries
- v. Health
 - vi. Hunger, malnutrition and famine
 - vii. Education and Literacy
3. Can poor countries become rich?
- i. Theories of development
 - ii. Evaluating theories of development
 - iii. The role of international organizations and global inequality
 - iv. Global economic inequality in a changing world
4. World population growth
- i. Population analysis: demography
 - ii. Dynamics of population change
 - iii. Malthusianism
 - iv. The demographic transition
 - v. Prospects of change

4. **CRIME AND DEVIANCE**

- 1. Basic concepts
- 2. Explaining crime and deviance: sociological theories
 - i. Functionalist Theories
 - ii. Integrationist theory
 - iii. Conflict theories: 'the new criminology'
 - iv. Control theories
 - v. Theoretical conclusions

3. Patterns of crime in Pakistan
 - i. Crime and crime statistics
4. Victims and perpetrators of crime
 - i. Gender and crime
 - ii. Youth and crime
 - iii. White-collar crime
 - iv. Organized crime
 - v. Cyber crime
5. Prisons: is it the answer to crime?
6. Conclusion: deviance and social order

List of Readings

1. *Browne, Ken. (2006). Introducing Sociology for AS Level. 2nd Edition. Polity Press*
2. *Cohen, Stephen Philip. (2005). The Idea of Pakistan. Vanguard Books (pvt.) Ltd.*
3. *Ferrante, Joan. (2003). Sociology: A Global Perspective. 5th Edition. Thomson Wadsworth, Australia.*
4. *Giddens, Anthony. (2006). Sociology. 5th Edition. Polity Press.*
5. *Haqqani, Husain. (2005). Pakistan: Between Mosque and Military. Vanguard Books (pvt.) Ltd.*
6. *Macionis, John J. Sociology. 7th Edition. Prentice Hall, Upper Saddle River, New Jersey*
7. *Raza, Rafi. (2001) Pakistan in Perspective: 1947-1997. 1st Edition. Oxford University Press*
8. *Talha, Naureen. (2000). Economic Factors in the Making of Pakistan (1921-1947). Oxford University Press*
9. *Chakravarti, Ashok. (2005). Aid, Institutions and Development: New Approaches to Growth, Governance and Poverty. Oxford university Press, New Delhi, India.*
10. *Webster, Andrew. (1990). Introduction to Sociology of Development. Macmillan Education Ltd.*
11. *Craig, Baxter. (2001). Pakistan 2000. Oxford University Press.*
12. *Ahmad, Akbar S. (1986). Pakistan Society: Islam, Ethnicity and Leadership in South Asia. Oxford University Press, New York.*
13. *Merton, Robert K. (1961). Contemporary Social Problems. Harcourt, Brace & World, Inc.*

14. Neuman, W. Lawrence. (2000). Social Research Methods: Qualitative and Quantitative Approaches. Allyn and Bacon.
15. Hamilton, Malcolm. (2000). The Sociology of Religion. 2nd Edition. Routledge, New York
16. Chaudhry, M. Iqbal. (1980) Pakistan Society: A Sociological Perspective. Aziz Publishers.
17. Ritzer, George. (1992). Sociological Theory. McGraw Hill.

SYLLABUS FOR THE SUBJECT OF STATISTICS PAPER– I

Total Marks: 100

Descriptive Statistics: (15%)

Nature and scope of Statistics. Organizing and classification of data. Population and sample. Variables, Measurement scales. Descriptive and Inferential Statistics. Description of data by frequency tables and graphs. Stem and leaf plot and Box and whisker plot. Arithmetic Mean, Geometric Mean, Harmonic Mean, Mode, Median, Quartiles. Properties of Mean with proofs. Relative Merits and Demerits of various averages. Weighted Arithmetic Mean. Empirical Relation between Mean, Median and Mode. Absolute and Relative Measures of dispersion: Range, Semi-Inter Quartile Range, Mean Deviation, Variance, Standard Deviation, Coefficient of Variation, Coefficient of Mean Deviation, Coefficient of quartile Deviation. Properties of Variance and Standard Deviation with proofs. Standardized Variables. Moments, Moments Ratios, Sheppard's Correction, Skewness and Kurtosis. Chebechev's theorem and its application.

Concepts of Probability: (05%)

Operation in sets. Cartesian product set. Random experiment. Sample space and events. Rules of counting. Introduction to probability and axioms of probability, emphasising to concepts, facts, interpretation and illustrating examples. Basic laws of probability. Conditional and marginal probabilities. Independence of events. Baye's theorem and its application.

Random Variable: (15%)

Discrete random variable. Probability function, probability distribution function. Mathematical expectation and its properties. Joint distribution of two discrete random variables. Marginal and conditional distributions. Mean, variance, moments, covariance and correlation of two discrete random variables. Moment generating function and its properties.

Continuous random variable. Probability distribution of a continuous random variable. Probability density function and probability distribution function. Joint distribution of two continuous random variables. Marginal and conditional distributions. Mathematical expectation and its properties. Moment generating function. Covariance and correlation of two random variables. Mean, Median, Mode, Geometric mean, Harmonic mean, Mean deviation, variance and moments of simple continuous functions.

Discrete Probability Distributions: (15%)

Uniform Bernoulli, Binomial, Multinomial, Hypergeometric, Poisson, Negative Binomial and Geometric distributions with their derivations, applications and fitting to statistical data. Poisson approximation to the binomial distribution.

Continuous Probability Distributions: (15%)

Uniform, Exponential and Normal distributions. Their properties, applications and fitting to statistical data. Normal approximation to the Binomial and Poisson distributions.

Bivariate Normal Distribution (10%):

Derivation, conditional density function, conditional expectation and moment generating function μ_{20} , μ_{02} and μ_{11} .

Method of Least Squares: (15%)

Scatter diagram, Principle of least square. Deduction and solution of normal equations of general linear model. Curve fitting. Equations of approximating curves by the method of least squares up to third degree polynomials. Fitting of exponential of the type (1) $y=ae^{bx}$ (2) $y = ab^x$ (3) $y = ax^b$. Graphic representation of the curves. Interpolation and Extrapolation graphically. Criteria for fitting a suitable curve.

Regression and Correlation Analysis: (10%)

Logic of regression and correlation, scatter diagram. Regression models. Simple linear regression, least square estimates and their properties. Properties of Least Square regression line, standard error of estimate, co-efficient of determination. Multiple linear regression with two regressors, co-efficient of multiple determination. Partial and multiple correlation up to three variables. Linear correlation . Correlation co-efficient and its properties. Correlation of bivariate frequency distribution. Partial and multiple correlation for three variables. Rank correlation. Tied ranks.

PAPER– B

Total Marks: 100

Sampling and Sampling Distributions: (15%)

Advantages of sampling. Probability and non-probability sampling. Sampling and non-sampling errors. Sampling designs of simple random, stratified, systematic, and cluster sampling. Judgment and quota sampling. Random numbers and their use in sampling. Calculation of sample mean, proportion and variance of simple and stratified random samples. Sampling distribution of a statistic and its standard error. Distributions of sample mean / proportion and difference between two sample means / proportions with properties. Central limit theorem with illustrations. Sampling distribution of sample variance and ratio of two sample variances. Concept of t, χ^2 and F – distributions.

Estimation: (10%)

Estimate and estimator. Point estimation by moments and maximum likelihood methods. Properties of point estimators: unbiasedness, consistency, efficiency and sufficiency.

Interval estimator and its interpretation. Interval estimation of the mean / proportion, difference between two means / proportions, of populations with known and unknown variances. Determination of sample size. Interval estimation of population variance and ratio of two population variances. Interval estimates of regression parameters, mean and individual prediction.

Hypothesis Testing: (15%)

Null and alternative hypotheses. Simple and composite hypotheses. Two types of errors, level of significance, p-value and power of the test. Acceptance and rejection regions, one sided and two sided tests. Testing of hypothesis for mean / proportion, difference between two means / proportions.

Testing of hypothesis (based on small samples and unknown population variance) for the mean, difference between two means for paired and independent observations. Testing of hypothesis about the variances and equality of two variances.

Testing of hypothesis about regression and simple correlation; partial and multiple correlation. Tests of hypothesis about regression parameters, mean and individual prediction. Pearson's test for goodness of fit. Contingency tables and tests for independence and homogeneity. Co-efficient of mean square contingency and its maximum value. Yates correction for continuity. Chi-Square test for the multinomial probabilities.

Non-Parametric Tests: (5%)

Sign test, Run test. Mann-Whitney U-test, Wilcoxon Signed Rank test, Wilcoxon Rank sum test and Kruskal-Wallis Test.

Analysis of Variance and Experimental Designs: (15%)

Definition, importance and assumptions of Analysis of Variance. Partitioning of sum of squares and degrees of freedom in one and two-way classification. Testing the equality of means for one and two-way classification. Multiple comparison tests: Least significant difference test, Duncan's and Newman-Keuls Multiple range tests.

Principles of experimental design. Completely randomised, randomised complete block and Latin square designs. Description, layout, statistical analysis, advantages, disadvantages, relative efficiency and applications of these designs.

Time Series: (10%)

Decomposition of Time Series. Measurement of Trend, Seasonal (Additive and multiplicative models), and Cyclical variations. Seasonal indices. Deseasonalisation of data.

Index Numbers: (10%)

Simple and composite indices. Problems in construction of index numbers. Laspayre, Paasche, Marshall-Edgeworth, Fisher ideal, Walsh and Palgrave indices. Shifting of base. Quantity index numbers. Theoretical tests for index numbers. Consumer Price index. Construction and uses of index numbers in Pakistan. Sensitive Price Indicator.

Official Statistics: (10%)

Introduction, working of statistical organizations in Pakistan, main sources of Statistical Data in Pakistan, Documents produced by Statistical Organizations in Pakistan. Census, registration system of deaths and births in Pakistan.

Applications of statistics in social, economic and political problems. Public health crimes, Law, social innovations, economic development and socio-political inequality.

Vital Statistics: (10%)

Vital events. Uses and shortcomings of vital statistics. Sources of demographic data. Gender and child woman ratio. Vital Index, Crude, specific and standardised death / birth rates. General and specific fertility rate. Gross and net reproduction rates.

BOOKS RECOMMENDED:

1. Clark, G.M. and Cooke, D. (1998), *A Basic Course in Statistics*, 4th ed, Arnold, London.
2. Clark, G.M. and Kempson, R. E. (1997), *Introduction to the Design & Analysis of Experiment*, Arnold, London.
3. Freedman, D; Pisani, R; Parues, R and Adhikari, A (1997). *Statistics 3rd Edition*. Norton, New York.
4. Freund, J.E (1990). *Modern elementary Statistics*. Prentice Hall, Inc. New Jersey.
5. Graybill, I and Burdick (1998). *Applied Statistics: A first course in inference*. Prentice Hall, New Jersey.
6. Lipschutz, S and Schiller, J (1998). *Introduction to Probability and Statistics*, McGraw Hill, New York.
7. Mittelhammer, R, C. (1996). *Mathematical Statistics for Economics and Business*, Springer Verlag, New York.
8. Mood, A.M., Graybill, G.A.and Boes, D.c (1974). *Introduction to the Theory of Statistics*, McGraw Hill Book Company Inc. New York.
9. Pollard, A.H; Yousaf, F and Pollard, G.N. (1981). *Demographic Techniques*. Second Edition, Pergaman Press, Oxford.
10. Speigal, M.R and Stephens. L.J. (1999). *Statistics, 3rd Edition*. McGraw Hill, New York.
11. Speigal, M.R; Schiller, J.L; Srinivasan, R.L (2000). *Probability and Statistics 2nd Edition*. Schamus out line Series, McGraw Hill, New York.
12. Walpole,R.E (1982). *Introduction to Statistics*. Macmillan Publishing Company, New York, London.
13. Walpole, R.E., Myers, R.H., Myers, S. L. and Ye, K. (2004) *Probability and Statistics for Engineers and Scientists, 7th Edition* Prentice Hall, New York.
14. Weiss, N.A. (1977), *Introductory Statistics, 4th ed*. Addison-Wesley Pub. Company, Inc.
15. Wonnacott, T.H. and Wonnacott, R.J (1981). *Introductory Statistics*, John Wily & Sons. New York.

SYLLABUS FOR THE SUBJECT OF ZOOLOGY

PAPER – I

Total Marks: 100

Invertebrate and Chordate Zoology

Section – A

- Invertebrate:** Introduction General organizations (Structure, function, mode of life, Reproduction, life cycles, adaptation, distribution and Economic Importance) of the Following groups with special reference to the Topic mentioned in each group:-
- Protozoa:** Animal – like Protists:
Origin and Phylogenetic relationship of protozoa, parasitism, Locomotion, Nutrition, Reproduction, Economic Importance and Harmful Protozoa.
- Porifera:** Multicellular and Tissue level of organization: origin and Evolutionary perspective, Evolutions of canal system, skeleton and Reproductive System in Porifera.
- Coelenterata:** Body wall and Nematocysts, Polymorphism, Coral and Coral reefs, Economic Importance of Coral reefs.
- Platyhelminthes:** The Triploblastic Acoelomate Body plan: Evolutionary perspective, Parasitic adaptation, life cycle of Fasciola Hepatica (liver fluke)
- Nematoda** The Pseudocoelomate Body Plan:
- (Aschelminthes):** Evolutionary Perspective, General characteristic, Economic Importance. Parasitic Nematodes of man.
- Ammelida:** The Metameric Body Form:
Evolutionary relationship with other animals, Metamerism and Tagmatization, Phylogenetic Consideration.
- Mollusca:** Origin of Coelome, Diversity in Gastropods, Bivalve and Cephalopods, Torsion, shell in Mollusca, modification of foot in Mollusca
- Arthropoda:** Evolutionary Perspective, Metamorphosis, Ecdysis, Appendages feeding, Respiration, Social insect, Economic Importance of Insects, Larvae in various Classes of Arthropoda.

Echinodermata: Skeleton, Water vascular System, Larval forms and their evolutionary significance, Phylogenetic Consideration.

Section – B

Chordata: Origin and basic plan of chordate, basic plane of vertebrate body, Earliest known vertebrate, Primitive jawed vertebrate, Evolution of jaw in vertebrate, Swimbladder in Fishes, Excretion and Osmoregulation.

Amphibian: First terrestrial vertebrates: Evolutionary perspective, Excretion and Osmoregulation, Reproduction and development.

Reptile: The First Amniotes
Evolution of Reptile, Rise and Fall of Reptile, Extinction of Dinosaurs, Excretion and Osmoregulation, Poisonous apparatus and biting mechanism of poisonous snake.

Aves: Birds, Feathers, Flight and Endothermy:
Phylogenetic Relationship and evolution of Birds, Evolution of flight in Aves, Aerial adaptation and Migration of Birds.

Mammalia: Specialized teeth, Endothermy:
Origin of mammals, Evolutionary perspectives, Diversity among mammals, adaptation in External Structure and Locomotion, vertebrate Excretion, osmoregulation, Reproduction and development, Dentition in vertebrae, Comparative account of Evolution of Heart, girdles Skull, development, nervous system, Stomach in the vertebrate and urinogenital ducts in vertebrates;

BOOKS RECOMMENDED (LATEST EDITION)

1. *Barrington E. J. W., 1969 Invertebrate Structure and Function. The English Language Book Society and Nelson London.*
2. *Willmer,P. 1991 Invertebrate Relationships (pattern in animal evolution) Cambridge University Press.*
3. *Barnes, R.D.(1980). Invertebrate Zoology (4th ed.), Saunders, Philadelphia.*
4. *Hegner and Engemann. Invertebrate Zoology Macmillan Publishing Company Inc, New York.*
5. *Parker and Haswell. A Text Book of Zoology. (Vol.!) Macmillan London.*
6. *Borredaile, L.A., Potts, F.A. Eastham, L.E.S., Saunders, J.T. and Kerkut, G.A. (1961). The Invertebrata. Cambridge University Press.*
7. *Hyman L.H, The Invertebrates. McGraw Hill Book Company Inc.*
8. *Bhatti, H.K. and Hashmi, T .H. Invertebrate Zoology Caravan Book Corporation, Lahore.*
9. *Dhami and Dhami. Comparative Invertebrate Morphology.*
10. *F. Harvey Pough, John, Bheiser, William N. Mcfarland Vertebrate life. 2nd Edition, 1985., and 3rd Edition, 1990.*
11. *G.C. Kent, 1987. Comparative Anatomy of vertebrates.*
12. *Yong, J. Z. 1965. The life of Mammals.*
13. *Young, J.Z. 1981. The Life of Vertebrate.*
14. *Romer & Parson, The vertebrate body. 6th Edition.*
15. *Edwin H Colbert. 1980. Evolution of the verttbrates. 3rd edition.*
16. *Miller. A.S. and Harley. J.B., (1999) & 2002; Zoology. 4th &5th Edition (International). Singapore: McGraw Hill.*
17. *Hickman, C.P., Roberts. L.S. and Larson. A. 2001. Integrated Principles of Zoology. 11 th Edition (International). Singapore: McGraw Hill Pechenik, J .A. (2002) Biology of Invertebrate. 4th Edition (International). Singapore: McGraw Hill.*
18. *Campbell, N.A. (2002). Biology Sixth Edition. Menlo Park. California: Benjamin/Cummings Publishing Company. Inc.*

PAPER -II

Total Marks: 100

General Zoology

SECTION-A

Cell Biology:

Generalized Structure of Prokaryotic and Eukaryotic Cell, Morphology, chemical composition and Functions of cellular organelles, Enzymes Catalysis, Regulation & Inhibition, Metabolic Pathways, Glycolysis, Krebs cycle and Electrons Transport chain. Nucleic acid, Mechanism of Protein synthesis, Transcription and Translation, Mitosis, Meiosis.

SECTION -B

General Physiology:

Excretion and Homeostasis, osmoregulation, vertebrate nephron as osmoregulatory organ, Thermoregulation in Animals, Movements and Muscle, ultra structure of Muscle fibril, mechanism of contraction, Physiological anatomy of digestive Tract, Potential and movement in Gastrointestinal Tract, Respiration, Respiratory Mechanism, Respiratory Pigments, Transport of O₂ and CO₂; cardiovascular Mechanism, electrical activity of Heart, Blood Pressure, Coordination in animals, Nervous coordination and chemical coordination, Nervous system, nerve Impulses, Hormones and their Biological action. Mechanism of Active membrane Potential and Resting membrane Potential, synopsis.

SECTION -C

Genetics: Mendelian Principles, Multiple alleles, Interaction of genes, Linkage and crossing over, mapping of genes, Sex-determination and Sex-linkage, Mutations, gene concept, Chromosomal aberrations, DNA as a genetic material, genetic Code, DNA Recombinant Technology, Application of genetic Engineering, Transgenic animals.

Section -D

Evolution: Theories of origin of Life, Biochemical origin of life, Lamarckism, Darwinism and Neo-Darwinism, Hardy Weinberg Principle, Mutation Pressure, Selection Pressure, Genetic drift species concept, Mechanism of evolution, modern concept of Natural Selection, Adaptive radiation.

SECTION – E

Ecology:

Concept of Ecosystem. Biogeochemical cycle, Animal adaptation to major Habitats, Energy flow in the Ecosystem, Food chain, Food web, Productivity of Ecosystem Environmental Pollution, Water Pollution and Lamo Pollution.

BOOKS RECOMMENDED (Latest Edition):

1. *Watson, J.D., Hopkin, N.H, Roberts, J.W., Streitz, J.A. and Weiner, M.A. (1990). Molecular Biology of the Gene. Benjamin, California.*
2. *Turner, P.C., Mclennon, A.G., Bates, A.D. and White, M.R.H. (1998).*
3. *Karp G. (2002). Cell and Molecular Biology. John Wiley & Sons, Inc. New York.*
4. *Twyman. R.M. (1998). Advanced Molecular Biology. Bios Scientific Publishers.*
5. *Weaver R.F. (1999). Molecular Biology, WCB/McGraw-Hill New York.*
6. *Adams, R.L.P., Knowler, J.T. and Leader, D.P. (1986). The Biochemistry of the Nucleic Acids. Champan and Hall.*
7. *Cell and Molecular Biology (8th Edition) De – Robbertis & De Robertis FMA.*
8. *Modern Genetics by Ayala, F.J. and Kiger, JaA.Jr.*
9. *Loewy, A.G. and Siekevitz. Cell structure and function, Holt Rinehart N.Y.*
10. *Levine, R.P. Genetics. Holt Rinehart and Winston, N.Y.*
11. *Robert F. Weaver, Philip W. Hedick, Basic Genetics.WCB.*
12. *Generald Karp, Cell and Molecular Biology, John Weley & sons.*
13. *Strickberger, M.W., Genetics. McMillan Co., New York.*
14. *Winchester, A.M. Genetics. Haugton-Mifflin Co.*
15. *Scheeler, P. and Bianchi, D., Cell and Molecular Biology.*

16. *Gagong, W.F. 1987, Prentice Hall, Inc. Review of Medical Physiology.*
17. *Gordon M.S., Bartholomew, G.A. Grinnel A.D., Jorgensen, C.B., and F.N., Animal Physiology: Principles and Adaptations, N.Y.*
18. *Guyton, A.C., Textbook of Medical Physiology, W.B. Saunders Company, Philadelphia.*
19. *Prosser, C.L. Comparative Animal Physiology, Saunders Philadelphia.*
20. *Hoar, W.S., General and Comparative Physiology, Inc, New Jersey.*
21. *Sadar, M.H. and Smith, M.S., 1993. EIA Methods and Procedure. Impact Assessment Institute, Carleton University, Ottawa, Canada.*
22. *Smith, R.L., Ecology and Field Biology, Harper and Row.*
23. *Michael, I. Mckinney and Robert, m Schoch, 1998. Environmental Science, Hones and Bartett Publisher, International.*
24. *Chapman, J.L and Reiss, M.J., 1997. Ecology (Principles and applications), Cambridge University Press.*
25. *Kormodndy, E.J., 1996. Concepts of Ecology. Prentice Hall, India.*
26. *Eckert and Randall, Animal Physiology.*
27. *Odum, E.P., Fundamentals of Ecology. W.B. Saunders.*
28. *Macfadyen, Animal Ecology: Aims and Methods.*
29. *Prosser, C.L., Cooperative animal physiology. W.B. Saunders.*
30. *Hoar, W.S., General and Comparative Physiology. Prentice Hall Inc.*
31. *Nebel, B.J., Environmental Science. Prentice Hall Inc.*
32. *Can, A.J., Animal species and their evolution. Hutchjinson's U.L. London.*
33. *Moody, P.A., Introduction to Evolution. Harper and Row.*

**HISTORY OF MODERN WORLD
PAPER - I**

Total Marks: 100

History: Various Concepts of perceiving History.

Modern: Connotation of the terminology.

World: How the idea of world is perceived. Implications of world history.

1. TOWARDS GLOBALIZATION

Old Regimes and Archaic Globalization: Peasants and Lords, Dynamics of New Politics, Archaic and Early Modern Globalization.

2. TRANSFORMATION FROM OLD REGIMES TO MODERNITY

The Last Great Domestication and Industrious Revolutions, New Patterns of Afro-Asian Material Culture, Production and Trade, Trade Finance and Innovation: European Competitive advantages, the development of Asian and African Publics.

3. CONVERGING REVOLUTIONS

Anatomy of the World Crisis (1720-1820), Sapping the legitimacy of the State: From France to China Ideological origin of the modern left and the modern state, Nationalities VS States and Empires. The Third Revolution: Polite and Commercial Peoples Worldwide.

4. MODERN WORLD IN GENESIS

World revolutions (1815-1865), Emigration, New World Order: 1815-1865, Wars of Legitimacy in Asia, Economic and Ideological Roots of Asian Revolutions, Hunger and Rebellion in Europe (1848-1851), American Civil War as a Global Event.

5. INDUSTRIALIZATION AND THE NEW CITY HISTORIANS

Industrialization, and Cities The Progress of Industrialization Poverty and the Absence of Industry, Cities as Centers of Production, Consumption, and Politics The Urban Impact of the Global Crisis, 1780-1820. Race and Class in the New Cities, Working-Class Politics, Worldwide Urban Cultures and their Critics.

6. NATION, EMPIRE, AND ETHNICITY, C. 1860-1900

Theories of Nationalism, When was Nationalism Born? Perpetuating Nationalisms: Memories, National Associations, and Print, From Community to Nation: The Eurasian Empires Where we Stand with Nationalism, Peoples without States:

Persecution or Assimilation? Imperialism and its History: The Late Nineteenth Century Dimensions of the "New Imperialism". A World of Nation-States? The Persistence of Archaic Globalization From Globalization to Internationalism in Practice.

7. **MYTHS AND TECHNOLOGIES OF THE MODERN STATE DIMENSIONS OF THE MODERN STATE**

The State and the Historians, Problems of Defining the State, The Modern State Takes Root: Geographical Dimensions Claims to Justice and Symbols of Power, The State's Resources, The State's Obligations to Society Tools of the State, State, Economy, and Nation.

8. **THE THEORY AND PRACTICE OF LIBERALISM, RATIONALISM, SOCIALISM, AND SCIENCE**

Contextualizing Intellectual History, The Corruption of the Righteous Republic: A Classic Theme. Righteous Republics Worldwide, The Advent of Liberalism and the Market: Western Exceptionalism? Liberalism and Land Reform: Radical Theory and Conservative Practice, Free Trade or National Political Economy? Representing the Peoples Secularism and Positivism: Transnational Affinities The Reception of Socialism and its Local Resonances. Science in Global Context. Professionalization at World Level.

9. **SOCIAL AND INTELLECTUAL MOVEMENTS**

Revolutionary Ideas, Philosophical and social trends.

10. **Clash of Civilizations**

11. **Neo-Conservation**

RECOMMENDED TEXTS AND LITERATURE REVIEWS

1. *Dorinda Outram, The Body and the French Revolution*
2. *Francis Fukuyama, French revolution and the Birth of Modernity*
3. *H Kissinger, Diplomacy*
4. *J M Thompson, Napoleon Bonaparte: His Rise and Fall*
5. *E J Hobsbawm, The Age of revolution, 1789-1848*
6. *E J Hobsbawm, Nations and Nationalism since 1780: Programme, Myth, Reality*
7. *P Pilbeam, The 1830 Revolution in France*
8. *Paul Kennedy, The Rise and Fall of Great Powers*
9. *Owen Chadwick, The Secularization of European Mind in the Nineteenth Century (1976)*

10. Peter Burke, *Popular Culture in Early Modern Europe* (1978)
11. Marc Bloch, *Feudal Society*
12. M W Beresford, *New Towns of the Middle Ages* (1988)
13. Rosalind B and Christopher Brooke, *Popular Religion in the Middle Ages* (1984)
14. Carlo Ginzburg, *The Cheese and The Worms: The Cosmos of a Sixteenth-Century Miller* (1982)
15. Lauro Martines, *Power and Imagination; City-States in Renaissance Italy* (1988)
16. Karl Marx, *Das Capital*
17. Herbert Butterfield, *The Origins of Modern Science, 1300-1800* (1965)
18. A R Hall, *The Revolution in Science, 1500-1750: The Formation of the Modern Scientific Attitude* (1983)
19. Londa Schiebinger, *The Mind Has no Sex? Women in the Origins of Modern Science* (1990)
20. Barbara Taylor, *Eve and the New Jerusalem: Socialism and Feminism in the Nineteenth Century* (1983)
21. Michel Foucault, *Madness and Civilization*
22. Asa Briggs, *Victorian People* (1954)
23. Gertrude Himmelfarb, *Darwin and the Darwinian Revolution* (1968)
24. Raymond Betts, *The False Dawn: European Imperialism in the Nineteenth Century* (1975)
25. Timothy Mitchell, *Colonizing Egypt* (1988)
26. Edward Said, *Orientalism* (1979)
27. WD Smith, *European Imperialism in the Nineteenth and Twentieth Centuries.*

PAPER - II

HISTORY OF SOUTH ASIA From Pre-historic to 18th Century AD

Total Marks: 100

Part – I

1. Approaches to Ancient & Medieval India
2. Indus Valley Civilization
3. The Vedas & The Vedic Age
4. Foreign Invasions and Dynasties: The Aryans, Conquests of Alexander, The Mauryans, 321-185 BC, The Age of the Guptas and After, Indo-European interaction
5. Buddhism
6. Ashoka, Kanishka and the Gandhara Art
7. Emergence and Development of Caste System
8. Economy (Trade, Commerce, Industry)
9. LAW AND ADMINISTRATION: Code of law, values and tradition. Sharia, *Akhlaq* as law system of governance.
10. Sources of the Mughal Rule in India
11. BHAKTI MOVEMENT: Salient features of Bhakti movement, main proponents/saints, Bhatkti literature and revolt against religious orthodoxy and central government/power.
12. DEVELOPMENT OF ARTS AND SCIENCES IN THE SUBCONTINENT: Sanskrit, Persian, Urdu, and Prakrit (local languages) literature with particular reference to humanist, political, regional and religious aspects. Relationship of power and language in medieval India.
13. Development of the Fine Arts under the Mughals.

HISTORY OF SOUTH ASIA

(From 18-21 Centuries)

Part-II

1. Concepts of Colonialism & Imperialism
2. Extracting land Revenue, Empire and Colonial Economy.
3. 1857 War of Independence or Mutiny, Social and Religious Reforms.
4. British Social life in India, Changing British attitudes to Indian religion and society, Architecture of the Raj. Dynamics of Anglo-Indian Society.
5. Sir Syed's efforts for re-interpreting religion and modernizing the Muslim Society and resistance of Ulema. Use of modern technologies by various religious

- revivalist/orthodox movements (e.g., Deobandi Movement) and displacement of Sufi tradition.
6. Colonial project of assigning identities and Emergence of Nationalism in India: Dividing India in religious, communal/sectarian, regional, gender and racial/tribal lines.
 7. Legacies of British Raj. Military and Bureaucracy, Political and Constitutional Development (1947-2006), Dynamics of Authoritarianism and Totalitarianism in Pakistan with reference to M Ayub Khan, M Yahya, Ziaul Haq, and Pervaiz Musharraf's regimes.
 8. Nature of democracy in Pakistan: Muhammad Ali Jinnah, Liaquat Ali Khan, ZA Bhutto, Benazir Bhutto, Nawaz Sharif, Shaukat Aziz.
 9. Religion and Polity contraction in the Society/State building in Pakistan.
 10. Problems of federal politics, Ethnic and sub-national ideologies, use of language as culture and ideology.

RECOMMENDED BOOKS:

1. *Aziz Ahmad, An Intellectual History of Islam in India*
2. -----, *Studies in Islamic Culture in the Indian Environment*
3. *SM Ikram, Muslim Rule in India*
4. *Daniel W Browne, Rethinking Tradition in Modern Islamic Thought*
5. *Muzaffar Alam, The Languages of Political Islam in India (c. 1200-1800)*
6. *Jamal Malik and Helmut Reifeld (ed), Religious Pluralism in South Asia and Europe*
7. *Richard M Eaton, Essays on Islam and Indian History (Delhi: OUP, 2001)*
8. *Richard M Eaton (ed), India's Islamic Traditions (Delhi: OUP, 2003)*
9. *Bernard Lewis, The Political Language of Islam (Chicago, University of Chicago Press, 1988)*
10. *SAA Rizvi, A History of Sufism in India, 02 Vols (Delhi, 1978)*
11. *Francis Robinson, Islam and Muslim History in South Asia (Delhi, 2000)*
12. *Annemarie Schimmel, Mystical Dimensions of Islam (NC: University of North Carolina Press, 1975)*
13. *Eugenia Vanina, Ideas and Society in India*
14. *Romila Thaper, Early History of India*
15. *Irfan Habib, Agrarian System of Mughal India*
16. *Sekhar Bandyopadhyay, From Plessey to Partition*
17. *Chaudheri Mohammad Ali, The Emergence of Pakistan*
18. *Khalid bin Saeed, Pakistan: The Formative Phase*
19. *Mushtaq Ahmed, Government and Politics in Pakistan*
20. *Pandev Nayak, Pakistan Society and Politics*
21. *Ayesha Jalal, Democracy and Authoritarianism in South Asia: A Comparative and Historical Perspective*
22. *Ayesha Jalal, The State of Martial Rule: the Origins of Pakistan's Political Economy of Defence*
23. *Ayesha Jalal, Self and Sovereignty*

24. *Farhat Mahmud, Pak-US Relations*
25. *Stephen Cohen, The Pakistan Army*
26. *Ralph Braibanti, Research on the Bureaucracy of Pakistan: A Critique of Sources, Conditions, and Issues*
27. *Omar Noman, The Political Economy of Pakistan, 1947-1985*
28. *Lawrence Ziring, Pakistan in the 20th Century*

**SYLLABUS FOR THE SUBJECT OF GEOLOGY
PAPER - I**

Total Marks: 100

Physical Geology: Earth as a member of the solar system; its origin, age, composition and internal structure. Geomorphic processes

Structural Geology: Physical properties of rocks and rock behavior in different tectonic environments; deformation by fracturing and folding; interpretation of linear and planar elements.

Paleontology: Paleontological principles and techniques and their application to the evolution of life, the ecological structure of ancient biological communities, and the history of the earth.

Stratigraphy and Sedimentology: Principles of stratigraphy; Stratigraphic record and nomenclature, Geological time scale, Stratigraphy of Salt Range. Origin, transportation and deposition of sediments; biostratigraphic dating and correlation; Sedimentary processes and environments.

Mineralogy/ Petrology: Crystal chemistry; crystal growth and mineral genesis, physicochemical principles governing crystal structures. Mineralogical, chemical, textural, and structural properties of igneous, metamorphic and sedimentary rocks; their origin and relations to evolution of the Earth crust and mantle including rocks of both the continents and ocean basins.

Geochemistry: chemical processes involved in the development of the earth and distribution of the elements in the earth's crust, atmosphere and ocean. Physical chemistry of soils including soil mineralogy (formation, relative stability, ion exchange properties) and surface chemistry. Principles of thermodynamics. Application of thermochemistry to high and low temperature processes.

Paper II

Total Marks: 100

Earth Resources: Fossil fuels, Nuclear mineral resources, Renewable energy resources, hydropower and geothermal energy, Water cycle, Surface water, Ground water, construction materials including those for concrete and aggregate, sand gravels, cement making and building stones; Fundamentals of Matellogeny and plate tectonics with reference to Pakistan. Uranium and strategic metals.

Engineering Geology: Fundamentals of Engineering Geology. Soil and rock properties. Landslides classification for slopes in rock and soil, Excavation principles in rock and soil. Stability of slopes – analysis. Site investigation and instrumentation. Dam sites of Pakistan (elementary analysis).

Remote Sensing and GIS: Introduction to the filed of remote sensing. Earth satellite systems for remote sensing. Applications in geological mapping, mineral prospecting, structural geology, geohydrology, engineering geology and geomorphology. Principles of geographic information system (GIS) including an overview of data structure, data types, methods of data analysis and cartographic modeling.

Climate and Climate Change: Scientific bases of the climate change phenomenon, climates of the past and theories of climate change. Impacts of a changing climate in different regions of the world, and mitigation strategies. Earth as a planet, its origin and composition. Rock forming major minerals. Fundamental description and classification of igneous, sedimentary and metamorphic rocks. Processes of Geomorphology both internal and external. Peneplain concept. Valley formation and Drainage patterns. Glacial landforms. Fossils, fossilization, modes of fossil preservation, geological signification of fossils. Geological timescale. Principles of stratigraphy, stratigraphic code and nomenclature, stratigraphy of Salt Range. Study of major structures i.e. Folds, Faults, Joints, Cleavage and linear structure. Fundamental concepts of Engineering Geology and Geohydrology Introduction to the concept of Environmental Geology and Global Climate Change. Fossils Fuels, hydropower, Geothermal Energy, Nuclear minerals, Renewable energy.

RECOMMENDED BOOKS

1. Albarade, F., (2003), Geochemistry: An Introduction, Cambridge Press.
2. Barnes, J.W. and Lisle, R.J. (2004), Basic Geological Mapping, John Wiley & Sons.
3. Bell, F.G., (2004), Engineering Geology and Construction, Spon Press, N.Y.
4. Bender, F.K. and Raza H.A.(1995), Geology of Pakistan, Gebruder Borntraeger.
5. Best, M.G. (2003) Igneous and metamorphic Petrology, Blackwell Science
6. Davis, G.H. and Reynolds, S.J. (1996), Structural Geology of Rocks and Regions, John Wiley & Sons.

7. Demers, M.N. (2005) Fundamentals of Geographic Information System, John Wiley & Sons.
8. Dobrin, M.B. and Savit, Ch.H. (1988), Introduction to Geophysical Prospecting, McGraw Hill.
9. Emery, D. and Myers, K.J. (1996), Sequence Stratigraphy, Oxford, Blackwell.
10. Hudak, P.F. (2005), Principles of Hydrogeology, 3rd Ed. CRC Press
11. Kazmi, A.H. and Abbas, S.G. (2001), Metallogeny and Mineral Deposits of Pakistan, Orient Petroleum Inc.
12. Kazmi, A.H. and Jan, M.Q. (1997) Geology and Tectonics of Pakistan, Graphic Publishers.
13. Keary, P and Vine, F.J. (1996) Global Tectonics, Blackwell.
14. Montgomery, C.W., (2005) Environmental Geology, McGraw Hill.
15. North, F.K. (1985) Petroleum Geology, Allen & Unwin.
16. Plummer, (2005), Physical Geology, Mcgeay and Carlson.
17. Raup, D.M. and Stanley, S.M. (1985), Principles of Paleontology, W.H. Freeman & Co.
18. Sam Boggs (1987), Sedimentology and Stratigraphy.
19. Shah. S.I. (1977) Stratigraphy of Pakistan, Geological Survey of Pakistan.
20. Solomon, S., Qin, D., Manning, M., (2007) Climate Change 2007: The Physical Science Basics, Intergovernmental Panel on Climate change (IPCC).
21. Thomas M.L, and Ralph, W.K. (2003) Remote Sensing and Image Interpretation, John Wiley & Sons.
22. Willam H.B. (1990) Principles of Mineralogy, Oxford University Press.
23. Yeung, Lo.C.P. and Lal, A.K. (2003) Concepts and Techniques of Geographic Information System, Prentice Hall.

SYLLABUS FOR THE SUBJECT OF LAW

PART- I

Total Marks: 100

- | | | | |
|------|---|---|----------|
| i) | Civil Procedure Code 1908. | } | 50-Marks |
| ii) | Limitation Act 1908, Registration Act, 1908 | | |
| iii) | Qanoon-e-Shahadat Order 1984 | | 50-Marks |

PART- II

Total Marks: 100

- | | | |
|------|---------------------------------------|----------|
| i) | Pakistan Penal Code 1860 | 40 Marks |
| ii) | Code of Criminal Procedure, 1898 | 40 Marks |
| iii) | West Pakistan Land Revenue Act, 1967. | 20 Marks |

1. **RECOMMENDED BOOK OF CIVIL PROCEDURE CODE**

- i) The Code of Civil Procedure (Aamer Raza)
- ii) Code of Civil Procedure (PLD Publishers) (Bare Act)

2. **RECOMMENDED BOOK OF LIMITATION ACT**

- i) The Limitation Act by Shaukat Mahmood

3. **RECOMMENDED BOOK OF QANOON-E-SHAHADAT ORDER 1984**

- i) Qanoon-e-Shahadat Order 1984 (PLD Publishers)

4. **RECOMMENDED BOOK OF PAKISTAN PENAL CODE**

- i) Pakistan Penal Code by Shaukat Mahmood

5. **RECOMMENDED BOOK OF CRIMINAL PROCEDURE CODE**

- i) Criminal Procedure Code by M. Mahmood
- ii) **Bare Act** of Criminal Procedure Code

6. **RECOMMENDED BOOK OF LAND REVENUE ACT**

- i) Land Revenue Act by M. Mahmood or Land Revenue Act by M. Mokal

SYLLABUS FOR THE SUBJECT OF COMMERCE ACCOUNTING PAPER-I

Total Marks: 100

- A. Introduction to Accounting, generally accepted accounting principles, accounting cycle, cash book and bank reconciliation statement, work sheet. Depreciation, Financial Statements, financial reporting, cash flow statement, financial analysis, accounting for leasing, contract accounts.
- B. Principles of cost account, cost accounting as a tool of management, cost elements. Cost classification, cost accounting cycle, Job order costing, process costing, factory overhead variances, standard costing, and break-even analysis.

SUGGESTED READING

1. *Meigs & Meigs, Accounting*
2. *Ghani M.A., Principles of Accounting.*
3. *Ghani M.A. Advanced Accounting*
4. *Uzair Hussain, Advanced Accounting*
5. *Shukla & Grewal, Advanced Accounting.*
6. *Nisar ud Din, Cost Accounting*
7. *Matg A. Usary, Cost Accounting.*
8. *T. Lucey, Cost Accounting.*
9. *S. Naqvi Ahmad, Cost Accounting*

PAPER- II
GENERAL COMMERCIAL KNOWLEDGE

Total Marks: 100

- A. Economic resources of Pakistan. Problems & Development of Industrial Sector, Exports & Imports, Economic Planning & Budgeting.
- B. Salient feature of income tax law in Pakistan. Calculation of total income and income tax payable under the head of salary, Income from business & profession and income from house property. First & second schedule of income tax ordinance 2001. Salient features of Sales Tax Act. Registration under Sales Tax Act, Furnishing of Returns Under Sales Tax.
- C. Risk management, external audit and submission of audit reports.
- D. Various forms of business organization. Sole proprietorship partnership, joint stock Company, their formation & management, capital structure & capital budgeting, business finance, its sources, short term & long term.
- E. Role & functions of Commercial Banks & Central Bank, Letter of Credits, Islamic Mode of Finance.
- F. Nature of Business Management, Functions of Management, Planning, Organizing, Staffing, Motivating, Leadership & Controlling, Factory Location, Layout, Scientific Management.

SUGGESTED READING:

1. *M. Saeed Nasir, Economic Problems of Pakistan.*
2. *Kh. Amjad Saeed, Economic Problems of Pakistan.*
3. *Govt. of Pakistan, Pakistan Economics Survey, Income Tax Ordinance 2001, Sales Tax Act.*
4. *Kh. Amjad Saeed, Income Tax Law.*
5. *Kh. Amjad Saeed, Auditing.*
6. *M. Muazzam Moghal, Income Tax Law.*
7. *M. Muazzam Moughal, Sales Tax Law.*
8. *Lawrence J. Gitman, Fundamentals of Investment.*
9. *Kontz & Weirick, Management.*
10. *Stephen B. Robins, Principles of Management.*
11. *Owen Richard N. Management Industrial Enterprises.*
12. *Adam, Ronald & Ebart, Production & Operation Management.*

خاکہ نصاب (پنجابی آپشنل)

کل نمبر 100

پہلا پرچہ

نمبر 30

1- پنجابی کلاسیکی شاعری

1.1- حضرت بابا فرید الدین گنج شکر

1.2- حضرت شاہ حسین

1.3- حضرت سلطان باہو

1.4- حضرت بلھے شاہ

1.5- حضرت خواجہ غلام فرید

نمبر 30

2- عصری جدید شاعری

شریف کجاہی

2.1- جگراتے

منیر نیازی

2.2- چارچپ چیزاں

باقی صدیقی

2.3- کچے گھڑے

نجم حسین سید

2.4- چندن رکھتے ویہڑا

ڈاکٹر شہزاد قیصر

2.5- گل وچ پائے پریت مہار

ڈاکٹر فقیر محمد فقیر

2.6- مواتے

مشتاق صوفی

2.7- تاء

نمبر 40

(حصہ نثر)

نمبر 10

3- قدیم نثر

مرتب: شرافت نوشاہی

3.1- موعظہ نوشہ گنج بخش

مرتب: ڈاکٹر شہباز ملک

3.2- پکی روٹی

4- جدید نثر

سجاد حیدر	کالا پتھن	4.1- ڈرامہ
اشفاق احمد	ٹاہلی دے تھلے	4.2- ڈرامہ
منشاء یاد	ٹانواں ٹانواں تارا	4.3- ناول
انور علی	نوری	4.4- کہانی

Recommended Books

- 1- آکھیا بابا فرید نے:
 - 2- بول فریدی:
 - 3- کافیاں شاہ حسین:
 - 4- ایبات باہو:
 - 5- کلیات بلھے شاہ:
 - 6- دیوان فرید:
 - 7- جگراتے:
 - 8- چارچپ چیزاں:
 - 9- کچے گھڑے:
 - 10- چندن رکھتے ویہڑا:
 - 11- گل وچ پائٹ پریت مہار:
 - 12- مواتے:
 - 13- تاء:
 - 14- مواعظ نوشہ پیر:
 - 15- پکی روٹی:
 - 16- کالا پتھن:
- محمد آصف خاں، پاکستان پنجابی بورڈ، لاہور، 1987ء
- ڈاکٹر فقیر محمد فقیر، پنجابی ادبی اکیڈمی، لاہور، 1965ء
- مجلس شاہ حسین، لاہور، 1966ء
- سلطان الطاف علی، غلام دستگیر اکیڈمی، جھنگ، 1988ء
- پنجابی ادبی اکیڈمی، لاہور، 1970ء
- مولوی نور احمد فریدی، قصر الادب، ملتان
- شریف کنجاہی، ادارہ اشاعت ادب گجرات، 1965ء
- منیر نیازی، لاہور
- باقی صدیقی، پاکستان پنجابی ادبی بورڈ، لاہور، 1996ء
- نجم حسین سید، سچیت کتاب گھر، لاہور
- ڈاکٹر شہزاد قیصر، لاہور
- ڈاکٹر فقیر محمد فقیر، بزم فقیر، لاہور
- مشتاق صوفی، میاں چیمبرز ٹمپل روڈ، لاہور، 1997ء
- شرافت نوشاہی، لاہور، 1990ء
- ڈاکٹر شہباز ملک، لاہور، 1987ء
- سجاد حیدر، لاہور

- 17- ٹاہلی دے تھلے
اشفاق احمد، سنگ میل پبلی کیشنز، لاہور
- 18- ٹانواں ٹانواں تارا:
منشاء یاد دوست پبلی کیشنز، اسلام آباد
- 19- نوری:
انور علی، پاکستان، پنجابی ادبی بورڈ، لاہور
- 20- سیدھاں:
نجم حسین سید، چھیت کتاب گھر، لاہور
- 21- رمز روایت:
ڈاکٹر اسلم رانا، لاہور، 1982ء
- 22- سانجھ و چار:
ڈاکٹر سعید بھٹے، لاہور، 1997ء
- 23- مہکدے پھل:
ڈاکٹر فقیر محمد فقیر، لاہور، 1959ء
- 24- وحدت الوجود تے پنجابی شاعری:
علی عباس جلالپوری، پاکستان، پنجابی ادبی بورڈ، لاہور، 1993ء

کل نمبر 100

دوسرا پرچہ

نمبر 20

1- پنجابی زبان و ادب کی تاریخ

- 1.1- پنجابی زبان دا پچھو کڑ
1.2- پنجابی زبان اُتے دو جیاں زبانوں دا اثر
1.3- پنجابی ادب دی تاریخ
1.4- پنجابی تنقید تے تحقیق دی ٹور

نمبر 10

2- لوک ادب

- 2.1- لوک گیت
2.2- لوک کہانی
2.3- پنجابی اکھان

نمبر 25

3- داستانی ادب

- 3.1- قصہ ہیر وارث شاہ
3.2- قصہ سسی ہاشم شاہ

- 3.3- قصہ سیف الملوک میاں محمد بخش
- 3.4- مرزاں صاحبان حافظ برخوردار
- 4- پنجابی واراں
- 4.1- سکھاں دی وار
- 4.2- چٹھیاں دی وار
- 4.3- ملتان دی وار
- 5- پنجابی ادب دیاں صفناں
- 5.1- پنجابی شاعری حمد، نعت، غزل، مثنوی، مرثیہ، سی حرفی، دوہڑا، شلوک، کافیاں، باراں ماہ، وار، نظم
- 5.2- پنجابی نثر داستان، ڈرامہ، ناول، سفرنامہ، مقالہ نگاری، تنقید نگاری، افسانہ، انشائیہ
- 6- انگریزی توں پنجابی ترجمہ
- 7- مضمون نویسی
- سماجی، ادبی، علمی اور حالات حاضرہ کے موضوعات

نمبر 15

نمبر 10

نمبر 5

نمبر 15

Recommended Books

- 1- پنجابی ادب دی کہانی: عبدالغفور قریشی، پاکستان پنجابی ادبی بورڈ، لاہور، 1989ء
- 2- پنجابی زبان و ادب کی مختصر تاریخ: ڈاکٹر انعام الحق جاوید، مقتدرہ قومی زبان، اسلام آباد، 1997ء
- 3- پاکستانی دور دی تحقیق تے تنقید: ڈاکٹر ناصر رانا، فکری سانجھ، لاہور، 2006ء
- 4- بن پھلو اڑی: افضل پرویز، ادارہ ثقافت پاکستان، اسلام آباد، 1984ء
- 5- سرائیکی لوک گیت: مہر عبدالحق، بہاولپور
- 6- پنجاب دے لوک گیت: مقصود ناصر چودھری، شیخوپورہ، 1970ء
- 7- کمال کہانی: ڈاکٹر سعید بھٹہ، سانجھ پبلی کیشنز، لاہور، 2006ء
- 8- بار دے گیت: مشتاق صوفی، پاکستانی پنجابی ادبی بورڈ، لاہور، 1984ء
- 9- ساڈے اکھان: ڈاکٹر شہباز ملک، لاہور، 1978ء

- 10- سرائیکی اکھان: اعجاز ڈیروی دبستان سحر ڈیرہ غازی خان 1978ء
- 11- ہیر وارث شاہ: شیخ عبدالعزیز پنجابی ادبی اکیڈمی لاہور 1960ء
- 12- سسی (ککارے): ہاشم شاہ پنجابی ادبی اکیڈمی لاہور 1963ء
- 13- پنجابی زبان و ادب کی تاریخ: بابائے پنجابی ڈاکٹر فقیر محمد فقیر سنگ میل پبلی کیشنز لاہور 2002ء
- 14- مرزا صاحبان: حافظ برخوردار لاہور
- 15- سیف الملوک: سید سبط الحسن ضیفم پبلی کیشنز لمیٹڈ لاہور 1993ء
- 16- سکھاں دی وار: شاہ محمد سنگ میل پبلی کیشنز لاہور
- 17- چھیاں دی وار: پیر محمد سنگ میل پبلی کیشنز لاہور
- 18- ملتان دی وار: (پوڑی نواب مظفر خان) شوکت منگل سرائیکی ادبی بورڈ ملتان 1994ء
- 19- لعلوں دی پنڈ: اقبال صلاح الدین لاہور 1982ء
- 20- پنجابی ادبی صنفاں: ڈاکٹر سید اختر جعفری لاہور
- 21- تاریخ ادبیات مسلمانان پاکستان و ہند: جلد 13، 14 دارہ معارف اسلامیہ پنجاب یونیورسٹی لاہور 72-1971ء
- 22- ننگ سک: محمد آصف خان پاکستان پنجابی ادبی بورڈ لاہور 1992ء
- 23- مقامات وارث شاہ: علی عباس جلاپوری لاہور 1999ء

خاکہ نصاب (اردو آپشنل)

کل نمبر 100

پہلا پرچہ

نمبر ۳۵

1- ادب اور تاریخ ادب اردو

(الف) ادب کیا ہے؟ اس کی اہمیت اور مقاصد پر بحث
(ادب کا زندگی اور انسان سے تعلق، ادب برائے ادب اور ادب برائے زندگی کے مباحث، ادب کے تخلیقی، تنقیدی اور تحقیقی زاویے)

(ب) اردو زبان کا آغاز و ارتقا

قدیم اردو شاعری کے عمومی فکری اور جذباتی رویے
(بحوالہ عشق، تصوف، تہذیب، قومی سربلندی، اخلاقی مقصدیت)

نمبر ۳۵

2- اردو نثر کا سفر

(الف) اردو نثر ۱۸۵۷ء تک

(ب) سرسید اور ان کے رفقا کی علمی کاوشیں بحوالہ نئی روشن خیالی، مغربی عقل و فکر کا فروغ

(ج) اردو ناول، افسانے، ڈرامے کی تاریخ

نمبر ۳۰

3- اردو کی جدید ادبی تحریکیں اور رجحانات

(الف) رومانوی تحریک، ترقی پسند تحریک، حلقہء ارباب ذوق کی تحریک (جدیدیت، نیا ادب)

(ب) پاکستانی شعر و ادب کے رنگارنگ نقوش (عصری علوم و فنون کے اثرات کا جائزہ)

امدادی کتب

اردو ادب کی تاریخ ۱۸۵۷ء تک

اردو شاعری کا سیاسی اور سماجی پس منظر

از ڈاکٹر تبسم کشمیری

از ڈاکٹر غلام حسین ذوالفقار

از ڈاکٹر سید عبداللہ

از ڈاکٹر انور سدید

از ڈاکٹر انور سدید

مدیر سید فیاض محمود (اردو سے متعلقہ جلدیں)

اشتہا ق احمد

سر سید احمد خان اور ان کے نامور رفقا

اردو ادب کی مختصر تاریخ

اردو ادب کی تحریکیں

تاریخ ادبیات مسلمانان پاک و ہند

کلچر مرتبہ

- 1- دفتری خط یا درخواست ۱۰ نمبر
- 2- مضمون (ادبی، سماجی، تاریخی، عصری موضوعات) ۱۵ نمبر
- 3- تلخیص یا انگریزی سے ترجمہ ۱۰ نمبر
- 4- اصنافِ نثر: تعریف و مختصر تاریخ (داستان، ناول، افسانہ، ڈرامہ (سٹیج، ریڈیو، ٹی وی)، خاکہ نگاری، سفرنامہ، سوانح نگاری، آپ بیتی) ۱۰ نمبر
- 5- سوانحی اور تنقیدی مطالعے ۲۰ نمبر

میرامن دہلوی (باغ و بہار)

سرسید احمد خان (مضامین سرسید)

الطاف حسین حالی (مقدمہ شعر و شاعری)

شبلی نعمانی (موازنہ انیس و دہیر)

مولوی عبدالحق (چند ہم عصر)

پطرس بخاری (مضامین پطرس)

غلام عباس (جاڑے کی چاندنی)

شوکت صدیقی (خدا کی بستی)

- 6- اصنافِ نظم (تعریف و مختصر تاریخ) (قصیدہ، غزل، مثنوی، قطعہ، رباعی، مرثیہ، نظم (پابند، معرا، آزاد،

نثری، ڈرامائی) ۱۰ نمبر

- 7- شاعری ۲۵ نمبر

سوانحی اور تنقیدی مطالعے اور منتخب کلام کی تشریح و تعبیر

میر تقی میر (منتخب غزلیں)

میر حسن (مثنوی سحرالبیان)

نظیر اکبر آبادی (منتخب نظمیں)
اسد اللہ خان غالب (منتخب غزلیں)
علامہ محمد اقبال (بانگ درا)
ن م راشد (ایران میں اجنبی)
فیض احمد فیض (نقش فریادی)
مجید امجد (شبِ رفتہ)

امدادی کتب

شعری ادب (منتخب غزلوں اور نظموں کے لیے) مرتبہ ڈاکٹر خواجہ محمد زکریا
انتخابِ زریں
نثری ادب
افسانوی ادب
اردو ادب - ۱۸۵۷ء سے تاحال
نظم جدید کی کروٹیں
اقبال ایک نئی تشکیل
مرتبہ ڈاکٹر خواجہ محمد زکریا
مرتبہ ڈاکٹر معین الرحمن
مرتبہ ڈاکٹر سہیل احمد
از ڈاکٹر سید عبداللہ
از وزیر آغا
از عزیز احمد