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General Science and Ability Mock

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General Instructions

1. Give numbering to headings
2. Do not write lengthy paragraphs. Write medium sized paragraphs with headings.
3. Do not use table for comparison and contrast questions.
4. Draw figures/diagram/flowchart where needed.
5. Start new question from fresh page.
6. Write unit of the answer in ability section.
7. Explain mathematical steps and the reasoning for better score.
8. Change colour scheme for references to give them more visibility.
9. Manage time well.
10. Wide page borders are discouraged. Should be reasonable.
11. Avoid writing wrong references.
12. Give more weightage to expressedly asked part/s of the question.

Q) 9) D) Solid Management System:

Solid waste management system refers to the organised collection, transportation, disposal, and recycling of solid waste materials generated by households, industries, commercial establishments, and institutions.

Solid waste management system typically consists of the following steps:

Waste Generation: Solid waste is generated from various sectors

On-Site handling: This step involves collecting the waste from various locations

On-Site Processing: During the collation phase, the wase is first segregated, based of its ilk i.e recyclable, hazardous etc, and then placed in apposite containers.

Waste Transportation: Waste is transported from the collection point to treatment facilities or disposal sites.

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Treatment: Some waste needs to be treated first, because of it hazardous nature, ~~and then~~ before it can be safely disposed.

Disposal: Non-Recyclable & non-Recoverable waste can be disposed of through various methods.

2) National Solid Waste Management Strategy in Pakistan:

The national waste management strategy of Pakistan aims to address challenges posed by increasing urbanisation, industrialization, and population growth. It focuses on improving waste collection, segregation, disposal and recycling practices.

3) Methods to Improve:

3.1) Integrated Waste Management System:

Implement comprehensive waste management systems that include waste reduction, reuse, recycling, and proper disposal and encourage citizens to segregate waste at source.

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3.2) Public Awareness :

launch campaigns to educate the people about the importance of waste management, segregation, and responsible waste disposal.

3.3) Technology Adoption :

Explore moder technologies for waste treatment, such as composting, biogas generation, and waste to energy processes.

4b) 1) Geographic Information System :

GIS stands for Geographic Information System, which is a powerful tool used for capturing, storing, analysing, and presenting geographically referenced or spatial data. It combines geographic data (maps) with attributes (data associated with the geographic features) to provide a better understanding of the relationships, patterns, and trends within the data.

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2) Components of GIS:

2.1) **Hardware**: This includes the physical devices needed to operate GIS, such as computers, servers, GPS receivers, scanners.

2.2) **Software**: is the core component that facilitates data manipulation, analysis and visualisation. eg ArcGIS, QGIS etc.

2.3) **Data**: Geographic data is fundemental to GIS. It includes spatial data (geometric information) and attribute data (descriptive information).

2.4) **Methods**: GIS employs various methods and techniques for data analysis. These methods help uncover patterns, relation ships, and insights within the data.

2.5) **Visualisation**: GIS tools provide the capability to visualise geographic data through maps, charts.

Diagram?

2.6) **Data Models**: Uses data models to represent real-world features in a digital format. common data models include

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vector data models.

2.7) Remote Sensing: involves using satellite or aerial imagery to collect data about Earth's surface.

2.8) GPS: Global Positioning system provides accurate location information whis is essential for data collection.

Real world

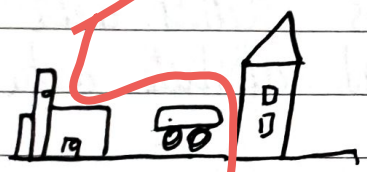

Fig 1: Overview of Gis

GIS Data
Full view
Elevations
Buildings
Routes
Boundaries
Water Bodies
Your Data

4c) 1) Causes of Population Explosion in Pakistan:

1.1) High Birth Rate: The birth rate in Pakistan have been high due to cultural norms, religious beliefs encourage large families

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1·2) Lack of Family Planning: Limited access to family planning services and contraceptives has contributed to the high birth rate.

1·3) Gender Inequality: Gender Inequality, lack of women's education and limited employment prospects result in early marriages and larger family sizes.

1·4) Limited Awareness: lack of awareness about the advantages of family planning reproductive health, and the impact of over population exacerbates the problem.

1·5) Religious Beliefs: Some religious interpretations may discourage the use of contraceptives which can affect ~~the~~ family planning practices.

2) Control Measures for Population Growth:

2·1) Promote Family Planning: Government and NGOs should educate people about family planning.

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2.2) Women Empowerment: promoting education and economic opportunities for women empower them to take informed decisions about reproductive health.

2.3) Religious and Community Engagement: Collaborating with religious leaders and communities to raise awareness and dispel misconceptions.

2.4) Awareness campaigns: Launching nationwide awareness campaigns about the benefits of family planning, population growth's impact on resources and health can change mind sets.

4d) i) Montreal Protocol:

It is an International Treaty established in 1987 to protect the Earth's ozone layer by phasing out the production & consumption of substances that deplete it. These substances are primarily chlorofluorocarbons (CFCs) and Hydrochloro-fluorocarbons (HFCs), and other various ozone depleting chemicals used in industrial processes, such as

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refrigeration and air conditioning.

2) Kyoto Protocol:

Kyoto Protocol is an international treaty adopted in 1997 as a part of United Nations framework convention on climate change (UNFCCC). It aimed to address the issue of global warming by setting binding emission reductions targets for developed countries. The protocol established a commitment period (2008-2012) during which these countries were required to collectively reduce GHG emissions by certain Percentages.

3) Carbon Market:

A carbon Market is a mechanism that allows countries, companies and organisations to trade ~~carbon~~ emission allowances ~~to~~ or credit as a way to acheive their emission reduction targets. There are two main types of carbon markets:

3.1) Cap-and-Trade system:

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In this system, a cap is set on the total green house gas emissions that can be emitted within a certain jurisdiction for sector. emission allowances are distributed among participants, and those who emit less than their allocated limit can sell their unused allowance.

3.2) Carbon off-setting:

This involves the purchase of carbon credits generated from emission reduction projects in other regions or countries

Q5 a) 1) Networking & Internet Standards:

Networking & Internet standards are a set of protocols, rules, and guidelines that ensure interoperability, compatibility, and reliable communication among different devices & systems

2) Types of Networking & Internet standards:

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2.1) Transport Protocols:

TCP & UDP ensure reliable data data transmission & communication b/w devices over the Internet.

2.2) Application Layer Protocols:

Includes HTTP, SMPT, and FTP, which define how data is exchanged between applications.

2.3) Network Layer Protocols:

IP and its versions (IPv4 and IPv6) define the addressing and routing mechanisms for data packets on the Internet.

2.4) Security Protocols:

SSL/TLS provide encryption and secure communication, while IPsec ensures secure data transmission across networks.

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1) What is Artificial Intelligence:

Artificial Intelligence refers to the simulation of human intelligence in machines that enable them to think and emulate like humans. The term can be applied to any machine that exhibits human like behaviour such as learning and problem-solving. AI enables the machines to learn from experiences and, with the passage of time, revamp its responces.

2) Examples of AI:

1) chess game
2) self-driving game
3) smart assistants e.g Siri

3) How AI has revolutionized the world:

The world has surely changed since ~~AI~~ the time that AI was practically used. AI has demonstrated the ability to perform tasks autonomously, freeing humans from repetitive or dangerous jobs. AI ~~typi~~ machines typically contain vast amount of data and, with the passage of time, they learn and improve their tasks. AI is currently deployed in various fields ranging from ~~the~~ medical to more labour intensive ~~stet~~ jobs such as

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manufacturing in Industries. Even the cell phones are equip with AI features such as Smart Assistants e.g Bixby.

4) How AI is employed in various fields.

As aforementioned A.I has had an immense impact in almost all fields, completely revolutionising them. Few examples of how AI has impacted some of the fields is as follows:

4.1) Entertainment:

AI is successfully employed in many strategic games. The vast database stores all the possible actions and knows perfectly well on how to respond to different moves executed by the player. A typical example of this is a single player chess game.

4.2 Industries:

AI is not only used to cover the manufacturing aspects in industries but can also be used to look after management tasks such as parking operations. Moreover, the more dangerous and labour intensive tasks can be executed by AI, such as molding using robotic arms.

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4.3) AI in Medical Field :

AI can perform more than just repetitive tasks. In the field of medical, AI is deployed to assist doctors in their efforts to reduce mortality rate among patients awaiting care from specialists.

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1) What is Optical Fiber:

Optical fiber comprises of strands of glass, which is used for transmitting light [ie photons/ energy packets], from one point to another. The main purpose of optical fibers is to transmit information or digital data from one point to another.

2) Constituents of Optical Fiber:

Optical Fiber consists of 2 part, namely core and claddling.

2.1) Core:

Core is the central part of an optical fiber. It high density and high refractive index, both of which are crucial for transmitting information

2.2) Claddling:

Claddling is the part that surrounds the core and has a lower refractive index compared to that of the core

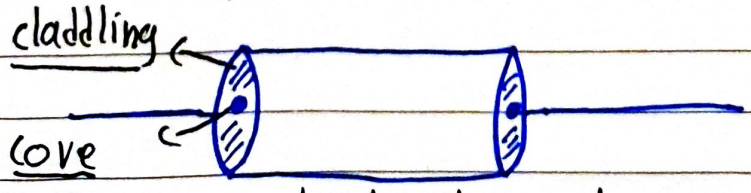

Figure: Optical Fiber and its main constituents

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3) How an optical Fiber works :

Optical Fibers work through the phenomenon of total internal reflection. Light travels down the optical fiber by bouncing off the walls. Total internal reflects enables this bouncing of the light within the cable, preventing it from travelling out from the edges. Total internal reflection occurs when critical angle is achieved, when angle of incidence at which angle of refraction becomes equal to 90°. This enables the light to reflect back at the core-claddling boundary.

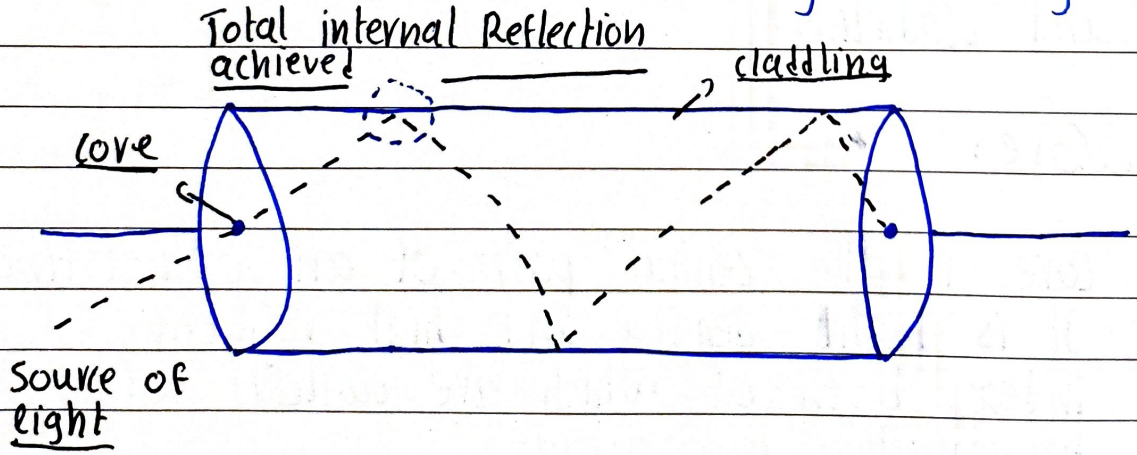

Figure : working of an optical fiber

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Section B

Q6 a) $370 in 3 parts = $3x, 5x$ and $\left(\frac{1}{4} \times 5x\right)$ => since its $\frac{1}{4}$ the third.

Total:

$$3x + 5x + \left(\frac{5x}{4}\right) = 370$$

$$\frac{12x + 20x + 5x}{4} = 370$$

$$37x = 370 \times 4$$

$$x = \frac{370 \times 4}{37}$$

$$x = 40$$

Hence

1st Part = $3x$ => $3(40)$ => $120

2nd Part = $\frac{1}{4} \times 5x$ => $\frac{5(40)}{4}$ => $50

3rd Part = $5x$ => $5(40)$ => $200

b) -> Rent needed = Rs800

-> borrowed from brother 20%

$$= \frac{20}{100} \times 800 \Rightarrow \boxed{\text{Rs}160}$$

-> borrowed from mom 30% of remaing

$$= \frac{30}{100}[800 - 160] \Rightarrow \boxed{\text{Rs } 192}$$

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-> In Bank = RS 200

-> Amount Needed => 800 - [100 + 192 + 200]

=> RS 248

d) Lights change : 24sec, 36sec, 72sec

Tackle LCM :

2 | 24
2 | 12
2 | 6
3 | 3
1

2 | 36
2 | 18
3 | 9
3 | 3
1

2 | 72
2 | 36
2 | 18
3 | 9
3 | 3
1

24 = 2 x 2 x 2 x 3 x 1

36 = 2 x 2 x 3 x 3 x 1

72 = 2 x 2 x 2 x 3 x 3 x 1

LCM = 2 x 2 x 2 x 3 x 3 x 1 = 72 seconds

Hence : 8 : 20 : 00 hrs + 72 seconds

=> 8 : 20 : 00 hrs + 1 min 12 seconds

-> 8 : 21 : 12 am

Q8) Speed = $\frac{\text{Distance}}{\text{Time}}$ => $\frac{2S}{t_1 + t_2}$

First journey : $\frac{S}{40}$

second journey = $\frac{S}{60}$

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Home Speed = $\frac{2S}{\frac{S}{40}+\frac{S}{60}}$

$= \frac{2}{\frac{60+40}{60\times 40}}$ => 48 Km/h

b) ROSE CHAIR PREACH
6821 73456 961473

Therefore SEARCH is
=> 21673

c) Siblings D

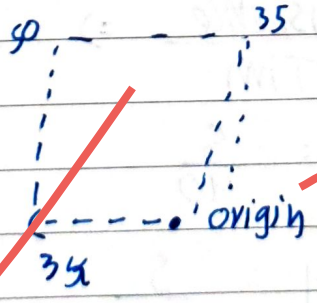
A B C D
m f m m

Key male : m
female : f
Father : D
Mother M
Brother : B
Sister : S

D is the Nephew of A

Explain steps

d)



Kashmala is 50 Km north of where she started her journey

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