TIME ALLOWED: THREE HOURS PART-I(MCQS): MAXIMUM 30 MINUTES	PART-I (MCQS) PART-II	MAXIMUM MARKS = 20 MAXIMUM MARKS = 80

NOTE:
  i. **Part-II** is to be attempted on the separate **Answer Book**.
  ii. Attempt **ONLY FOUR** questions from **PART-II**, by selecting **TWO** questions from **EACH SECTION.ALL** questions carry **EQUAL** marks.
 iii. All the parts (if any) of each Question must be attempted at one place instead of at different places.
 iv. Write Q. No. in the Answer Book in accordance with Q. No. in the Q. Paper.
  v. No Page/Space be left blank between the answers. All the blank pages of Answer Book must be crossed.

SUBJECTIVE PART — PART-II
SECTION-A

Q. 2. **(a)** Differentiate between the Reduced Instruction Set Computers (RISC) and Complex Instruction Set Computers (CISC) architectures. **(6)**

(b) Explain the three buses listed below: **(6)**

1. Address bus

2. Data bus

3. Control bus

(c) In contemporary times, the notion of the Moore's law failing is being debated. Discuss with evidence. **(8)**

Q. 3. **(a)** Differentiate between the layers of the OSI model. **(8)**

(b) Discuss how Network Address Translation (NAT) works and why is it useful? Elaborate the working of multiplexing/de-multiplexing at the transport layer. **(6)**

(c) Compare TCP and UDP. Which, in your opinion, is the better protocol? **(6)**

Q. 4. **(a)** Draw and explain the five-state process model. What is the difference between the long term and the short term scheduler in this model? **(6)**

(b) There are three processes PA, PB and PC and three resources RA, RB and RC. Resources RA and RB have one instance each while resource RC has two instances. PA is holding one instance of RC and has requested for RA. Process PB is holding RA and has requested for RB. RB is allocated to PC which has also requested an instance of RC. Represent the scenario with a resource allocation graph. Discuss whether there is a deadlock or not? If yes, which processes are blocked? **(8)**

(c) Differentiate between the workings of processes and threads. Explain using example scenarios. **(6)**

SECTION-B

Q. 5. **(a)** Elaborate the concepts of super key and foreign key with examples. **(4)**

(b) Explain the three stage ANSI-SPARC architecture in the context of databases. **(6)**

(c) Consider the following database schema shown and write the SQL code for the following queries. Display the results of all students named 'Hamza'. List all the courses which have more than three credit hours. Display all instructors who have an ID number greater than 1000 and belong to

'HUMANITIES' department. **(10)**
- Students (Stu_Reg, Stu_Name, Stu_Address)
- Instructor (Ins_ID, Ins_Name, Ins_Dept_ID)
- Course (Cr_Code, Cr_Title, Cr_CrHours)
- Dept (Dept_ID, Dept_Name)
- Results (Res_Stu_Reg, Res_Cr_Code, Res_Marks, Res_Ins_ID, Res_Grade)

Q. 6. **(a)** Describe the process of application of compression based technique for image segmentation. **(6)**
(b) Matrix operations are considered different from array operations. How so? **(6)**
(c) When are mean or median filters used? What are the differences between the two? **(8)**

Q. 7. **(a)** Design an ER diagram for a restaurant. The complete process of customer ordering food, chef cooking the food and the customer being billed for the food should be catered in the diagram. (Hint: focus on the data that needs to be stored in the restaurant) **(8)**
(b) Differentiate between DDL, DML and DCL. **(6)**
(c) What are distributed databases; how are they different from traditional relational databases? **(6)**

Q. 8. **(a)** Requirement engineering is considered one of the pillars of large scale software development. Explain the importance of requirement engineering in the context of web development. **(6)**
(b) Block chain technology is increasingly becoming popular on the web. What is block chain and how is it used to conduct transactions on the web? **(6)**
(c) Write short notes on two of the following three: **(8)**
1. HTML
2. DOM
3. SEO

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Best of Luck for CSS-2022