FEDERAL PUBLIC SERVICE COMMISSION
COMPETITIVE EXAMINATION - 2016
FOR RECRUITMENT TO POSTS IN BS-17
UNDER THE FEDERAL GOVERNMENT

Roll Number

COMPUTER SCIENCE, PAPER-II

TIME ALLOWED: THREE HOURS **PART-I(MCQS): MAXIMUM 30 MINUTES**	**PART-I (MCQS) MAXIMUM MARKS = 20** **PART-II 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) Candidate must 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.
(vi) Extra attempt of any question or any part of the attempted question will not be considered.

PART-II
SECTION-A

Q. 2. **(a)** Suppose you add two new devices to an existing five-device network. If you have a fully connected mesh topology, how many new cable lines are needed? If, however, the devices are arranged in a ring, how many new cable lines are needed? **(6)**

(b) Transmission media are not perfect because of imperfections and impairments in the signal sent through the medium. Signals at the beginning and at the end of the medium are not the same. Discuss in detail the impairments in the transmission medium. **(7)**

(c) Whenever multiple devices are used in a network, the problem arises that how to connect them to make one-on-one communication possible. Switching is the best solution for this kind of problem. A switched network consists of a series of inter-linked nodes called switches. Explain briefly the methods of switching used by computer networks. **(7)**

Q. 3. **(a)** RAID is a physical disk drives viewed by the operating system as a single logical drive, where data are distributed across the physical drives of an array. Explain different levels of RAID? Elaborate your answer with suitable diagrams. **(8)**

(b) The basic function performed by a computer is execution of a program, which consists of set of instructions stored in memory. The processor required for a single instruction is called an instruction cycle. Elaborate basic instruction cycle used by modern computer systems. Also add diagrams for explanation. **(6)**

(c) Differentiate between Reduced Instruction Set Computers (RISC) and Complex Instruction Set Computers (CISC) architectures. **(6)**

Q. 4. **(a)** Deadlock prevention algorithms prevents deadlock by restraining how requests can be made, the restrain ensure that at least one of the necessary conditions for deadlock cannot occur and hence, that deadlock cannot hold. Explain the Banker's Algorithm for deadlock avoidance. **(8)**

(b) Central Processing Unit (CPU) scheduling deal with the problem of deciding which of the processes in the ready queue is to be allocated to the CPU. What are the pros and cons of *Multilevel Queue Scheduling* and *Multilevel Feedback Queue Scheduling*? **(6)**

(c) What do you know about Process Control Block? Discuss its components in detail. **(6)**

SECTION-B

Q. 5. **(a)** A complete SELECT statement embedded within another SELECT statement. The results of this inner SELECT statement (or subselect) are used in the outer statement to help determine the contents of the final result. Differentiate among following nested sub-queries operators "IN", "ANY" and "ALL". **(8)**

(b) Explain how Pattern match search condition (LIKE/NOT LIKE) can be used in SELECT statement part of SQL in database management system. **(6)**

(c) Differentiate between Data Manipulation Language (DML) and Data Definition Language (DDL) of structured query language (SQL) in database management system (DBMS). **(6)**

Q. 6. **(a)** A transaction is a unit of program execution that accesses and possibly updates various data items. Usually, a transaction is initiated by a user program written in a data manipulation language. Explain the ACID property of transaction processing. **(8)**

(b) Distinguish among functional dependency, Fully functional dependency and Transitive dependency. **(6)**

(c) A trigger is a statement that the system executes automatically as a side effect of a modification to the database. What are the different forms of triggers and how they are defined? **(6)**

Q. 7. **(a)** Write down a short note on Array versus Matrix Operations **(6)**

(b) Differentiate between CMY and CMYK Colour Models used in digital image processing. **(6)**

(c) Explain the Boundary Extraction Algorithm used for basic morphology. **(8)**

Q. 8. **(a)** Explain the principals of requirement engineering of web applications. **(8)**

(b) Elaborate the term E-Commerce. Discuss in detail about the effects of E-Commerce in Islamic Banking in Pakistan. **(6)**

(c) What are the components of Generic web application architecture? **(6)**

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