FEDERAL PUBLIC SERVICE COMMISSION

COMPETITIVE EXAMINATION FOR RECRUITMENT TO POSTS IN PBS-17, UNDER THE FEDERAL GOVERNMENT, 2003

COMPUTER SCIENCE

TIME ALLOWED: THREE HOURS **MAXIMUM MARKS: 100**

NOTE: Attempt **FIVE** questions in all, including **QUESTION NO. 8** which is **COMPULSORY**. Select at least **ONE** question from each of the **SECTIONS – I, II** and **III**. All questions carry **EQUAL** marks. Illustrate your answer with diagrams and sketches wherever necessary. Answer should be neat, clean and to the point. Avoid unnecessary details but record facts and any assumptions made.

SECTION - I

1. (a) What is the BIOS and what functions are preformed by it? **(10)**

   (b) What is Virtual Memory and how many ways it is implemented? In this context describe some three process scheduling techniques? **(10)**

2. (a) What do you mean by a linear system? Give an example of it. Explain how Gaussian elimination algorithm can be used to solve a linear system of equations? Why this algorithm is suitable for parallelization? **(10)**

   (b) Explain various addressing modes of instructions with examples. What is the process control Block and what are its functions. **(10)**

3. (a) What factors would you consider if you are asked to design a LAN from scratch? Assume that all Hardware requirements can be satisfied appropriately. **(10)**

   (b) What is the basic difference between a Switch and a Hub? State which device controls the collision domains betterly. **(10)**

SECTION - I I

4. (a) How the complexity of an algorithm is measured? Define and explain Greedy Algorithms. **(10)**

   (b) Discuss various types of team structure that can be formed for software development. Also explain briefly why the feasibility of producing quality software is reduced if project risk is great. **(10)**

5. (a) Provide three examples of fourth generation Software Engineering technique. Explain COCOMO model for software estimation. Discuss your perception of ideal training and background for a system analyst. **(10)**

   (b) Differentiate between the parameter passing paradigm "calls by value" and "call by reference". Also find out the result of the following expressions. Execute each expression independently.

   int a = 40, b = -8, c = 2, p = 9, q = 4, r = 12, x = 5, y = 10

   a. `X += !(!x) + !!y*c`
   b. `X=(a%b>? (a%c>0? 3:4): (b>c?5:6))`
   c. `P-=q++ % --q+r`
   d. `X = p++ * --q +++ r` **(10)**

SECTION -III

6. (a) Describe various 2D-taransformations and represent them in normal form. **(10)**

(b) Explain the concept of ODBC, with the help of an architectural diagram. What problems are caused by data redundancies? Can data redundancies be completely eliminated when the database approach is used? Why or why not? **(10)**

7. (a) Define 3NF, BCNF. Give an example of a relation in 3NF but not in BCNF. Transform that relation in BCNF. What are checkpoints? Where they are used? Why? **(10)**

(b) With the help of appropriate diagram explain the CGI programming environment in detail. Write a CGI based Perl script that keeps track of the number of visitors to the home page of a certain site. **(10)**

COMPULSORY QUESTION

8. (A) Write only True or False in the Answer Book. Do not reproduce the question **(1x10)**

(1) A feature of an operating system that allows more than one program to run simultaneously is called Multitasking.

(2) A trackball operates like a joystick on its back. It is extremely useful when there isn't enough space to use a mouse.

(3) Digitizing Tablet is a special Input device that is mainly used to digitize vector-oriented design or pictures

(4) Dedicated line is a high speed cable line that is not permanently wired into the internet.

(5) A Router is a network device that helps LANs and WANs achieve interoperability and connectivity and that can link LANs that have different network topologies, such as Ethernet and Token Ring.

(6) Internet Protocol is a routable protocol in the backbone that is responsible for IP addressing, routing, and the fragmentation and reassembly of IP packets.

(7) Telnet is an Internet connection that enables a user to terminate an active connection with a computer at a remote site.

(8) ESD stands for Electronic Static Distance.

(9) IRQ is Interrupt ReQuest.

(10) Copyright computer programs made available on trial basis are called shareware.

(B) Please choose the most appropriate answer from the given set of answers. **(1 X 5)**

(11) What is the long form of 'CMOS'?

(a) Complimentary Metal Oxide Semiconductor
(b) Complex Metal Oxide Semiconductor
(c) Controller Metal Oxide Semiconductor
(d) Complimentary Metal Oxide Sets

(12) What is a Y-Connector?

(a) A Y-Shaped splitter cable that divides a source input into two output signals.
(b) A Y-Shaped splitter connector that divides a source input into two output signals.
(c) A Y-Shaped splitter card that divides a source input into two output signals.
(d) None of the above

(C)

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(13) What do you mean by 'IBM-Compatible'?
- (a) A computer that has a processor that is compatible with the original IBM PC.
- (b) A computer that has a processor that is similar to original IBM PC.
- (c) A computer that has a casing that is similar original IBM PC.
- (d) None of the above

(14) What do you mean by 'virtual '? Select all that apply:
- (a) In general, it distinguishes something that is merely conceptual from something that has physical reality.
- (b) Real
- (c) Not real
- (d) None of the above

(15) Select correct statement describing a term 'stateless '?
- (a) Having all information about what occurred previously
- (b) Having some information about what occurred previously
- (c) Having no information about what occurred previously
- (d) Having new information about what occurred previously

(C) Write short answers to the following: **(1×5)**
- (16) MAN
- (17) Polymorphism in OOPS
- (18) HTM L
- (19) Business management and IT.
- (20) Usenet

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