2016

COMPUTER SCIENCE PAPER-II

Time allowed: 3 hrs.

Full Marks: 200

f the questions attempted are in excess of the prescribed number, only the question attempted irst up to the prescribed number shall be valued and the remaining ones ignored.

nswers may be written either in English or in Bengali but all answers must be in one and the Same language.

Answer any five questions from the following:

1. (a) Explain the difference between logical and physical addresses.

    4

    (b) Consider a logical address space of 8 pages of 1024 words mapped into a physical memory of 32 frames than how many bits are there in the logical address as well as physical address?

    6

    (c) A certain computer provides its users with a virtual memory space of 2^{24} words. The computer has 2^{18} words of physical memory. The virtual memory is implemented by paging and the page size is 256 words. A user program generates the virtual address 11123456 (octal). Explain how the system establishes the corresponding physical location.

    10

    (d) A binary semaphore is a semaphore whose integer value can range only between 0 and 1. Show how a general semaphore can be implemented using binary semaphore

    10

    (e) Explain the basic steps of SDLC by taking an example

    10

    (a) What is meant by exceptions? How an exception is handled in C++? Bring out the advantages of using rious exceptions handling mechanism.

    5+7

    (b) Explain the signaficance of friend function and friend class with proper example. Also explain how a end function behaves like a bridge between two classes.

    5

    (c) Differentiate between compile time polymorphism and run time polymorphism in object oriented ogramming with suitable examples.

    12

    (a) What is BUS arbitration? Explain polling and daisy chaining method in BUS arbitration technique with diagram.

    15

    (b) What is associative memory? Explain how it is used in address mapping in a cache memory system.

    5+8

    (c) Given 128 X 8 RAM chips
    i) How many chips are needed to provide a memory capacity of 2048 bytes?
    ii) How many address BUS lines needed to access 2048 bytes of memory
    iii) How many lines must be decoded to chip select? Also specify the size of the decoder.

    12

P. T. O.

4. (a) A typical microprocessor has M address lines and N data lines than how many addresses cab be developed by this microprocessor and how much maximum memory can be addressed by it if the memory is byte-organised.

4

(b) Draw the timing diagram for execution of the instruction MVI A,32H for 8085 microprocessor and also write down the necessary steps of execution.

14

(c) Differentiate between Memory mapped I/O and I/O mapped I/O with suitable diagram.

8

(d) Specify the contents of the memory locations ZZ70H to ZZ74H after execution of the following instructions.

        LXI H, ZZ70H
        MVI B, 05H
        MVI A, 01
STORE: MOV M,A
        INR A
        INX H
        DCR B
        JNZ STORE
        HLT

8

(e)   Give the merits and demerits of the floating point and fixed point representation for storing real numbers.

6

5. (a)   Draw a block diagram of the phases of a compiler and indicate the main function of each phase.

8

(b) Give three examples of machine-dependent optimization. State where these types of optimization are performed in the compiler and explain the tradeoffs of optimizing there rather than at some earlier or later time.

12

(c) Explain the packet switching and circuit-switching technique with examples.

8

(d) differentiate among : i)A grammer ii) A language iii) A machine. Which of the following describes the behavior of a BNF specification?

9+3

6. (a) Draw an ERD for the following ....

You have to consider a situation in which the academic administration finds itself. It has to handle data regarding students, faculty and courses being offered and the possible areas of specialization. The following points are to be considered before constructing the model ....

The Students specialize in one or more areas.

i) The students study a specific course.

ii) The course belongs to an area of specialization.

iii) A faculty member belongs to an area of specialization.

iv) The student can be either doctoral or post graduate student.

v) A faculty member guides a doctoral student.

vi) Certain other courses have the prerequisites.

vii) faculty offers a corresponding course.

Draw the corresponding ER Diagram and design the set of tables accordingly.

20

. (b) Explain Intersection operation related to relational algebra with example,

Discuss in

brief the ACID properties of a transaction.

7+8

5

(c) Explain the features of third normal form in database.

6

7. (a) What are the s/w and h/w components of a multimedia system?

b) State two differences between Mono sound and Stereo sound. Explain Dolby Digital encoding method in brief

9

c) If 1 hour of Stereo music are stored in MIDI File as well as WAV File format with 16-bit resolution @44.1 KHZ sample rate than what would be the storage requirement of the two files?

10

(d) Explain the Cohen-Sutherland line clipping algorithem and illustrate it by taking a suitable example .

15