

A6-R5 : COMPUTER ORGANIZATION AND OPERATING SYSTEM

अवधि : 03 घंटे
DURATION : 03 Hours

अधिकतम अंक : 100
MAXIMUM MARKS : 100

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|-----------------|--|--|--|--|--|
| ओएमआर शीट सं. : | | | | | |
| OMR Sheet No. : | | | | | |

रोल नं. :
Roll No. :

उत्तर-पुस्तिका सं. :
Answer Sheet No. :

परीक्षार्थी का नाम :
Name of Candidate :

परीक्षार्थी के हस्ताक्षर :
Signature of Candidate :

परीक्षार्थियों के लिए निर्देश :

Instructions for Candidate :

| | |
|---|---|
| कृपया प्रश्न-पुस्तिका, ओएमआर शीट एवं उत्तर-पुस्तिका में दिये गए निर्देशों को ध्यानपूर्वक पढ़ें। | Carefully read the instructions given on Question Paper, OMR Sheet and Answer Sheet. |
| प्रश्न-पुस्तिका की भाषा अंग्रेजी है। परीक्षार्थी केवल अंग्रेजी भाषा में ही उत्तर दे सकता है। | Question Paper is in English language. Candidate can answer in English language only. |
| इस मॉड्यूल/पेपर के दो भाग हैं। भाग एक में चार प्रश्न और भाग दो में पाँच प्रश्न हैं। | There are TWO PARTS in this Module/Paper. PART ONE contains FOUR questions and PART TWO contains FIVE questions. |
| भाग एक "वैकल्पिक" प्रकार का है जिसके कुल अंक 40 हैं तथा भाग दो "व्यक्तिपरक" प्रकार का है और इसके कुल अंक 60 हैं। | PART ONE is Objective type and carries 40 Marks. PART TWO is Subjective type and carries 60 Marks. |
| भाग एक के उत्तर, ओएमआर उत्तर-पुस्तिका पर ही दिये जाने हैं। भाग दो की उत्तर-पुस्तिका में भाग एक के उत्तर नहीं दिये जाने चाहिए। | PART ONE is to be answered in the OMR ANSWER SHEET only. PART ONE is NOT to be answered in the answer book for PART TWO. |
| भाग एक के लिए अधिकतम समय सीमा एक घण्टा निर्धारित की गई है। भाग दो की उत्तर-पुस्तिका, भाग एक की उत्तर-पुस्तिका जमा कराने के पश्चात् दी जाएगी। तथापि, निर्धारित एक घंटे से पहले भाग एक पूरा करने वाले परीक्षार्थी भाग एक की उत्तर-पुस्तिका निरीक्षक को सौंपने के तुरंत बाद, भाग दो की उत्तर-पुस्तिका ले सकते हैं। | Maximum time allotted for PART ONE is ONE HOUR. Answer book for PART TWO will be supplied at the table when the Answer Sheet for PART ONE is returned. However, Candidates who complete PART ONE earlier than one hour, can collect the answer book for PART TWO immediately after handing over the Answer Sheet for PART ONE to the Invigilator. |
| परीक्षार्थी, उपस्थिति-पत्रिका पर हस्ताक्षर किए बिना और अपनी उत्तर-पुस्तिका, निरीक्षक को सौंपे बिना, परीक्षा हॉल/कमरा नहीं छोड़ सकते हैं। ऐसा नहीं करने पर, परीक्षार्थी को इस मॉड्यूल/पेपर में अयोग्य घोषित कर दिया जाएगा। | Candidate cannot leave the examination hall/room without signing on the attendance sheet and handing over his/her Answer Sheet to the invigilator. Failing in doing so, will amount to disqualification of Candidate in this Module/Paper. |
| प्रश्न-पुस्तिका को खोलने के निर्देश मिलने के पश्चात् एवं उत्तर लिखना आरम्भ करने से पहले उम्मीदवार जाँच कर यह सुनिश्चित कर लें कि प्रश्न-पुस्तिका प्रत्येक दृष्टि से संपूर्ण है। | After receiving the instruction to open the booklet and before starting to answer the questions, the candidate should ensure that the Question Booklet is complete in all respect. |

जब तक आपसे कहा न जाए, तब तक प्रश्न-पुस्तिका न खोलें।

DO NOT OPEN THE QUESTION BOOKLET UNTIL YOU ARE TOLD TO DO SO.

PART ONE

(Answer all the questions, each question carries ONE mark)

1. Each question below gives a multiple choice of answers. Choose the most appropriate one and enter in the "OMR" answer sheet supplied with the question paper, following instructions therein. (1x10)

1.1 Which one of the following expressions does represent exclusive NOR of x and y ?

- (A) $x'y + xy'$
- (B) $xy + x'y'$
- (C) $x' \oplus y'$
- (D) None of these

1.2 Which of the following Boolean function is represented by the given truth table ?

| x | y | F(x, y) |
|---|---|---------|
| 0 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 0 | 1 |
| 1 | 1 | 1 |

- (A) x
- (B) $x + y$
- (C) $x \oplus y$
- (D) xy

1.3 What is the minimal form of the Karnaugh map shown below ? Assume that X denotes a don't care term.

| cd \ ab | 00 | 01 | 11 | 10 |
|---------|----|----|----|----|
| 00 | 1 | X | X | 1 |
| 01 | X | | | 1 |
| 11 | | | | |
| 10 | 1 | | | X |

- (A) $b'd'$
- (B) $b'd' + b'c' + c'd'$
- (C) $b'd' + a'b'c'd'$
- (D) $b'd' + b'c'$

1.4 The representation of -12 in 2's Complement form is :

- (A) 00001100
- (B) 11110100
- (C) 11110011
- (D) 10001100

1.5 The data on which operation is to be performed is called as :

- (A) Opcode
- (B) Operand
- (C) Instruction
- (D) Processor

1.6 The instructions are stored in :

- (A) Memory
- (B) Control Unit
- (C) ALU
- (D) I/O devices

1.7 You should choose Sleep option when :

- (A) The computer is tired after working for the whole day.
- (B) You are leaving for a very short time and want to resume your work shortly.
- (C) When computer gets hanged frequently, let it sleep for some time.
- (D) You finish working and going to bed.

1.8 The Banker's algorithm is used :

- (A) to rectify deadlock
- (B) to detect deadlock
- (C) to prevent deadlock
- (D) to solve deadlock

1.9 First-In-First-Out (FIFO) scheduling is :

- (A) Non-preemptive Scheduling
- (B) Preemptive Scheduling
- (C) Fair Share Scheduling
- (D) Deadline Scheduling

1.10 Suppose a system has only three physical pages. Given the sequence of virtual page references as 1 2 1 1 3 2 1 4 3 1 1 2 4 1 5 6 2 1, determine the number of page faults that are required using the Least Recently Used (LRU) replacement policy. Initially, assume that the physical pages are not being used by any virtual page.

- (A) 9
- (B) 10
- (C) 11
- (D) 12

2. Each statement below is either TRUE or FALSE. Choose the most appropriate one and enter your choice in the "OMR" answer sheet supplied with the question paper, following instructions therein.

(1x10)

2.1 Execution of a Program in the Von Neumann system is done concurrently.

2.2 The length of an instruction depends on memory organization.

2.3 A data bus provides path for moving data between system modules.

2.4 The Von Neumann Bottleneck refers to CPU Memory speed disparity.

2.5 Instruction register points to the first instruction to be executed when the processor starts.

2.6 With multiprogramming, two or more programs use the same computer resources simultaneously.

2.7 When a program's source code is modified, the source code needs to be assembled and linked again before it can be executed with the changes.

2.8 DMA is worse for large transfers than interrupts due to the overhead of setting up the transfer.

2.9 Virtual Memory is an illusion of extremely large main memory.

2.10 Increasing the speed of the CPU is a solution to thrashing.

3. Match words and phrases in column X with the closest related meaning/ word(s)/phrase(s) in column Y. Enter your selection in the "OMR" answer sheet supplied with the question paper, following instructions therein. (1x10)

| X | | Y | |
|------|-------------------------------|---|---------------------------|
| 3.1 | Scanner | A | CPU Scheduling |
| 3.2 | XOR gate | B | Output device |
| 3.3 | MOV R0, 300 | C | Inequality detector |
| 3.4 | Printer | D | Immediate addressing mode |
| 3.5 | MOV A, R0 | E | Register addressing mode |
| 3.6 | Microsoft Windows | F | Utility |
| 3.7 | Anti-virus | G | Page replacement |
| 3.8 | Shortest Remaining Time | H | Multitasking OS |
| 3.9 | Least Recently Used algorithm | I | Operating System |
| 3.10 | Time sharing systems | J | Input device |
| | | K | BATCH OS |
| | | L | Multiprograms OS |
| | | M | Disk Scheduling |

4. Each statement below has a blank space to fit one of the word(s) or phrase(s) in the list below. Enter your choice in the "OMR" answer sheet supplied with the question paper, following instructions therein. (1x10)

| | | | | | |
|----|-------------------|----|-----------------|----|-------------------|
| A. | Propagation delay | B. | Round Robin | C. | Physical page |
| D. | Windows | E. | Mainframe | F. | Operating System |
| G. | DOS | H. | CPU utilization | I. | Memory management |
| J. | FIFO scheduling | K. | Multithreading | L. | Super computers |
| M. | Multitasking | | | | |

- 4.1 _____ computers are powerful multi-user computer capable of supporting many hundreds or thousands of users simultaneously.
- 4.2 _____ are extremely fast computers that can perform hundreds of millions of instructions per second.
- 4.3 _____ is a disadvantage of single bus structure over multi-bus.
- 4.4 _____ is a multitasking operating system.
- 4.5 _____ is a Non-preemptive Scheduling.
- 4.6 Making no assumptions about the processes being scheduled, _____ scheduling algorithm will prevent starvation.
- 4.7 Multiprogramming of computer system increases _____.
- 4.8 _____ is useful for application that perform a number of essentially independent tasks that do not be serialized.
- 4.9 The size of a virtual page is identical to the size of a _____.
- 4.10 _____ is the layer of a computer system between the hardware and user program.

PART TWO

(Answer any FOUR questions)

5. (a) What advantage does 2's complement have over 1's complement ? Convert the following decimal numbers to binary using 6-bit 2's complement representation.
- (i) 13_{10}
 - (ii) -3_{10}
- (b) What are different types of RAM and ROM memories ? Explain in detail. **(8+7)**
6. (a) What are the different I/O modes of data transfer ? Discuss different modes of transfers in detail.
- (b) What is an interrupt ? What are different types of interrupts ? How are interrupts handled ? **(8+7)**
7. (a) What relation is holds between the following pairs of sets of CPU-scheduling algorithms ?
- (i) Priority and SJF
 - (ii) Multilevel feedback queues and FCFS
- (b) Explain the advantages and disadvantages of following memory allocation algorithms :
- (i) First Fit
 - (ii) Best Fit **(6+9)**

8. (a) Explain `/`, `/bin`, `/dev` & `/etc` of Unix file system.
- (b) What is a process in the context of operating systems ? Explain the various states of a process with the help of state Transition diagram. **(8+7)**
9. (a) What is Redirection in Linux ?
- (b) Briefly discuss the Inode & its structure in Linux OS. **(7+8)**

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SPACE FOR ROUGH WORK

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