

## A6-R5 : Computer Organization and Operating System

अवधि : 03 घंटे

DURATION : 03 Hours

अधिकतम अंक : 100

MAXIMUM MARKS : 100

ओएमआर शीट सं. :  
OMR Sheet No. :

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रोल नं. :

Roll No. :

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उत्तर-पुस्तिका सं. :

Answer Sheet No. :

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परीक्षार्थी का नाम :

Name of Candidate :

परीक्षार्थी के हस्ताक्षर :

Signature of Candidate :

परीक्षार्थियों के लिए निर्देश :	Instructions for Candidates :
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 अंग्रेजी भाषा में है। परीक्षार्थी उत्तर लिखने के लिए केवल अंग्रेजी भाषा का ही प्रयोग कर सकते हैं।	Question Paper is in English language. Candidate has to 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, इस प्रश्न-पत्र के साथ दी गई ओएमआर उत्तर-पुस्तिका पर, उसमें दिये गए अनुदेशों के अनुसार 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, supplied with the question paper, as per the instructions contained therein. 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 यह जाँच कर 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 of the following is not a weighted code ?

- (A) Binary number system
- (B) Decimal number system
- (C) Excess 3-code
- (D) Octal number system

**1.2** Select one of the following statements that best describes the parity method of error detection.

- (A) Parity checking is best suited for detecting single-bit errors in transmitted codes.
- (B) Parity checking is not suitable for detecting single-bit errors in transmitted codes.
- (C) Parity checking is capable of detecting and correcting errors in transmitted codes.
- (D) Parity checking is best suited for detecting double-bit errors that occur during the transmission of codes from one location to another.

**1.3** In direct mapping, the physical address is divided as :

- (A) Tag, Line Number and Block/ Line Offset
- (B) Block Number/Tag and Block/Line Offset
- (C) Tag, Set Number and Block/Line Offset
- (D) None of the above

**1.4** Which register holds the address for a stack whose value is supposed to be directed at the topmost position ?

- (A) Stack Register
- (B) Stack Pointer
- (C) Both (B) & (C)
- (D) None of the above

**1.5** Increasing the RAM of a computer typically improves performance because :

- (A) Larger RAMs are faster
- (B) Fewer page faults occur
- (C) Fewer segmentation faults occur
- (D) Virtual memory increases

**1.6** In Linux, which one of the following provide a command interpreter environment ?

- (A) Terminal
- (B) Command
- (C) Kernel
- (D) Shell

- 1.7 For which value of K, the k-way set associative mapping becomes direct mapping.
- (A) 4 (B) 3  
(C) 2 (D) 1
- 1.8 Which of the following algorithms tends to minimize the process flow time ?
- (A) Shortest Job First  
(B) Longest Job First  
(C) Earliest Deadline First  
(D) Round Robin
- 1.9 Which directory used to store the user commands in Linux ?
- (A) /etc/  
(B) /bin/  
(C) /root/  
(D) /dev/
- 1.10 Which of the following process scheduling algorithm may lead to starvation ?
- (A) FIFO  
(B) Lottery scheduling  
(C) Shortest Job Next  
(D) Round Robin
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 Under UNIX the key board is the default input device and the monitor is the default output device.
- 2.2 The command chown, is used to change the owner of file, system files and directories.
- 2.3 Linux Shell takes care of inter process communication.
- 2.4 The hexadecimal number  $(1E2)_{16}$  to equal to  $(482)_{10}$ .
- 2.5 The system calls in UNIX is written in assembly language.
- 2.6 If the quantum time of round robin algorithm is very large, then it is equivalent to FIFO.
- 2.7 Cache mapping is a technique by which the contents of main memory are brought into the cache memory.
- 2.8 Linux operating system is virus free.
- 2.9 Every file and directory in UNIX/Linux system has three permissions which is known as read, write and delete.
- 2.10 A CPU handles interrupt by executing interrupt service subroutine by checking interrupt register after execution of each instruction.

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	User Permissions	A	change permissions
3.2	Combinational logic circuits	B	search text
3.3	$(170)_{10}$	C	create file
3.4	IC Number of Interrupt controller	D	Natural language
3.5	Linux Command touch	E	$(AA)_{16}$
3.6	Linux Command chmod	F	System call
3.7	IC Number of Micro controller	G	$(641)_8$
3.8	$(417)_{10}$	H	Stack
3.9	fork()	I	8051
3.10	grep	J	half adders
		K	rxw
		L	8259
		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. Choose the most appropriate option, enter your choice in the "OMR" answer sheet supplied with the question paper, following instructions therein. (1x10)

A.	Processes	B.	Byte Count	C.	Interface circuits
D.	Accumulators	E.	Heap	F.	Operating System
G.	Stack	H.	Vectored Interrupt	I.	High-level Language
J.	Single bus	K.	Locality of reference	L.	Cache memory
M.	Multithreading				

- 4.1 Cache memory works on the principle of \_\_\_\_\_.
- 4.2 In the case of, Zero-address instruction method the operands are stored in \_\_\_\_\_.
- 4.3 The transfer of branch information to the microprocessor by an interrupting source through the data bus is called as \_\_\_\_\_.
- 4.4 \_\_\_\_\_ bus structure is usually used to connect I/O devices.
- 4.5 A shell in a Linux operating system takes input from user in the form of commands, \_\_\_\_\_ it, and then gives an output.
- 4.6 A source program is usually written in \_\_\_\_\_.
- 4.7 To reduce the memory access time we generally use \_\_\_\_\_.
- 4.8 Address register and \_\_\_\_\_ register are significantly incremented and decremented respectively for the transmission of each byte by Direct Memory Access (DMA).
- 4.9 The \_\_\_\_\_ serves as an intermediary between the device and the BUSes.
- 4.10 \_\_\_\_\_ is the layer of a computer system between the hardware and user program.

**PART TWO**

**(Answer any FOUR questions)**

5. (a) Explain Block Diagram of von Neumann architecture. Differentiate between Computer Organization and Computer Architecture.
- (b) Draw the Logic design of 4 bit adder Subtractor and explain ? **(8+7)**
6. (a) Perform the arithmetic operations  $(+42) + (-13)$  and  $(-42) - (-13)$  in binary using signed - 2's complement representation for negative numbers.
- (b) A digital computer has a common bus system for 16 registers of 32 bits each. The bus is constructed with multiplexers.
- (i) How many selection inputs are there in each multiplexer ?
- (ii) What size of multiplexers are needed ?
- (iii) How many multiplexers are there in the bus ? **(6+9)**
7. (a) What is the difference between a direct and an indirect address instruction ? How many references to memory are needed for each type of instruction to bring an operand into a processor register ?
- (b) Draw the Block diagram of an associative memory and explain its operation in terms of match logic read and write operation.
- (c) What is the difference between isolated I/O and memory-mapped I/O ? What are the advantages and disadvantages of each ? **(5+5+5)**
8. (a) Explain the different types of operating system.
- (b) What do you mean by CPU scheduling ? Discuss CPU/IO burst cycle. **(8+7)**
9. (a) Explain component of Linux System. Mention important features of Linux Operating System.
- (b) Explain Process Control Block. Draw the block diagram of process transition states.
- (c) List Various Type of Operators in shell Scripting ? Discuss Logical Operator in Shell Scripting with example ? **(5+5+5)**

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**SPACE FOR ROUGH WORK**

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