A4-R4: COMPUTER SYSTEM ARCHITECTURE

अवधि: 03 घंटे **अधिकतम अंक: 100**
DURATION: 03 Hours **MAXIMUM MARKS: 100**

ओएमआर शीट सं.: **OMR Sheet No.:**						

रोल नं.: **Roll No.:** | | | | | | |

उत्तर-पुस्तिका सं.: **Answer Sheet No.:** | | | | | | |

परीक्षार्थी का नाम: **परीक्षार्थी के हस्ताक्षर:**
Name of Candidate: _____; Signature of candidate: _____

परीक्षार्थियों के लिए निर्देश: **Instructions for Candidate:**

कृपया प्रश्न-पुस्तिका, ओएमआर शीट एवं उत्तर–पुस्तिका में दिये गए निर्देशों को ध्यान पूर्वक 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 कर सकता है।	Question Paper is in English language. Candidate can answer in English language only.
इस मॉड्यूल/पेपर के **दो भाग** है। **भाग एक** में चार प्रश्न और **भाग दो** में पाँच प्रश्न है।	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 है तथा **भाग दो**, "व्यक्तिपरक" प्रकार है और इसके कुल अंक 60 है।	**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 है। **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 पश्चात 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.**
परीक्षार्थी, उपस्थिति-पत्रिका पर हस्ताक्षर किए बिना अथवा अपनी उत्तर-पुस्तिका, निरीक्षक को सौंपे बिना, परीक्षा हाल नहीं छोड़ सकता हैं। ऐसा नही 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 or handing over his 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 पश्चात एवं उत्तर देने से पहले उम्मीदवार यह जाँच कर यह सुनिश्चित कर ले कि प्रश्न-पुस्तिका प्रत्येक दृष्टि से संपूर्ण है।	After receiving the instruction to open the booklet and before answering 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)

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 In a function of six variables, the total maximum number of product terms that the expression can have will be?
A) 64 B) 6
C) 32 D) 12

1.2 The operation of a combinational circuit can be described by means of:
A) State Table B) Excitation table
C) Truth Table D) None of these

1.3 Which of the following gates can be used as a parity checker?
A) NAND B) NOR
C) XOR D) XNOR

1.4 The 2's compliment representation of (-24) in a 16-bit microcomputer is:
A) 0000 0001 1000 1000
b) 1111 1111 1110 0111
C) 0001 0001 1111 0011
D) 1111 1111 1110 1000

1.5 A feature that distinguishes the JK flip-flop from SR flip-flop is the:
A) Toggle condition B) Preset input
C) Type of clock D) Clear Input

1.6 A common bus system can be constructed using:
A) Multiplexer B) Decoders
C) Registers D) None of these

1.7 An interrupt for which hardware automatically transfers the program to a specific memory location is known as
A) Software Interrupt B) Hardware Interrupt
C) Maskable Interrupt D) Vector Interrupt

1.8 Associative Memory uses the following search for accessing the data:
A) Parallel B) Sequential
C) Direct access D) random

1.9 The instruction LOAD A is a:
A) Zero-address B) One-address
C) Two-address D) Three-address.

1.10 Which of the following addressing mode is used in instruction PUSH B?
A) Immediate B) Register
C) Direct D) Register indirect.

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 The Program counter register is used for storing an instruction.
2.2 Immediate addressing is best suited for storing floating point numbers.
2.3 The secondary memory is slower than that of main memory but has a larger capacity.
2.4 The principle of locality says that all the references to data have to be to the same memory location.
2.5 Comparison of data items are performed in the ALU.
2.6 Data Buffering is used to smoothing out the speed difference between CPU and I/O devices.
2.7 Parallel interface are commonly used for connecting printers to a computer.
2.8 Address Buses are unidirectional in nature.
2.9 Two minterms in a K-map are adjacent only if they differ by two bit position.
2.10 There are four select lines for a 30-to-1 MUX.

ROUGH WORK SPACE:

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	Variable rotation speed	**A.**	Magnetic tape
3.2	Stack overflow: type of interrupt	**B.**	Binary bit
3.3	Status bit	**C.**	Floppy Disk
3.4	Low cost low speed device	**D.**	CD-ROM
3.5	Data transfer in DMA	**E.**	Internal Interrupt
3.6	Stacks	**F.**	stack
3.7	Double sided double density storage device	**G.**	I/O devices
3.8	Accumulator Machines	**H.**	Zero address instructions
3.9	Microinstructions	**I.**	External Interrupt
3.10	Reverse polish notations	**J.**	DVD-ROM
		K.	Control memory
		L.	One address instructions
		M.	Flag bit

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.	5	**B.**	3	**C.**	Method of clocking
D.	XY+YZ+XZ	**E.**	BR	**F.**	Micro operation
G.	8	**H.**	Write-Back	**I.**	1
J.	Clear the IR	**K.**	QWERTY	**L.**	0
M.	6				

4.1 The carry expression of the full adder circuit is _____.

4.2 A binary-to-BCD converter that takes 4 bits as input produces _____ bits as outputs.

4.3 A byte of data can be serially shifted in a shift register in _____ clock pluses.

4.4 The difference between asynchronous and synchronous counters lies in the _____.

4.5 The operation executed on data stored in register is called as _____.

4.6 _____ field in a microinstruction stores the branch address.

4.7 In a program using subroutine call instruction, it is necessary to _____.

4.8 The method of updating the main memory as soon as word is removed from the cache is called as _____.

4.9 The number of fetch operations required to execute instructions in immediate mode is _____.

4.10 _____ Keyboard is most commonly used in computers.

ROUGH WORK SPACE:

PART TWO
(Answer any FOUR questions)

5.

a) What is a register? Describe the use of the instruction register, address register, data register and the accumulator register?

b) What are shift micro operations? Explain their hardware implementation?

(7+8)

6.

a) What do you mean by an instruction cycle? Explain its all phases?

b) What are handshaking signals? Explain the handshake control of data transfer during input and output operations? What are the sequences of events during an input operation using handshake scheme?

(6+9)

7.

a) Use Booth's algorithm to multiply 15 x 13 assuming 5 bit register that holds signed numbers and also verify the results?

b) Explain the difference between isolated and memory mapped I/O?

(9+6)

8.

a) What do you understand by level of memory hierarchy? Explain each of these levels in detail?

b) With the help of diagram discuss the working of DMA.

(7+8)

9.

a) Write a short note on Assembly language. Describe different fields used in assembly language instructions.

b) What is Pipelining? What is the potential speech of a pipeline? Discuss the different Hazards and their solutions.

(6+9)

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ROUGH WORK SPACE:

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