

A4-R4/B1.4-R4 : COMPUTER SYSTEM ARCHITECTURE

अवधि : 03 घंटे
DURATION : 03 Hours

अधिकतम अंक : 100
MAXIMUM MARKS : 100

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)

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 gates can be used as a parity checker ?

- (A) NAND
- (B) XOR
- (C) NOR
- (D) XNOR

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 Half adder can be implemented using _____.

- (A) OR and AND GATE
- (B) NAND and AND GATE
- (C) XOR and AND GATE
- (D) None of the above

1.4 Performing a three position, right logical shift on the number 10110001 results in :

- (A) 00110110
- (B) 00010110
- (C) 10001001
- (D) 10110111

1.5 The Octal equivalent of the Hexadecimal number A277 is :

- (A) 121167
- (B) 504731
- (C) 5277
- (D) 7725

1.6 Simplified form for Boolean Algebraic Expression $F = ABC + ABC' + A'C$ (where A' means complement of A) is :

- (A) $AB + A'C$
- (B) $BC + A'C$
- (C) $AC + AC'$
- (D) None of the above

1.7 RAM is :

- (A) Read and Add Memory
- (B) Redirected Address Bus Memory
- (C) Rapid Access Memory
- (D) Random Access Memory

1.8 CAM stands for :

- (A) Content Addressable Memory
- (B) Content Approachable Memory
- (C) Common Approachable Memory
- (D) Common Addressable Memory

1.9 What is the size of address bus in 8086 microprocessor ?

- (A) 8 - bits
- (B) 16 - bits
- (C) 20 - bits
- (D) 24 - bits

1.10 _____ memory gives illusion of large memory.

- (A) Associate
- (B) Set-Associate
- (C) Segmented
- (D) Virtual

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

(1x10)

- 2.1 OR gate may have more than one input.
- 2.2 There are four select lines for a 30-to-1 MUX.
- 2.3 Debugger is used to find and fix errors.
- 2.4 Every time you open a program, it gets loaded from the RAM to the hard drive of the computer.
- 2.5 RISC machine/processor executes one instruction per clock cycle always.
- 2.6 Synchronous devices use same clock pulses.
- 2.7 Handshaking is a method of transmitting control signals between two independent units like CPU and I/O interface.
- 2.8 Assembly language is a high level language.
- 2.9 JK flip-flop is a combinational circuit.
- 2.10 A register is a group of flip-flops with each flip-flop capable of storing one bit of information.

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

X		Y	
3.1	This contains thousands of gates within a single package	A.	NOT
3.2	The performance of cache memory	B.	Memory
3.3	Handling of all transfer of data and addresses on bus (8086 machine)	C.	Multiple instruction multiple data
3.4	3 Inputs and 8 Outputs Combinational Circuit	D.	Post-fix
3.5	Reversing (changing ones to zeroes and vice versa) the bits of operand in Assembly language.	E.	Hit Ratio
3.6	Sequential circuit	F.	Flip-Flop
3.7	MIMD stands for	G.	JK
3.8	Converting expression to evaluate arithmetic expression in stack operations	H.	Multiple interpretation multiple diversion
3.9	Shift register is a cascading of	I.	DMA
3.10	Data are accessed by its contents	J.	Encoder
		K.	3 to 8 Decoder
		L.	BIU
		M.	VLSI

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

A.	2^{17}	B.	Nibble	C.	ROM
D.	-127	E.	Bit	F.	2
G.	RS	H.	-128	I.	Stack organization
J.	RAM	K.	AX	L.	$XY + YZ + XZ$
M.	2's complement				

- 4.1 Register _____ is called accumulator register.
- 4.2 The carry expression of the full adder circuit is _____.
- 4.3 _____ is a method to represent negative numbers.
- 4.4 A group of four bits is called a _____.
- 4.5 The bootstrap loader is stored in _____.
- 4.6 If the word size of memory is 2 bytes and address is of 16 bits, then the size of memory is _____ bytes.
- 4.7 A clock pulse has _____ levels.
- 4.8 Zero address instructions are used in _____.
- 4.9 A JK flip-flop is refinement of _____ flip-flop.
- 4.10 The smallest negative number that can be represented in 8-bit two's complement form is _____.

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 do you mean by an instruction cycle ? Explain its all phases. (8+7)
6. (a) Explain the Booth multiplication algorithm using the flow chart and use this algorithm to multiply (-6) by (2).
- (b) What is the advantage of interrupt initiated I/O ? Differentiate between vectored interrupt and non-vectored interrupt. (9+6)
7. (a) Explain the working of DMA transfer mechanism.
- (b) Explain working of a typical laser printer. (7+8)
8. (a) Draw the logic diagram of JK Flip-flop and give its truth table and characteristic table.
- (b) Describe working of cache. (8+7)
9. (a) What is Virtual Memory Address Translation ? Explain in detail about memory hierarchy with neat diagram.
- (b) Explain the Working of a Carry-Look Ahead adder. (9+6)

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SPACE FOR ROUGH WORK

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