B1.4-R4: COMPUTER SYSTEM ARCHITECTURE

अवधिः 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 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 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** 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 है तथा **भाग दो**, "व्यक्तिपरक" प्रकार 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 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 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 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 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 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.

SPACE FOR ROUGH WORK

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. (1 × 10)

1.1 The instruction -> Add LOCA,R0 does,

(A) Adds the value of LOCA to R0 and stores in the temp register

(B) Adds the value of R0 to the address of LOCA

(C) Adds the values of both LOCA and R0 and stores it in R0

(D) Adds the value of LOCA with a value in accumulator and stores it in R0

1.2 In case of, Zero- address instruction method, the operands are stored in

(A) Registers

(B) Accumulators

(C) Push down stack

(D) Cache

1.3 _____ is used to store data in registers.

(A) D flip flop

(B) JK flip flop

(C) RS flip flop

(D) none of the options

1.4 The SRAM's are basically used as _____.

(A) Registers   (B) Caches

(C) TLB   (D) Buffer

1.5 _____ are used to overcome the difference in data transfer speeds of various devices.

(A) Speed enhancing circuitry

(B) Bridge circuits

(C) Multiple Buses

(D) Buffer registers

1.6 The instruction, Add R1,R2,R3 in RTN is _____.

(A) R3=R1+R2+R3

(B) R3<-[R1]+[R2]+[R3]

(C) R3=[R1]+[R2]

(D) R3<-[R1]+[R2]

1.7 While using the iterative construct (Branching) in execution, _____ instruction is used to check the condition.

(A) TestAndSet

(B) Branch

(C) TestCondn

(D) None of the options

1.8 PLC stands for _____

(A) Program logic code

(B) Programmable logic device

(C) Performance logo code

(D) Programmable light contact

1.9 Each stage in pipelining should be completed within _____ cycle.

(A) 1   (B) 2

(C) 3   (D) 4

1.10 What is used by an assembly language to represent each low-level machine operation or opcode ?

(A) Variable

(B) Mnemonic

(C) Labels

(D) All of the options

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.**

(1 × 10)

2.1 Fetch cycle is also a type of instruction cycle.

2.2 Address bus is bidirectional.

2.3 The read and write memory of a computer is called ROM.

2.4 PC holds the address of the data which is to be executed next.

2.5 Stack pointer is not a sequence of memory locations defined by the user.

2.6 Control bus is a group of lines used for the purpose of data flow.

2.7 A stack can be placed in a portion of a large memory.

2.8 LIFO is a stack organization.

2.9 ROM is a volatile memory.

2.10 1011-1001-1001 = -0011.

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. (1 × 10)

	X		Y
3.1	SIMD stands for	A.	Local address
3.2	For two variables, n=2 , the number of possible Boolean functions is	B.	Hit ratio
3.3	Which of the following is the method in which the unit receiving the data responds with another control signal ?	C.	Two bit
3.4	Assembly language	D.	4
3.5	What is Q, when S = 1 and R = 1 for SR flip-flop ?	E.	Indeterminate.
3.6	What is the equivalent in hexadecimal for the decimal number 973 ?	F.	3CD
3.7	What is a parity bit ?	G.	Handshaking
3.8	What is the purpose of the floating point unit(FPU) ?	H.	Single instruction multiple data
3.9	Cycle stealing is/are used in which concept ?	I.	EEPROM
3.10	Name the type of memory that can be erased with the electric discharge.	J.	To detect errors
		K.	DMA
		L.	uses alphabetic codes in place of binary numbers used in machine language
		M.	Makes some arithmetic calculations faster

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.   **(1 × 10)**

A.	Frames	B.	Speed up memory access	C.	QWERTY
D.	Nibble	E.	Primary Storage	F.	Instruction address register
G.	Program	H.	Static RAM	I.	Encoder
J.	n-bit instruction register	K.	Binary micro program	L.	90%
M.	1				

4.1   In Boolean Algebra, A+ A' = _____.

4.2   _____ Keyboard is most commonly used in computers.

4.3   _____is a digital circuit that converts information into coded form.

4.4   The method of subtraction by an addition approach is known as_____.

4.5   A micro program written as string of 0's and 1's is a _____.

4.6   PC Program Counter is also called _____.

4.7   A group of 4 bits is called _____.

4.8   Cache memory is used in a computer system to _____.

4.9   Step by step instruction is called _____.

4.10   The tape is divided into vertical columns called _____.

PART TWO
(Answer any FOUR questions)

5. (a) Differentiate between computer architecture and computer organization.

(b) Write note on the following :
   (i) Interrupt Vector Table
   (ii) RISC vs. CISC computers
   (iii) Synchronous serial transfer
   (iv) Line Print Terminal

(3 + [3 × 4])

6. (a) Starting from an initial value of R = 11010111, determine the sequence of binary values of R after a logical shift left, followed by a circular shift-right, followed by a logical shift right and a circular shift right.

(b) Differentiate between Programmed Driven I/O and Interrupt Driven I/O.

(5 + 10)

7. (a) Convert the following infix expression to reverse polish notation, clearly showing the steps involved.

$$A * (B + C * D) + E$$

(b) Briefly explain Memory Address Map.

(c) Our system has a main memory with 16 megabytes of addressable locations and a 32 kilobyte direct mapped cache with 8 bytes per block. The minimum addressable unit is a byte. How many blocks are there in the cache ?

(5 + 5 + 5)

8. (a) Derive and explain an algorithm to multiply two binary numbers.

(b) Explain in detail about Virtual Memory Address Translation.

(8 + 7)

9. (a) Explain the working of a parallel Adder/ Subtractor Circuit.

(b) Write an assembly language (8086) program to find the factorial of a number in Assembly Language

(8 + 7)

SPACE FOR ROUGH WORK