

**DiplETE – CS (Current & New Scheme)**

Time: 3 Hours

**June 2019**

Max. Marks: 100

**PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.**

**NOTE: There are 9 Questions in all.**

- Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.
- The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.
- Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.
- Any required data not explicitly given, may be suitably assumed and stated.

**Q.1 Choose the correct or the best alternative in the following: (2×10)**

- a. The ALU makes use of \_\_\_\_\_ to store the intermediate results:
 

(A) Accumulators	(B) Registers
(C) Heap	(D) Stack
- b. A source program is usually in
 

(A) Assembly language	(B) Machine level language
(C) High level language	(D) Natural language
- c. The \_\_\_\_\_ format is usually used to store data
 

(A) BCD	(B) Decimal
(C) Hexadecimal	(D) Octal
- d. The time delay between two successive initiation of memory operation is called
 

(A) Memory access time	(B) Memory search time
(C) Memory cycle time	(D) Instruction delay
- e. Which register can interact with the secondary storage?
 

(A) MAR	(B) PC
(C) IR	(D) R <sub>o</sub>
- f. The register, ALU & the interconnection between them are collectively called as
 

(A) Process route	(B) Information trail
(C) Information path	(D) Data path
- g. Two processors A & B have two clock frequencies of 700 MHz & 900 MHz respectively. Suppose A can execute an instruction with an average of 3 steps & B can execute an instruction with an average of 5 steps. For the execution of the same instruction which processor is faster?
 

(A) A	(B) B
(C) Both take the same time	(D) Insufficient information

- h. \_\_\_\_\_ bus structure is usually used to connect I/O devices  
 (A) Single Bus (B) Multiple Bus  
 (C) Star Bus (D) Ram Bus
- i. The advantage of DMA is  
 (A) Avoiding “busy waiting ” by CPU  
 (B) High- Speed data transfer between memory & I/O  
 (C) Polling  
 (D) None of these
- j. Few addressing modes and fixed instruction size are the features of  
 (A) CISC (B) RISC  
 (C) RAID (D) None of these

**Answer any FIVE Questions out of EIGHT Questions.  
 Each question carries 16 marks.**

**Q.2** a. What are the functional elements of a computer? Explain in detail. **(8)**

- b. A computer spends 82% of its time in computing & 18% waiting for the disk. The instruction mix and the average cycle per instruction (CPI) for each type is:

Type	Instruction%	CPI
Int	40%	1
Floating Type	30%	5
Other	30%	2

Considering following 3 modification to the system, calculate speed up for each:

- (i) The processor is replaced by a new one that reduces the total computation time by 35%
- (ii) The disc is replaced with a solid state device that reduces the disk waiting time by 85%
- (iii) The processor is replaced with a new one that has improved floating point performance. The average floating point CPI is reduced to 3, all other aspects are unchanged.

Which modification gives the best speed up? **(8)**

**Q.3** a. Write the zero and one address instruction for the following expression: **(8)**  
 $X=A*(B-C)/(E+F-G)$

b. What is an instruction? Discuss the instruction design set issues. **(8)**

**Q.4** a. Explain a single bus structure & an I/O interface for an Input device using suitable diagram. **(4+4)**

b. What is a bus arbitration. What are its types. Explain using suitable diagram. **(4+4)**

- Q.5** a. What is a serial port? Draw a serial interface. (3+5)  
b. What is a PCI bus? What is its use in a computer system? Explain. (3+5)
- Q.6** a. Analyze the memory hierarchy in terms of speed size and cost. (8)  
b. What are static memories. Compare synchronous & Asynchronous DRAM'S. (3+5)
- Q.7** a. Explain the organization of virtual memory. (8)  
b. Explain the organization and accessing of data on a disk. (8)
- Q.8** a. Explain the working of Booth's algorithm for 7\*3. (8)  
b. Describe the IEEE754 standard format for single & double precision floating point numbers. (8)
- Q.9** a. Explain the steps involved in the execution of an instruction. (8)  
b. Draw and explain the micro-programmed control unit. (8)