

2017

**COMPUTER SCIENCE**

[ Honours ]

PAPER – IV

*Full Marks : 90*

*Time : 4 hours*

*The figures in the right hand margin indicate marks  
Candidates are required to give their answers in their  
own words as far as practicable*

*Illustrate the answers wherever necessary*

[ NEW SYLLABUS ]

GROUP – A

Answer any two questions : 15 × 2

1. (a) Show the execution of

$$X = (A - B) / (C + D * E)$$

in three, two, and one address machine. 6

( Turn Over )

- (b) One BCD digit in register A. Unpack it into two register i.e register B and register C with 8085 micro instruction. 5
- (c) What is absolute loader ? Explain with example. 3
- (d) What is machine cycle ? 1
2. (a) Explain DMA based data transfer operation between memory and other peripherals. 5
- (b) Write the steps of assembly operation in Pass-II. 4
- (c) State L1 and L2 cache policies with suitable figure. 3
- (d) Draw the block diagram of 8254 IC. 3
3. (a) Why both Pass-I and Pass-II are necessary in assembler ? 3
- (b) Write the function of CU. 4
- (c) Draw the timing diagram for execution of IN 84 H instruction. 6

- (d) What is fold back memory ? 2
4. (a) What is Harvard Architecture ? How is it different from Von Neumann architecture ? 2+2
- (b) Write a program for 8085 microprocessor to clear the memory location from C400H to C4FFH. 4
- (c) What is the function of absolute loader ? Explain with diagram. 4
- (d) Write the difference between write back policy and write through policy in cache. 3

**GROUP – B**

**Answer any five questions : 8 × 5**

5. (a) Explain how set associative mapping can be used as direct mapping and associative mapping ? 4
- (b) What are the advantages and disadvantages of binding at execution time over binding at load time ? 4

6. (a) Write a program for 8085 microprocessor to count the number of 1s in a data byte. 5
- (b) What do you mean by macro with in macro explain with example ? 3
7. A hierarchical cache-main memory subsystem has the following specification :
- (i) Cache access time of 50 nsec.
- (ii) Main memory access time of 500 nsec.
- (iii) 80% of memory request are for read.
- (iv) Hit ratio of 0.9 for read access and the write through scheme is used.
- Calculate the following :
- (a) Average access time of the memory system considering only memory read cycle.
- (b) Average access time of the system both for read and write request. 4 + 4
8. (a) What are the different types of interrupts ? Give an example. What is programmed I/O technique ? 5

- (b) Write the difference between SRAM Vs. DRAM. 3
9. (a) Consider the execution of a program of 20000 instructions by a linear pipeline processor with a clock rate 40 MHz. Assume that the instruction pipeline has five stages and that one instruction is issued per clock cycle. The penalties due to branch instructions and out of order executions are ignored. Calculate the speed up of the pipeline over its equivalent non-pipeline processor, the efficiency and through put. 5
- (b) Write the difference between 8155  $\mu\text{p}$  and 8255  $\mu\text{p}$ . 3
10. (a) Explain the use of AIF and AGO. 2
- (b) Explain why the number of output ports in the peripheral mapped I/O is restricted to 256 ports. 2
- (c) Draw the block diagram of 8254 micro-processor. 4

11. (a) Why does DMA data transfer is preferable than the transfer of data is made by CPU in time of memory transfer. 3
- (b) Write short notes on : 5
- (i) Micro instruction
  - (ii) Micro-operation
  - (iii) SCSI
  - (iv) PCI
  - (v) PSW.
12. (a) Describe different types of interrupts. 6
- (b) What is macro definition ? 2

**GROUP – C**

**Answer any five questions : 4 × 5**

13. (a) A zero address machine is also known as a stack based machine explain. 2
- (b) What is the function of RIM and SIM ? 2
14. (a) Why indirect addressing is needed ? 2

- (b) What is co-processor ? 2
15. (a) Write the difference between memory mapped I/O and I/O mapped I/O. 3
- (b) Write a single instruction of 8085  $\mu$ p that accumulator content zero. 1
16. (a) Write the difference between Hardwired control unit and microprogrammed control unit. 2
- (b) Write a program of 8085  $\mu$ p to add 32 H and 04H. Store the result in 2500 H. Also calculate the execution time if processor speed in 2 MHz. 2
17. (a) Write a short note on fixed and floating point arithmetic circuit. 3
- (b) What is BSS ? 1
18. (a) What is guard bits ? 2
- (b) Write a short note on linking loader. 2

19. Explain the following 8085 micro-instruction : 4

(i) SHLD

(ii) DAD rp

(iii) SPHL

(iv) RAR.

20. (a) Write a short note on bus organization using tri-state buffer. 2

(b) What is Boot strap loader ? 2

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