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UG/II/CSC/H/IV/17(Old)

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

[OLD SYLLABUS]

GROUP – A

Answer any four questions : 10 × 4

1. What is an instruction set? What are the elements of an Instruction? How is an instruction represented? What are the types of instruction according to data control operation? 2+2+2+4

(Turn Over)

2. (a) What is the role of addressing mode of an instruction. 2
- (b) Discuss at least 4 addressing mode with example. 4 + 4
3. (a) Draw a block diagram of basic structure of the CPU. 4
- (b) Explain the function of stack pointer program counter and Accumulator. 5
- (c) What is PSW ? 1
4. (a) What do you mean status and control register ? 1
- (b) Write down the function of various flag register. 6
- (c) Write down the difference between static and dynamic RAMs. 3
5. (a) What is floating point ALU ? 1

- (b) Represent the following number using a 16 bit floating point representation.
- 10110.1101. 3
- (c) Draw the block diagram of a general model of control unit. 3
- (d) What are the basic responsibilities of the control unit. 3
6. (a) What is microprogrammed control unit ? 1
- (b) Write down the disadvantages of micro-programmed control unit ? 3
- (c) Write down the difference between horizontal microinstruction and vertical microinstruction. 3
- (d) What is microinstruction ? Discuss two general types of microinstruction. 1 + 2
7. (a) What is associative addressing ? Define masked ROM. 1 + 1
- (b) Write down the difference between EE-PROM and EPROM. 3

(c) What is Booth's algorithm ? Using Booth multiplication algorithm derive step by step process of product multiplier X with multiplicand Y ie.

$$P = XY. \text{ where } X = 10110011$$

$$Y = 11010101 \quad 1 + 4$$

GROUP – B

Answer any five questions : 5 × 5

8. Find the generating function for the sequence

$$1, 1, 1, 1, 1, 1, 0, 0, 0, 0, \dots \quad 5$$

9. In India there are coins of denominations 1, 2, 5, 10, rupees and ₹100. In how many ways we can make up ₹100 from these coins ? 5

10. Solve the recurrence relation :

$$\begin{aligned} f(n+1) &= f(n) + f(n-1) + f(n-2), \\ f(0) &= f(1) = f(2) = 1 \end{aligned} \quad 5$$

11. 20 teachers and 20 students sit around a table.

to discuss seminar to pic. Is it always possible to find a person both of whose neighbors are students. 5

12. Find the generating function of the sequence

1, 3, 3, 1, 0, 0, 0, 0,.... 5

13. What is recurrence relation ? Write down the principal of Inclusion. Exclusion. 1 + 4

14. In a local store there are 8 different laptops, 7 different mouse and 3 different headphones for general customers. How many ways can you by a system(a laptop and a mouse or a laptop and a headphone) ? 5

15. Using generating function find an interm of in $a_0 = 2$ and $a_n + 1 = 3a_n$ for $n > 0$. 5

GROUP – C

Answer any five questions : 5 × 5

16. (a) What is 3-byte instruction ? Discuss opcode and operand of this type instruction. Give an example. 1 + 1

- (b) Draw the block diagram of programming model of 8085. 3
17. Draw the timing diagram of instruction MOV C, B which is stored in location 2017 H. Hex code of mov C, B is 48 H. 5
18. (a) Write down the comparison of memory-mapped I/O and peripheral I/O about following characteristics : 3
- (i) Data transfer
 - (ii) Execution speed
 - (iii) Instruction available.
- (b) What are the control signals necessary in the memory-mapped I/O ? 2
19. (a) Give an example of Direct and Indirect addressing mode of 8085 instruction set. 1 + 1
- (b) What is unconditional branch instruction ? 1
- (c) Draw the bus structure of 8085 MPU. 2

20. (a) Write down the function of ALE. 2

(b) What will be the flag status (s, t, cy) if the content of accumulator (is 93 H) added to the content of Register B which have B7H. 3

21. (a) Describe the instruction RLC and RRC. 1 + 1

(b) What is RAR ? Give proper example. 1 + 2

22. Write an instruction to load the 16 bit number 2017 H in the register pair HL using LXI and MVI opcodes and explain the difference between the two instruction. 2 + 3

23. (a) What is interrupt ? Explain different types of Restart Interrupts. $1 + 1\frac{1}{2}$

(b) If a clock frequency of the system is 2 MHz, then how much time are needed for one T state, opcode fetch and memory read for instruction. $\frac{1}{2} + 1 + 1$