

2018

**M.Sc. 1st Seme. Examination**

**COMPUTER SCIENCE**

**PAPER—COS-102**

*Full Marks : 50*

*Time : 2 Hours*

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words as far as practicable.*

*Illustrate the answers wherever necessary.*

**Group-A**

1. Answer any *four* questions : 4×2

- (a) What is the difference between computer architecture and computer organization ?
- (b) What is Von Neumann bottleneck ?
- (c) What is addressing mode ? What is the advantage of it ?

*(Turn Over)*

- (d) Distinguish horizontal and vertical microprogramming.
- (e) What is I/O driver ?
- (f) Explain instruction pipeline with an example.
- (g) Define locality of reference.
- (h) Briefly explain the techniques for maintaining coherence in memory hierarchy.

### Group-B

2. Answer any *four* questions : 4×4
- (a) Implement the following expression using three address, one address, zero address and two address instructions.  

$$X = (A + B) - (C + D).$$
1+1+1+1
  - (b) Explain with example the following addressing modes :
    - Implied mode,
    - Stack addressing mode,
    - Register indirect mode,
    - Direct addressing mode. 1+1+1+1
  - (c) Draw and explain 4 bit carry propagate adder. 4

- (d) What is control unit ? Explain with diagram the micro-program control unit. 1+3
- (e) Briefly explain MIMD architecture.
- (f) Draw and explain UMA and NUMA model of multiprocessor system. 2+2
- (g) What is locality of reference ? Explain different types of locality of reference. 1+3
- (h) What is pipeline hazards ? Explain structural and control hazards. 1+3

### Group-C

3. Answer any *two* questions : 2×8
- (a) (i) Find out the maximum speed up ratio of a K stage pipeline.
- (ii) Consider a 4 stage pipeline processor with clock rate 20 MHz and number of instruction 4000. Calculate speed up, efficiency and throughput. 3+5
- (b) (i) What is the difference between RISC and CISC ?
- (ii) Explain different type of data hazards. 4+4

- (c) (i) Implement floating point adder-subtractor using four stage pipeline.
- (ii) Calculate  $0.9504 \times 10^3 + 0.8200 \times 10^2$  using the implemented pipeline. 5+3
- (d) Explain any *two* of the following :
- (i) DMA,
- (ii) Look ahead carry adder,
- (iii) Virtual memory,
- (iv) COMA model of multiprocessor. 4+4

*Internal Assessment — 10*

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