FACULTY OF ENGINEERING
COMPUTER ORGANIZATION AND ARCHITECTURE

Time: 3 Hours] [Max. Marks: 75

Note: Answer all questions of Part A.
Answer five questions from Part B.

PART – A (25 Marks)

1. Draw the Block diagram of 4-bit combinational circuit shifter and write its function table. 3
2. Show the hardware for implementing Booth’s algorithm. 3
3. How many clock pulses are required to execute the following micro-operations?
   a) IR ← M[Pc]  b) AC ← AC + TR  c) DR ← DR + AC 3
4. Differentiate between a memory-mapped I/O and an isolated mapped I/O. 2
5. Explain Flynn’s classification of processor. 2
6. Explain Hand-shaking method of Asynchronous data transfer. 3
7. Mention different phases in an instruction cycle. 2
8. What is bootstrap loader? 2
9. Differentiate between complier Assembler and language translator. 3
10. Write briefly about multiprocessor. 2

PART – B (50 Marks)

11. a) Derive an algorithm in flow chart form for the non-restoring method of fixed point binary division. 6
    b) Draw the logic diagram of a 4-bit adder-subtractor and explain with the help of a truth table. 4
12. Draw the flow chart for interrupt cycle and explain in detail all the phases. 10
13. a) Discuss SIMD processor organization. 4
    b) Explain instruction pipeline conflicts and their remedies. 6

(This paper contains 2 pages) 1 2
14. a) Explain Daisy-chain interrupt priority and draw the logic circuit for one stage of
diary chain priority arrangement.
b) Explain CPU-IOP communication.

15. a) Explain read and write operations with respect to Association Memory.
b) A magnetic disc system has the following
   \[ P_s \] – Average time to position the magnetic head over the track.
   \[ R \] – Rotation speed in revolutions/sec.
   \[ N_t \] – No. of bits/track
   \[ N_s \] – No. of bits/sector
   Calculate the average time \( T_a \) that will take to read one sector.

16. a) Explain DMA transfer in detail with all relevant Block diagrams.
b) Draw the circuit diagram of a 4 x 4 FIFO buffer and explain its operation.

17. Write short notes on:
   a) Functional aspects of operating systems
   b) RISC/CISC – Differentiate
   c) Stored program organization.