(3 hours) **Total Marks: 80**

N.B. 1. Question **No. 1** is compulsory
2. Attempt any **three** questions from remaining five questions
3. Assume suitable data if **necessary** and justify the assumptions
4. Figures to the **right** indicate full marks

Q1	A	What are universal logic gates? Why are they called so? Explain with a suitable example	05
	B	Explain the functioning of D and T flip-flops along with their Truth table	05
	C	Differentiate between Hardwired control unit and Micro programmed control unit	05
	D	List and describe the key characteristics of memory?	05
Q2	A	Using booths algorithm multiply 3 x -2 along with its flow chart do write appropriate comments for each operation.	10
	B	Draw the flow chart for Restoring division algorithm and Perform 6 ÷3	10
Q3	A	Explain Multiplexer & Demultiplexerx (IC level description only)	10
	B	Discuss the different ways in which data can be accessed in memory using addressing modes.	10
Q4	A	Explain Micro instruction format and write a micro program for the instruction ADD R_1 , R_2	10
	B	Explain Hardwired Control Unit and the various design methods associated with it.	10
Q5	A	Explain different memory Mapping Techniques	10
	B	Describe Interleaved memory	05
	C	What do you mean by cache coherence	05
Q6	A	Explain Instruction pipelining and describe the hazards associated with it	10
	B	Explain Flynn's Classification.	10