B.E. Instrumentation Engineering (Model Curriculum) Semester-IV
IN402 - Digital Circuits and Fundamentals of Microprocessors

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Notes : 1. All questions carry marks as indicated.
2. Due credit will be given to neatness and adequate dimensions.
3. Assume suitable data wherever necessary.
4. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Describe the advantages of Digital Circuits over analog circuits with suitable applications. **8**

b) Explain the transistor as a NOT, AND, OR gate using their respective circuit diagram. **8**

OR

2. a) Distinguish between SSI, MSI, LSI, VLSI circuits & give their applications. **8**

b) Explain De Morgan's both theorem and prove them with their truth table. **8**

3. a) Construct NOT, AND, OR, EX-OR gate using NAND gate. **8**

b) Minimize the following expression using K-map **8**
i) $F(W, X, Y, Z) = \text{sum}(0,1,5,7,8,10,14,15)$

OR

4. a) Elaborate with the help of logic diagram and truth table, an octal-to-binary encoder. **8**

b) Explain the difference between a multiplexer and a de-multiplexer using any 5 points. **8**

5. a) Design a 32:1 multiplexer using 4, 8:1 multiplexer. **8**

b) Explain BCD-to-Seven segment decoders with their diagrams. **8**

OR

6. a) Design a 1:32 demultiplexer using two 1:16 demux. **8**

b) Describe with neat circuit diagram and truth table the operation of full subtractor. **8**

7. a) What is latch explain with diagram? Explain the conversion of D to T flip-flop? **8**

b) Distinguish between synchronize and A synchronize sequential Circuits? **8**

OR

8.	a)	Draw and explain 3-bit up down counter.	**8**
	b)	What is a race around condition? Discuss how it can be avoided?	**8**
9.	a)	Draw and elaborate the architecture of 8085 microprocessor.	**8**
	b)	State all the logical instructions associated with $\mu p\,8085$.	**8**

OR

10.	a)	Discuss how to determine the control word for 8255.	**8**
	b)	Discuss the architecture of 8279.	**8**

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