QUESTION BANK (I Scheme)

Name of subject: Digital Techniques
Course Title: DTE (22320) **Unit Test: I**
Semester: 3I **Program Code: IS/EJ**

CHAPTER 1: Number Systems and Codes

2 marks

1. Write the base of the following number systems: Decimal, Binary, Octal, and Hexadecimal.
2. Give two applications of EX-OR and EX-NOR gates each.
3. Convert the following Binary number into Gray code.
   (i) 1111
   (ii) 1101001

4 marks

4. Convert the following:
   i) (5C7)16 = (?)10
   ii) ii) (2598)10 = (?)16
   iii) iii) (10110)2 = (?)10 = (?)16
5. Perform the following subtraction using 1's and 2's complement method:
   i) (52)10 – (65)10
   ii) ii) (101011)2 – (11010)2

CHAPTER 2: Logic Gates and Logic Families

2 marks

6. Define following characteristics of logic families :
   i) Propagation Delay
   ii) ii)Fan out
7. State commutative and associative laws for the binary numbers.
8. Draw the Symbol and write the Truth Table of Universal Gates.

4 marks

9. For the given figure No. 1, derive the Boolean expression of Y.

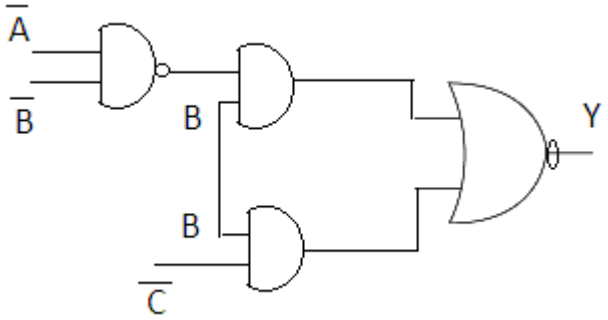

Figure No. 1

10. Realize the following logic operations using only NAND and NOR gates: AND, OR, NOT.
11. Compare TTL and CMOS logic families on the basis of following:
    i) Propogation delay
    ii) Power dissipation
    iii) Fan-out
    iv) Basic gate
12. State and prove De Morgan's Theorems.
13. Reduce the following Boolean expression using Boolean laws.

$$Y=AB+\bar{A}B+A\bar{B}+\bar{A}\bar{B}$$

14. Describe the operation of TTL logic circuit working as NAND gate.

CHAPTER 3: Combinational Logic Circuits

2 marks

15. Draw three variable K-map formats.
16. State the necessity of multiplexer.
17. Draw Block diagram of 4:1 Multiplexer and write its truth table.
18. Identify function of following ICs. (i) 74244(ii) 74245.

4 marks

19. Minimize the following expression using K-map. f
    (P, Q, R, S) = Σ m (0, 1, 4, 5, 7, 8, 9, 12, 13, 15).
20. Draw the block diagram and write the Truth Table of Half Subtractor.
21. Design Full Adder using K-map and Truth Table.
22. Design a four bit BCD adder using IC 7483 and NAND gates only.
23. Design Gray to Binary converter.

24. Give the function of the following terminals of IC 7447.
    i) LT ii) RBI iii) BI iv) RBO
25. Design 1: 16 demultiplexer using 1: 4 demultiplexers.
26. Realize the following function using demultiplexer :
    I) $F1 = \Sigma m (1, 2, 5, 6, 7, 11,$
    II) $F2 = \pi M (0, 1, 2, 5, 6, 7, 8, 11, 12, 15)$