

**III/SEM/E & TC/CSE/IT/
AE & I/2015(W)**

DIGITAL ELECTRONICS

Sub Code-ETT-302

Full Marks : 70

Time : 3 hours

Answer any five questions

The figures in the right-hand margin indicate marks

- 1. (a) Define Modulus of a Counter. 2
- (b) Describe the working of a Serial in Parallel out shift register with the help of a suitable logic diagram. 5
- (c) Discuss the operation of an asynchronous counter with its timing diagram. 7
- 2. (a) State de Morgan's theorem. 2
- (b) With a neat circuit diagram explain the function of 1:4 demux circuit. 5
- (c) Design a 2 bit magnitude comparator circuit whose outputs are $X > Y$, $X = Y$, $X < Y$, where X and Y 2 bit nos. 7

(Turn Over)

(2')

- 3. (a) Convert the following binary nos. into gray codes : 2
 - (i) 1101011
 - (ii) 100010110
- (b) Explain the working of a clocked RS flip-flop with its functional table with a neat diagram. 5
- (c) Which gates are referred to as universal gates and why? How other gates can be implemented by using *any one* of the universal gates? 7
- 4. (a) Which code is known as self correcting code and why? 2
- (b) Design and describe 4:2 encoder. 5
- (c) Simplify and minimize the 4 variable logic expression by using K-map and implement this ckt by using NOR gates.

$$F(A, B, C, D) = \pi M(0, 2, 4, 5, 6, 8, 9, 10, 12, 13, 14) + d(0, 2, 5)$$
7
- 5. (a) Find the 2's complement of a no. 11001011. 2

(3)

- (b) Simplify the Boolean expression by Boolean algebra and draw the logic circuit by using NAND gates. 5

$$X = AB + \bar{A}C + A\bar{B}C(AB + C)$$

- (c) With a suitable logic diagram design a decade counter. Write its truth table too. 7

6. (a) What is a Multiplexer and Decoder? 2

- (b) Explain the working of a Ladder network type D/A converter with diagrams. 5

- (c) Design a combinational logic circuit for converting 4 bit binary to BCD code. 7

7. (a) State two differences between a counter and a register. 2

- (b) Differentiate between Latches and flip-flops and explain working of JK flip-flop with neat diagram. 5

- (c) Convert 7

(i) JK FF to D FF

(ii) SR FF to T FF

(iii) JK FF to SR FF

(iv) T FF to D FF