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34005

BT-4 / M-18

DIGITAL ELECTRONICS

Paper–ECE–204E

Time allowed : 3 hours] *[Maximum marks : 100*

Note :- *Attempt any five questions.*

1. (a) Implement Boolean expression for E-OR gate using NAND gates. 10

(b) What is Demorgans theorm? Solve using this theorm the following: 10

$$(A + B) . (C + D) = \overline{\overline{(A + B)}} + \overline{\overline{(C + D)}}$$

2. (a) Represent decimal numbers 27 in binary form using 6

(i) BCD Code (ii) Excess-3 Code (iii) Gray Code

(b) Find a minimal SOP representation for 14

$f(A, B, C, D, E) = \Sigma m (1, 4, 6, 10, 20, 22, 24, 26) + d (0, 11, 16, 27)$ using K-map method. Draw the circuit of the minimal expression using only NAND.

3. (a) Realize $F (w, x, y, z) = \Sigma (1, 4, 6, 7, 8, 9, 10, 11, 15)$ using 8 to 1 Mux. 10

(b) Design a BCD to Gray code converter. Uses don't care. 10

4. (a) Draw a 2-bit ripple counter and convert this into a 2- bit ring counter. 10

(b) Convert T-Flip Flop into an SR- Flip Flop. Draw the circuit. 10

5. (a) Explain the working Master / Slave JK FF. 5

(b) Explain the operation of 3 input TTL NAND gate with required diagram and truth table. 10

(c) Explain the terms: Fan-in, Fan-out, Tri-state gates, and Propagation delay. 5

6. (a) Explain the working of TTL logic family and also highlight the advantages of TTL family. 10

(b) Explain the operation of CMOS Logic family. 10

7. (a) Explain in detail the functioning of A/D converter. 10

(b) Design a combinational circuit using a ROM. The circuit accepts a three bit number and outputs a binary number equal to the square of the input number. 10

8. Explain the following in detail:-

(i) R/2 R Ladder D / A Converter 10

(ii) Dual Slope ADC 10

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