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Question Paper Code: R2425

B.E. / B.Tech. DEGREE EXAMINATION, APRIL / MAY 2025

Second Semester

Computer Science and Business Systems

R21UEC225 - PRINCIPLES OF ELECTRONICS ENGINEERING

(Regulations R2021)

Duration: Three hours

Maximum: 100 Marks

Answer All Questions

PART A - (10 x 1 = 10 Marks)

1. Peak Inverse voltage of Half wave rectifier is _____ CO1- U
(a) $2V_m$ (b) V_m (c) $V_m/2$ (d) 0
2. Which of the following is the main application of Zener diode CO1- U
(a) Amplifier (b) Multivibrator (c) Voltage regulator (d) Rectifier
3. The collector of transistor is CO1-U
(a) heavily doped (b) moderately doped (c) lightly doped (d) none
4. In a BJT, if the collector-base junction is reverse-biased and the base-emitter junction is forward-biased, which region is the BJT operating in? CO1-U
(a) Saturation region (b) Active region
(c) Cutoff region (d) Reverse active region
5. Which of the following statement is true about FET? CO1-U
(a) It has high output impedance (b) It has high input impedance
(c) It has low input impedance (d) It does not offer any resistance
6. The output characteristics of a MOSFET, is a plot of CO1-U
(a) I_d as a function of V_{gs} with V_{ds} as a parameter
(b) I_g as a function of V_{gs} with V_{ds} as a parameter
(c) I_d as a function of V_{ds} with V_{gs} as a parameter
(d) I_g as a function of V_{ds} with V_{gs} as a parameter

7. Which of the following options are correct for a 4×1 multiplexer? CO1-U
 (a) It has four 3 – input AND gates (b) It has four 2 – input AND gates
 (c) It has one 3 – input AND gate (d) It has one 3 – input AND gate
8. De Morgan's Law states that CO1-U
 (a) $(A+B)' = A'*B$ (b) $(AB)' = A' + B'$
 (c) $(AB)' = A' + B$ (d) $(AB)' = A+B$
9. Which of these flip – flops cannot be used to construct a serial shift register? CO1-U
 (a) D – flip flop (b) SR flip – flop (c) T flip – flop (d) JK flip – flop
10. Ripple counters are also called _____ CO1-U
 (a) SSI counters (b) Asynchronous counters
 (c) Synchronous counters (d) VLSI counters

PART – B (5 x 2= 10 Marks)

11. What is barrier potential? CO1 U
12. Give the relation between α and β . CO1-U
13. Define amplification factor in JFET. CO1 U
14. Implement the Boolean function $F=XY+X'Y'+Y'Z$ With AND, OR and inverter gates. CO1 U
15. Explain the difference between asynchronous and synchronous sequential circuits. CO1 U

PART – C (5 x 16= 80 Marks)

16. (a) Draw and explain the energy band diagram for the following CO1-U (16)
 (i) conductors
 (ii) Insulators
 (iii) semiconductors
 Or
 (b) Explain the classification of semi-conductors. CO1-U (16)
17. (a) Draw a circuit diagram to determine the CC characteristics of PNP transistor. Also explain the input and output characteristics. CO1 -U (16)
 Or
 (b) Give a detailed description of the input and output characteristics of transistor in CE, CB and CC configuration. CO1 -U (16)

18. (a) “Field Effect Transistor is a voltage controlled current device”.- CO1- U (16)
Justify the statement by describing the characteristics of the device involving the impact of various parameters such as pinch-off voltage, source drain voltage and gate source voltage.
Or
(b) Explain the working of n-channel depletion MOSFET. Discuss its characteristics. CO1-U (16)
19. (a) Explain the function of all logic gates with their logical symbol and truth table. CO2 -U (16)
Or
(b) Minimize the given Boolean function using K-map and implement the minimized function using appropriate logic gates. CO2 -U (16)
 $F(A,B,C,D) = \Sigma m(3,4,5,7,9,13,14,15)$.
20. (a) Construct a synchronous counter with a following repeated binary sequence: 0, 1, 2, 3, 4, 5. Use JK-flip flop. CO4 -App (16)
Or
(b) Construct MOD-3 synchronous counter with the states 0,1,2. CO4 -App (16)

