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Reg. No. :

Question Paper Code: R2425

B.E./B.Tech. DEGREE EXAMINATION, APRIL 2024

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 - (5x 1 = 5 Marks)

1. What is the forbidden energy gap in pure conductor CO1-U

   a) 1.1eV b) 6 eV c) 0.7 eV d) 0 eV

2. The base of transistor is CO1-U

   a) heavily doped b) moderately doped c)lightly doped d) none

3. For a FET when will maximum current flows? CO1- U

   (a) $V_{gs} = 0V$ (b)$V_{gs} = 0v$ and $V_{ds} >= |V_p$ (c) $V_{DS} >= |V_p|$ (d) $V_p = 0$

4. What is the gray code for the binary number: 1011100010? CO2-U

   (a) (0110010011) (b) (00110010011) (c) (1110010011) (d) (0010010011)

5. What will be the output from a D flip – flop if the clock is low and D = 0? CO2 -U

   (a) 0 (b) 1 (c) No change (d) Toggle between 0 and 1

PART – B (5 x 3= 15Marks)

6. Define dynamic resistance. CO1-U

7. Give the relation between α and β. CO1- U

8. What is pinch off voltage? CO1 -U

9. Convert the following Hexadecimal numbers to their decimal equivalents; CO2-U

   (a) 49 (b) BC2

10. Find the number of flip-flops to design MOD-10 counter. CO2- U

PART – C (5 x 16= 80 Marks)

11.	(a)	Explain how Zener diode is used as voltage regulator with its VI characteristics? Explain the working principle of Zener voltage Regulator.	CO1-U	(16)
		Or		
	(b)	With a neat diagram explain the working of a PN junction diode in forward bias and reverse bias and show the effects of temperature on its VI characteristics.	CO1-U	(16)
12.	(a)	Distinguish between the different types of transistor configurations with necessary circuit diagrams. Also, obtain the relation between the current amplification factors α ,β and γ of a transistor.	CO1- U	(16)
		Or		
	(b)	A transistor operating in CB configuration has I_C=2.98mA,I_E=3 mA and I_{CO}=0.01mA.What current will flow in the collector circuit of this transistor when connected in CE configuration with a base current of 30 μA.	CO1- U	(16)
13.	(a)	"Field Effect Transistor is a voltage controlled current device".- 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.	CO1- U	(16)
		Or		
	(b)	Discuss your understanding on MOSFET detailing the types, construction and characteristics.	CO1 -U	(16)
14.	(a)	Simplify the following Boolean functions using 3 variable maps: $F(X,Y,Z) = \Sigma(0,2,3,6,7)$ $F(X,Y,Z) = \Sigma(0,2,3,4,6)$ $F(X,Y,Z) = \Sigma(0,1,2,3,7)$ $F(X,Y,Z) = \Sigma(3,5,6,7)$	CO4 -App	(16)
		Or		
	(b)	Using the K-map method, simplify the following function to obtain (i) minimum sum of products and (ii) minimum product of sums. $F(w,x,y,z) = \sum(1,3,4,5,6,7,9,12,13)$	CO4- App	(16)

15. (a) Make use of clocked S-R flip-flop to formulate the excitation table of J-K flip-flop and characteristic equation from its characteristic table. CO4 -App (16)

Or

(b) Construct a 4-bit UP-DOWN asynchronous counter to count the states from 0 to 15. CO4 -App (16)