C **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 52408

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2022

Second Semester

Electronics and Communication Engineering

15UEC208 - ELECTRONIC DEVICES

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. In a degenerate n type semiconductor material, the Fermi level CO1- R

   (a) is in valence band

   (b) is in conduction band

   (c) is at the centre in between valence and conduction bands

   (d) is very near valence band

2. If a peak rectified voltage for the full-wave filter circuit is 40 V, calculate the filter dc voltage if C = 75 μF and load current is 40 mA. CO2- R

   (a) 27.9v (b) 32.12v (c) 37.78v (d) 40v

3. In which region are both the collector-base and base-emitter junctions forward-biased? CO3- R

   (a) active (b) cutoff (c) saturation (d) none

4. For a JFET, the value of VDS at which ID becomes essentially constant is the CO4- R

   (a) pinch-off voltage (b) cutoff voltage (c) breakdown voltage (d) ohmic voltage

5. You need to design a relaxation oscillator circuit. The most likely device to use might be CO5- R

   (a) SCR (b) UJT (c) TRIAC (d) 4-layer diode

PART – B (5 x 3= 15 Marks)

6	Define Drift Current.	CO1- R	
7.	Define peak inverse voltage in a PN junction diode	CO2- R	
8.	Define Regulator.	CO3- R	
9.	Draw the structure and symbol for a n-channel JFET	CO4- R	
10.	What is SCR? Mention its Applications.	CO5- R	

PART – C (5 x 16= 80Marks)

11.	(a)	Derive the expression for carrier concentration in intrinsic semiconductor based on structure.	CO1- U	(16)
		Or		
	(b)	Explain about drift and diffusion currents and obtain its expression.	CO1- U	(16)
12.	(a)	(i) Explain the operation of PN junction under forward bias condition with its characteristics.	CO2- U	(8)
		(ii) Explain how a barrier potential is developed at the PN Junction.	CO2- U	(8)
		Or		
	(b)	Explain the construction and working of full-wave rectifiers and its parameter	CO2- U	(16)
13.	(a)	With neat diagram explain the operation and input and output characteristics of CE configuration.	CO3- U	(16)
		Or		
	(b)	A transistor with IB=100μA and IC=2mA Find (i) B of the transistor (ii) α of the transistor (iii) emitter current I_E	CO3- U	(16)
14.	(a)	Explain the construction, working and operating characteristics of N-channel JFET with relevant diagrams.	CO4- U	(16)
		Or		
	(b)	Explain the principle of operation of enhancement N-channel MOSFET and draw its drain characteristics.	CO4- U	(16)

15.	(a)	Draw the VI characteristics of SCR and explain its operation. Explain the terms Holding current and latching current	CO5- U	(16)
		Or		
	(b)	Write short notes on: (i) Photodiode. (ii) LED (iii) UJT.	CO5- U	(16)

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