Code No: R2021022 **R20** SET - 1

II B. Tech I Semester Supplementary Examinations, July - 2022
ELECTRONIC DEVICES AND CIRCUITS
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Answer any **FIVE** Questions each Question from each unit
All Questions carry **Equal** Marks
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1	a)	Explain about Fermi Dirac function and Fermi level in intrinsic and extrinsic semiconductors.	[8M]
	b)	The voltage across a silicon diode at room temperature of 300^{o}K is 0.62V when 3mA current flows through it. If the voltage increases to 0.80V, calculate the new diode current.	[6M]
		Or	
2	a)	At room temperature of 300K, the Fermi level is 0.35 eV above the valence bond in a P-type semiconductor. When the temperature is increased to (i) 370K, and (ii) 410K, calculate the position of Fermi level.	[6M]
	b)	Explain the volt-ampere characteristics of PN junction diode.	[8M]
3	a)	With a neat sketch explain the V-I characteristics of Photodiode.	[7M]
	b)	Explain the different operating regions of SCR.	[7M]
		Or	
4	a)	A sinusoidal voltage whose V_m = 25V is applied to a half-wave rectifier. The diode may be considered to be ideal and R_L = 1.6 KΩ is connected as load. Determine the following: Peak value of current RMS value of current DC value of current Ripple factor	[8M]
	b)	Draw the circuit diagram of a full-wave rectifier using center-tap transformer. Explain its working principle.	[6M]
5	a)	Explain how transistor can be used as an amplifier with a neat diagram.	[8M]
	b)	Explain about Ebers-Moll model of a transistor.	[6M]
		Or	
6	a)	Derive the relationship among transconductance, drain resistance and amplification factor of a JFET.	[6M]
	b)	Explain the construction and operation of JFET and draw its characteristics.	[8M]
7	a)	Draw the fixed bias circuit of a BJT? Derive the equation for stability factor.	[7M]
	b)	Draw a circuit which uses a diode to compensate for changes in I_{CO}. Explain how stabilization is achieved in the circuit.	[7M]
		Or	
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8 a) Define Q-point and give its significance. [3M]

b) Give the comparison between fixed bias, collector to base bias and self-bias circuits. [5M]

c) Explain diode compensation against variation in base-emitter voltage V_{BE}. [6M]

9 Derive the expressions for voltage gain, current gain, input impedance and output impedance of CE amplifier using exact and approximate analysis. [14M]

Or

10 a) A CE amplifier is drawn by a voltage source of internal resistance r_s = 800 Ω, and the load impedance is a resistance R_L = 1000Ω. The h-parameters are h_{ie}=1KΩ, h_{re}=2x10^{-4}, h_{fe}=50 and h_{oe}=25μA/V. Compute the current gain, input resistance, voltage gain and output resistance. [8M]

b) Explain the principle of CS amplifier with the help of circuit diagram. [6M]