Code No: R1921023 **R19** SET - 1

II B. Tech I Semester Supplementary Examinations, September - 2021
ELECTRONIC DEVICES AND CIRCUITS
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions each Question from each unit
All Questions carry **Equal** Marks
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1	a)	Explain about Hall effect and derive an expression for Hall coefficient?	[8M]
	b)	Explain in detail about Fermi level in an extrinsic semiconductor with neat diagrams?	[7M]
		Or	
2	a)	Derive the expression for the fundamental law governing the flow of charge with all the possible conditions	[8M]
	b)	In an N-type semiconductor, the Fermi level lies 0.2eV below the conduction band. Find the new position of Fermi level if the concentration of donor atoms is increased by a factor i)4 and ii)8. Assume the necessary values at room temperature.	[7M]
3	a)	Explain about LED with real time applications	[8M]
	b)	Find the conductivity of silicon atom when the donor impurities of 1 in 10^8 is applied. The intrinsic value of silicon atom is 1.5 x 10^{10} cm^{-3} at 300^0K. The mobility of the electrons and holes are 1300 cm^2 /V-s and 500 cm^2 /V-s respectively. The number of silicon atoms is 5 x 10^{25} cm^{-3}.	[7M]
		Or	
4	a)	Explain the breakdown phenomena in zener diode.	[8M]
	b)	Draw the circuit diagram and explain the operation of full wave rectifier using center tap transformer and using bridge rectifier. Compare TUF and PIV for the both cases.	[7M]
5	a)	Explain the current components in transistor with appropriate diagrams	[8M]
	b)	Explain the construction and operation of JFET and draw its characteristics.	[7M]
		Or	
6	a)	Draw the small signal equivalent diagrams for all the three configurations of transistor by using approximate analysis	[8M]
	b)	What is base width modulation? Explain its effect on i/p and o/p characteristic curves of CE and CB configurations and also explain reach through in transistor.	[7M]
7	a)	What is the difference between stabilization and compensation techniques? Explain transistor compensation techniques.	[8M]
	b)	What is the condition for stability and determine stability factor and operating point for CE germanium transistor amplifier which uses self-bias technique where V_{cc}=16V,R_c = 3 KΩ, R_E=2 KΩ, R_1=56KΩ, R_2= 20 KΩ and α= 0.985.	[7M]
		Or	
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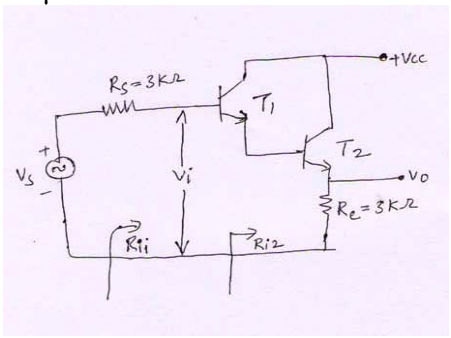
8 a) What is the condition for thermal stability? [8M]

b) A silicon transistor with β=80 is used in self-biasing arrangement with V_{CC}=15V, R_C=4.7 KΩ. The operating point Q is at V_{CE}=8.2V, I_C=1.2 mA. Find the values of R_1, R_2 and R_E. [7M]

9 a) Using approximate h parameter model for a CE circuit obtain the expression for i)A_I ii) R_I iii) A_V iv) R_o [8M]

b) For the circuit shown in below fig .calculate R_i, A_v, A_i, and R_0 for h_{ie}=1KΩ, h_{fe}=50 and h_{re}=2x10^{-4}, h_{oe}= 20μA/V. [7M]



Or

10 a) Draw the small signal model of JFET amplifiers. [8M]

b) Give the compaction of FET amplifiers. [7M]