Total number of printed pages:4

UG/3rd/UIE302

2021

ELECTRONIC DEVICES & CIRCUITS

Full Marks: 100

Time: Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1.	a)	How semiconductors are classified? Explain different types of semiconductors.	10
	b)	What is fermi level? How fermi level is positioned in Intrinsic, N-type and P-type semiconductor?	2+3= 5
	c)	What are drift and diffusion in semiconductor?	5
2.	a)	Derive the Einstein's relation for Diffusion.	7
	b)	State and explain Hall effect.	5
	c)	Derive the expression for built in potential of an abrupt pn junction.	8
3	a)	What is a rectifier? Explain half wave and full wave rectifier with neat diagram.	10
	b)	Draw the circuit diagram and output waveforms of Positive and negative simple series clipper and Positive and negative biased series clipper	10
4	a)	For the emitter-bias network of Fig. 1 , determine:	7

a. I_B.
b. I_C.
c. V_{CE}.
d. V_C.
e. V_E.
f. V_B.
g. V_{BC}.

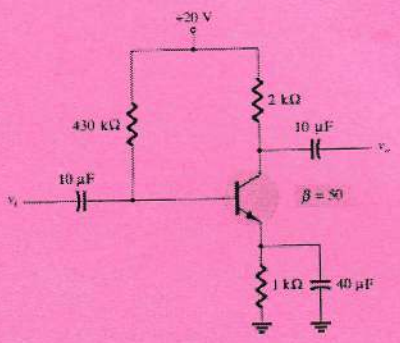

Fig. 1

b) Given the load line of Fig. 2 and the defined *Q*-point, determine the required values of V_{CC}, R_C, and R_B for a fixed-bias configuration. 6

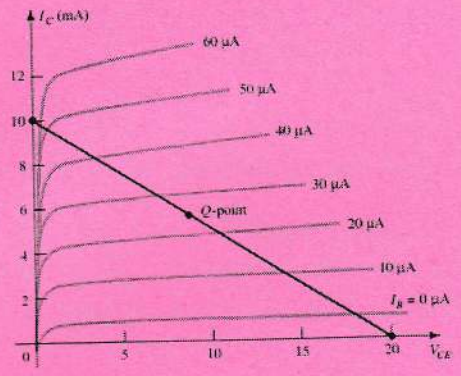

Fig.2

c) For the network of Fig. 3 : 7

a. Determine *re*.

b. Find *Zi* (with *ro* = ∞ Ω).

c. Calculate *Zo* (with *ro* =∞ Ω).

d. Determine *Av* (with *ro* =∞ Ω).

e. Repeat parts (c) and (d) including *ro* = 50 kΩ in all calculations and compare results.

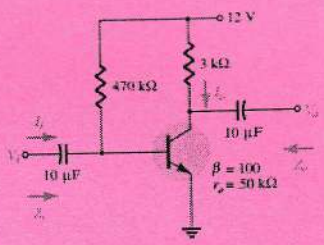

Fig.3

5 a) What is a field effect transistor? Explain the working of an enhancement mode Metal oxide semiconductor field effect transistor. 10

	b)	Obtain the maximum efficiency of a series fed class A amplifier.	10
6	a)	What is negative feedback? What are the advantages of negative feedback?	6
	b)	What are the various feedback connections? Show the feedback connections with neat diagram and obtain the overall gain expressions for various feedback connections.	2+4+8=14
7		Write short notes on:	5x4=20

a) Diode Clamping circuit

b) BJT self bias configuration

c) JFET

d) Class B amplifier