Roll No. | | | | | | | | | | |

SHAMBHUNATH INSTITUTE OF ENGINEERING AND TECHNOLOGY

Subject Code:BEC101 **Subject:Fundamentals of Electronics Engineering**

Course: B.Tech. **SEMESTER: Ist**

SECOND SESSIONAL EXAMINATION, ODD SEMESTER, (2022-2023)

Branch: EC, CSE, EE, ME, CE

Time –2 Hrs **Maximum Marks – 45**

SECTION – A

1. Attempt all questions in brief.

Q N	QUESTION	Marks	CO	BL
a.	A 400 watt carrier is modulated to a depth of 75 percent. Calculate the total power in the modulated wave.	2	CO5	2
b.	Why BJT is called current controlled device?	2	CO2	2
c.	What is PIV for half-wave and full-wave centre-tapped transformer rectifier?	2	CO1	3
d.	State two differences between FET and BJT.	2	CO2	1
e.	What is the need for modulation?	2	CO5	1
f.	Draw the V-I characteristics of an ideal diode in forward and reverse bias conditions.	2	CO1	6

SECTION – B

2. Attempt any *ONE* part of the following :

Q N	QUESTION	Marks	CO	BL
a.	Draw and explain the working of a bridge rectifier with input and output waveforms. Calculate efficiency and ripple factor.	5	CO1	5
b.	Draw the block diagram of a communication system and explain each block in brief.	5	CO5	6

3. Attempt any *ONE* part of the following:

Q N	QUESTION	Marks	CO	BL
a.	What is voltage multiplier? Draw and explain the voltage doubler circuit.	5	CO1	3
b.	Describe the construction and working of a NPN transistor in CE configuration with respect to size and doping.	5	CO2	6

P.T.O.

4. Attempt any *ONE* part of the following:

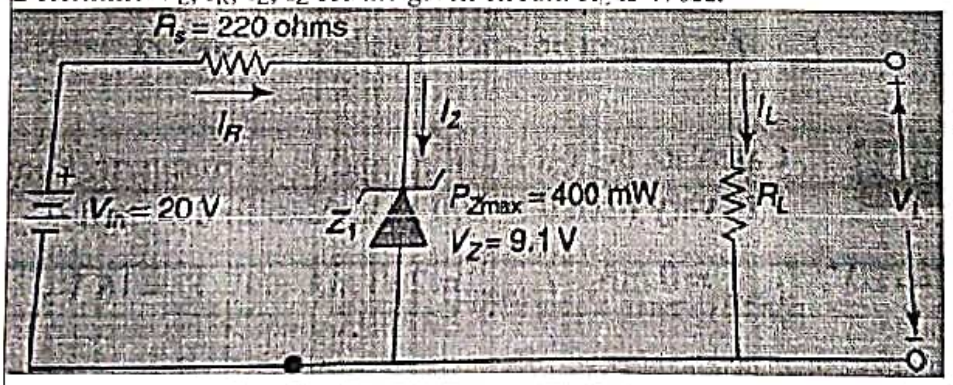
	QUESTION	Marks	CO	BL
a.	Describe working of n-channel JFET with help of constructional diagram and draw its drain and transfer characteristics.	5	CO2	4
b.	Explain the input and output characteristics of a BJT in the CE configuration.	5	CO5	1

SECTION - C

5. Attempt any *ONE* part of the following:

Q N	QUESTION	Marks	CO	BL
a.	Explain the V-I characteristics of PN junction diode.	6	CO1	2
b.	For a JFET given I_{DSS} = 6 mA and V_P = -4.5 V: a. Determine I_D at V_{GS} = -2V and -3.6 V. b. Determine V_{GS} at I_D = 3mA and 5.5 mA.	6	CO2	1

6. Attempt any *ONE* part of the following:

Q N	QUESTION	Marks	CO	BL
a.	(i) Prove the following relation between total power and carrier power in AM wave. $P_t = P_c(1+\frac{m^2}{2})$ (ii) The antenna current of an AM transmitter is 8 ampere when only the carrier is sent, but it increases to 8.93 ampere when the carrier is modulated by a single sine wave. Find the percentage modulation. Determine the antenna current when the percent of modulation changes to 0.8.	6	CO5	3
b.	Determine V_L, I_R, I_L, I_Z for the given circuit. R_L is 470Ω. 	6	CO1	5

7. Attempt any *ONE* part of the following:

Q N	QUESTION	Marks	CO	BL
a.	Write short notes on (a) LED (b) Tunnel Diode	6	CO1	1
b.	Define Amplitude Modulation. Derive the expression for AM modulated waveform.	6	CO5	2

Roll No. 22BT0S0260

SHAMBHUNATH INSTITUTE OF ENGINEERING AND TECHNOLOGY

Subject Code: BEC 101 Subject: Fundamentals of Electronics Engineering

Course: B.Tech. SEMESTER: 1st

FIRST SESSIONAL EXAMINATION, ODD SEMESTER, (2022-2023)

Branch: (CE/EC/EE/ME/CS)

Time –1hr 30 min Maximum Marks – 30

NOTE: Attempt all sections

SECTION – A

1. Attempt all questions in brief. (4*2 = 8)

Q N	QUESTION	Marks	CO	BL
a.	Define the terms: (i) Minterm (ii) Maxterm	2	4	L1
b.	Write the characteristics of an ideal op-amp.	2	3	L1
c.	For a given op-amp, CMRR=10^4 and A_d=10^5, find its common mode gain.	2	3	L3
d.	Simplify the Boolean function using Boolean Algebra theorems: A'B'C'+A'B C'+A B'C'+A B C'	2	4	L5

SECTION - B

2. Attempt any ONE part of the following: (1*5 = 5)

Q N	QUESTION	Marks	CO	BL
a.	Draw the circuit diagram of noninverting amplifier using op-amp; derive the expression for voltage gain.	5	3	L5
b.	Simplify the following logical expression using K-map $Y(A,B,C,D) = \Sigma m(1,3,4,6,8,9,11,13,15) + d(0,2,14)$. Realize the minimized expression using the basic gates.	5	4	L5

SECTION - C

3. Attempt any ONE part of the following: (1*5 = 5)

Q N	QUESTION	Marks	CO	BL
a.	Write technical short notes on the following: (i) Inverting comparator (ii) Differential and Common-Mode Operation	5	3	L1
b.	Minimize using K-map and realize using basic gates only. F (A, B, C, D) = ΠM (3, 4, 5, 7, 9, 13, 14, 15). d (0, 2, 8).	5	4	L3

4. Attempt any ONE part of the following: (1*6 = 6)

Q N	QUESTION	Marks	CO	BL
a.	Explain how the basic gates can be realized using NAND gates only.	6	4	L2
b.	Draw a differential amplifier circuit using op-amp and find the output voltage in terms of different input voltage.	6	3	L5

5. Attempt any ONE part of the following: (1*6 = 6)

Q N	QUESTION	Marks	CO	BL
a.	Convert the following :- i) $(1101.00101)_2 = (\ )_8$ ii) $(457)_8 = (\ )_{10}$ iii) $(101110.0101)_2 = (\ )_{16}$ iv) $(82.35)_{10} = (\ )_8$ v) $(ABC.75)_{16} = (\ )_{10}$	6	4	L5
b.	Draw the circuit diagram of integrator and differentiator using op-amps, derive the expression its output voltage.	6	3	L5