



### END Semester Examination

Programme: B. Tech

Course Code: EE-

Branch: Mechanical Group/Comp Engg.

Duration: 1.5 Hrs

Student PRN No.

Semester: I

*Section-I*

Course Name: BEEE

Academic Year: 2023-24

Max Marks: 30

6	1	2	3	0	3	0	4	3
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**Instructions:**

- Figures to the right indicate the full marks
- Mobile phones and programmable calculators are strictly prohibited.
- Writing anything on question paper is not allowed.
- Exchange/Sharing of stationery, calculator etc. is not allowed.
- Write your PRN Number on Question Paper.
- Separate answer sheets should be used for solving Section-I and Section-II.

### Section-I

			Marks	CO	PO
Q1	a)	A coil of resistance $8\ \Omega$ and inductance $0.03\ \text{H}$ is connected to an AC supply of $240\ \text{V}$ , $50\ \text{Hz}$ . Calculate: (i) the current, the power and the power factor (ii) the value of a capacitance which, when connected in series with the above coil causes no change in the value of current and power taken from the supply.	5	1	1-4
	b)	Obtain the current $I$ using the Superposition theorem for the network shown in figure. <div align="center"> </div>	5	1	1-4
Q2	a)	A single-phase, $20\ \text{kVA}$ transformer supplies a load at a p.f. of $0.81$ (lagging). The iron loss of the transformer is $200\ \text{W}$ and the full load copper losses at this load is $180\ \text{W}$ . Calculate (i) the efficiency (ii) if the load is now changed to $30\ \text{kVA}$ calculate the new efficiency.	5	2	1-4
	b)	What is the function of the following parts of a dc machine: (i) field poles; (ii) armature; (iii) brush and commutator?	5	2	1-4
Q3	a)	What is MCB? What are the different parts of an MCB and explain how it works.	5	3	1-4
	b)	What is earthing? How does it protect a person from electric shock? Also state different methods of earthing.	5	3	1-4



## END Semester Examination

Programme: B. Tech./B. Plan./M. Tech./M. Plan./MBA

Course Code: EE -

Branch: Mechanical Group / Comp. Engg.

Duration: 1.5 Hrs

Student PRN No.

Semester: I Section-II

Course Name: Basic Electrical and  
Electronics Engineering

Academic Year: 2023-24

Max Marks: 30

6	1	2	3	0	3	0	4	3
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Instructions: 1. Figures to the right indicate the full marks.

2. Mobile phones and programmable calculators are strictly prohibited.

3. Writing anything on question paper is not allowed.

4. Exchange/Sharing of stationery, calculator etc. not allowed.

5. Write your PRN Number on Question Paper.

- |                                                                                                                                                         | Marks | CO | PO |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----|----|
| Q1 a With the help of neat diagrams explain in detail the effect of biasing voltages on the working of BJT in CE configuration.                         | [5]   | 4  | 1  |
| b Determine the pulse width for a 555-timer operating in monostable mode with $R_1 = 2.2 \text{ k}\Omega$ and $C_1 = 0.01 \mu\text{F}$ .                | [2]   | 6  | 3  |
| c Calculate the output voltage of an op-amp summing amplifier for the following sets of voltages and resistors. Given, $R_f = 1 \text{ M}\Omega$ .      | [3]   | 6  | 3  |
| a) $V_1 = 1\text{V}$ , $V_2 = 2\text{V}$ , $V_3 = 3\text{V}$ ; $R_1 = 500 \text{ k}\Omega$ , $R_2 = 1 \text{ M}\Omega$ , $R_3 = 1 \text{ M}\Omega$ .    |       |    |    |
| b) $V_1 = -2\text{V}$ , $V_2 = 3\text{V}$ , $V_3 = 1\text{V}$ ; $R_1 = 200 \text{ k}\Omega$ , $R_2 = 500 \text{ k}\Omega$ , $R_3 = 1 \text{ M}\Omega$ . |       |    |    |

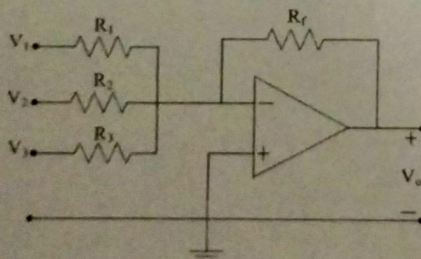


Figure 1

- Q2 a An AC supply of  $230 \text{ V}$  is applied to a centre-tapped full wave rectifier circuit through a transformer of turn ratio  $5:1$ . Assuming both diodes to be ideal and  $R_L = 100 \Omega$ , find the
- Output DC voltage
  - Output DC current.
  - Peak Inverse Voltage and
  - Rectifier efficiency

- b For a zener shunt regulator if zener breakdown voltage,  $V_Z = 5.1\text{ V}$ , zener resistance,  $r_Z = 10\ \Omega$ , and  $R_S = 100\ \Omega$  and current varies from  $1\text{ mA}$  to  $15\text{ mA}$ , find the maximum and minimum values of input voltage which can be regulated by the zener shunt regulator. [3] 4 3

- c Explain voltage follower with a diagram and derive the gain equation for it. [3] 6 1

- Q3 a Determine the following for the fixed-bias configuration of Fig. 2 [4] 5 3

- $I_{BQ}$
- $I_{CQ}$
- $V_{CEQ}$
- $V_C$
- $V_B$
- $V_{BC}$

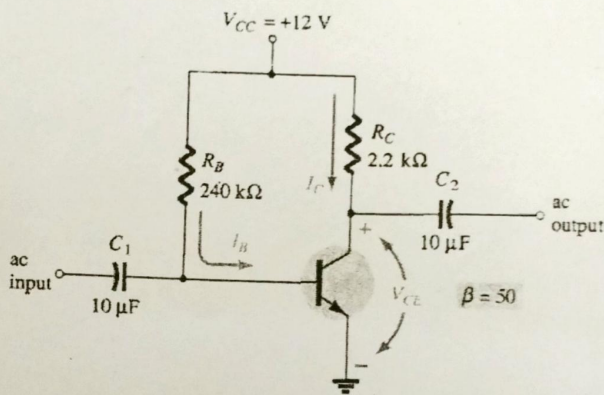


Figure 2

- b With the help of neat diagrams explain the working of Astable multivibrator. Sketch the output and capacitor voltage waveforms and give the equation of duty cycle. [6] 6 1