



**COEP TECHNOLOGICAL UNIVERSITY, PUNE**  
(A Unitary Public University of Government of Maharashtra.)

**END Semester Examination**

**Programme: B. Tech**

**Semester: I** *Section - I*

**Course Code: EE-**

**Course Name: BEEE**

**Branch: Mechanical Group/Comp Engg.**

**Academic Year: 2023-24**

**Duration: 1.5 Hrs**

**Max Marks: 30**

**Student PRN No.**

6 | 1 | 2 | 3 | 0 | 3 | 0 | 4 | 3

**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  |
|-----------|----|--|-------|----|-----|
| <b>Q1</b> | 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.  | 5     | 1  | 1-4 |
|           |    |  |       |    |     |
| <b>Q2</b> | 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 |
| <b>Q3</b> | 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

Semester: I Section -II

Course Code: EE -

Course Name: Basic Electrical and  
Electronics Engineering

Branch: Mechanical Group / Comp. Engg.

Academic Year: 2023-24

Duration: 1.5 Hrs

Max Marks: 50

Student PRN No.

6 1 2 3 0 3 0 n 3

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 |
|-------|--|----|----|
| Q 1 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)    | $V_1 = -2\text{V}$ , $V_2 = 3\text{V}$ , $V_3 = 1\text{V}$ ; $R_1 = 200 \text{ k}\Omega$ , $R_2 = 500 \text{ k}\Omega$ , $R_3 = 1 \text{ M}\Omega$ . |    |    |

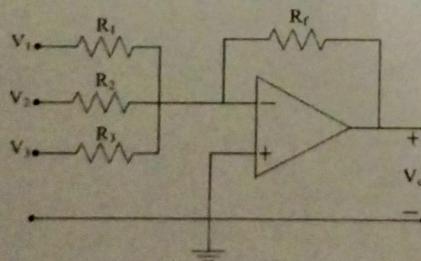


Figure 1

|       |   |   |   |
|-------|---|---|---|
| Q 2 a | An AC supply of 230 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 [4] | 4 | 3 |
| a)    | Output DC voltage   |   |   |
| b)    | Output DC current   |   |   |
| c)    | Peak Inverse Voltage and  |   |   |
| d)    | Rectifier efficiency  |   |   |



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- b For a zener shunt regulator if zener breakdown voltage,  $V_Z = 5.1 V$ , 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

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

- a)  $I_{BQ}$
- b)  $I_{CQ}$
- c)  $V_{CEQ}$
- d)  $V_C$
- e)  $V_B$
- f)  $V_{BC}$

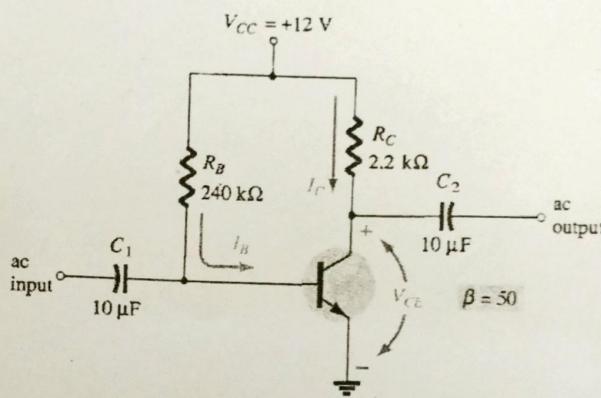


Figure 2

- 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