

Time : 3 Hours]

[Maximum Marks : 80
[Min. Passing Marks : 24

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary.) Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)

1. _____ Nil _____ 2. _____ Nil _____

UNIT - I

1 (a) Find I_x in fig. 1 using Nodal Analysis.

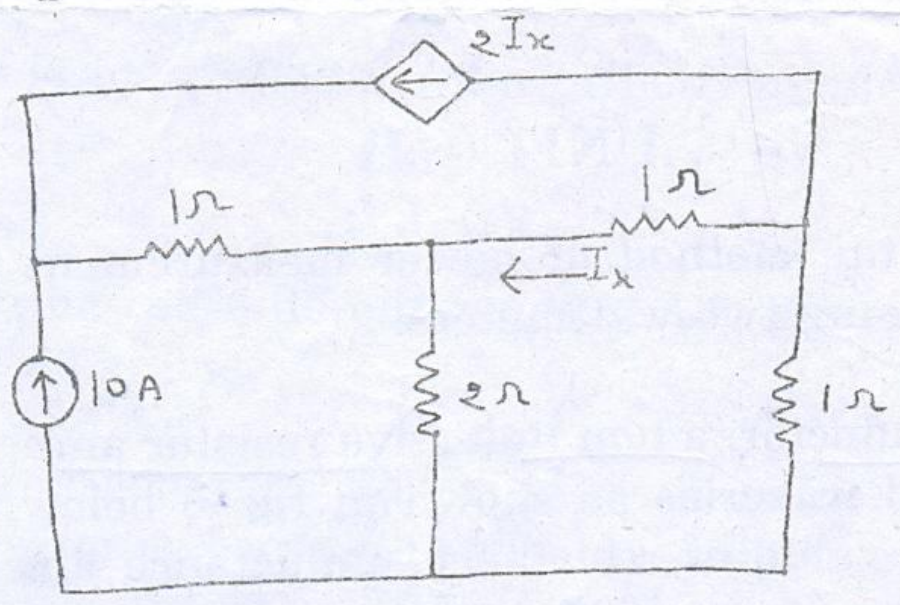


Fig. 1

(b) Solve for the current I of fig. 2 by applying the super position theorem.

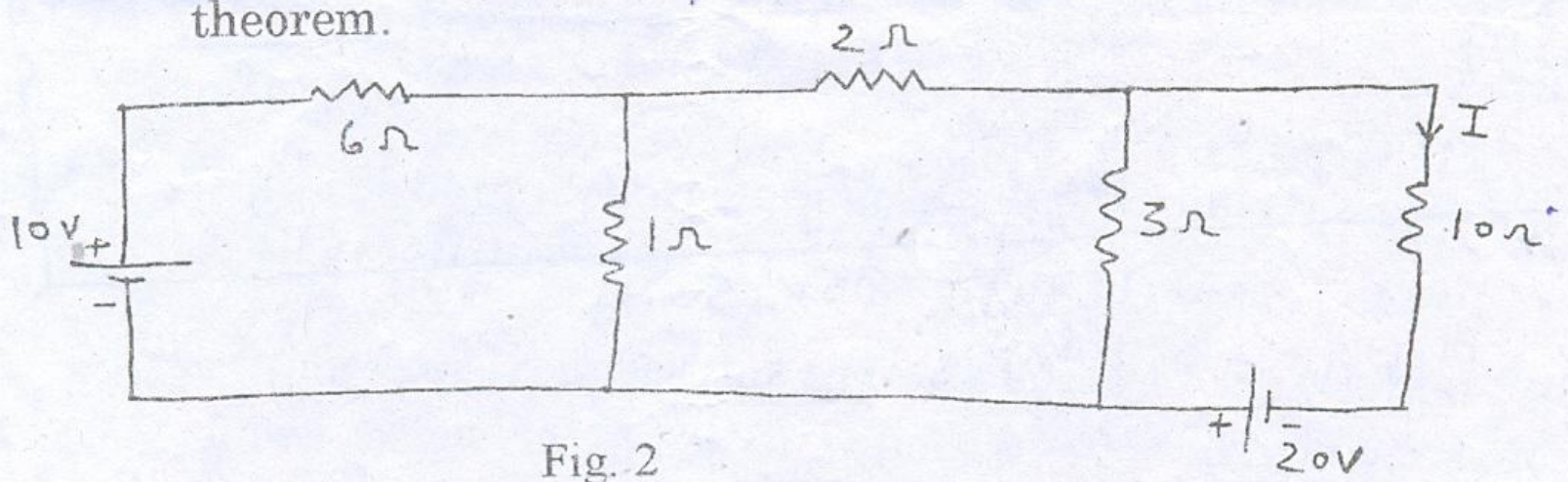
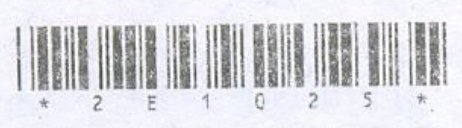


Fig. 2

OR



- 1 (a) Find the Thevenin's equivalent of the circuit of Fig. 3 as seen at the terminals X and Y.

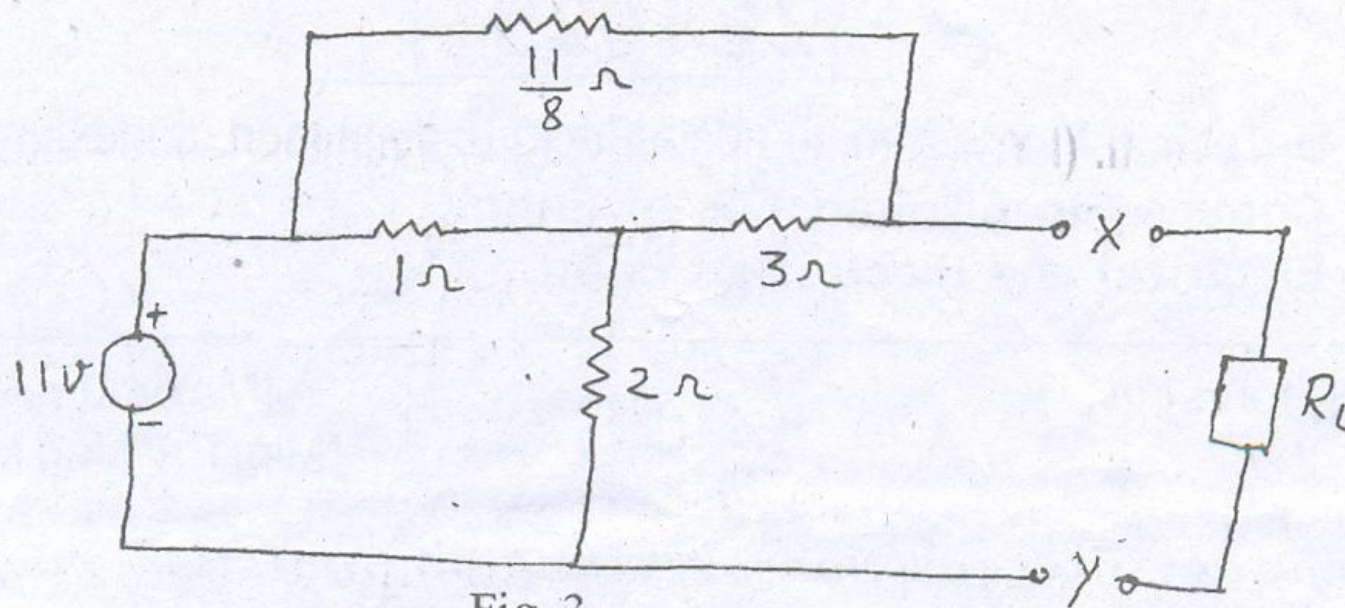


Fig. 3

Find the load current if R_L is 9Ω .

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- (b) Determine V_{ab} using Mesh Analysis in Fig. 4 given below.

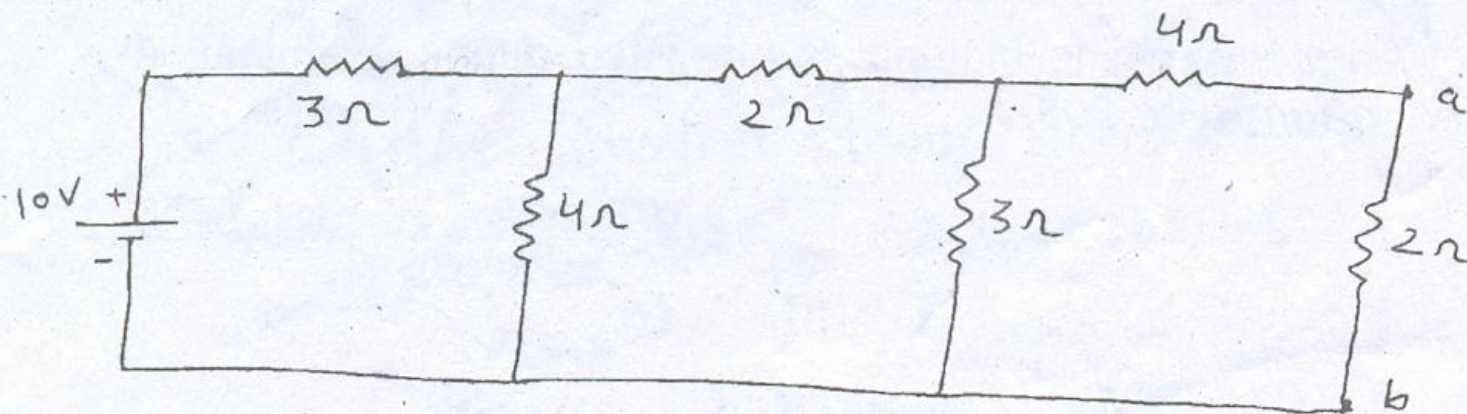


Fig. 4

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UNIT - II

- 2 (a) Explain the method of power measurement in a 3-phase system using two wattmeters.

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- (b) A pure inductor, a non inductive resistor and a capacitor are connected in series as shown in fig. 5 below, determine :
 (i) The value of resistance, inductance and capacitance
 (ii) Power factor of the circuit

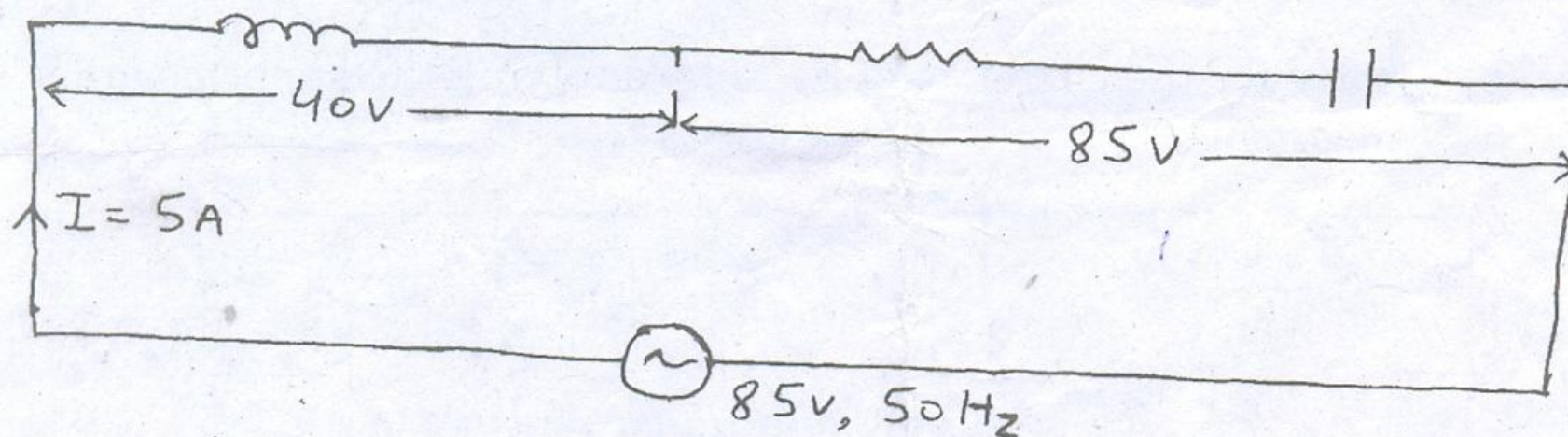


Fig. 5

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OR



- 2 (a) A circuit consists of the following in parallel :
- (i) A resistor of 500 ohms
 - (ii) An inductor of 2H
 - (iii) A capacitor of $10 \mu F$. A source voltage of 200 V, 50 Hz is applied. Determine the current drawn from the supply, complex power, active power, reactive power and power factor of the circuit. 8
- (b) The power reading of two wattmeters are +15 kW and -4 kW for a three phase load. If the supply voltage is balanced at 440 volt, find the true power drawn by the load, the power factor and line current. 8

UNIT - III

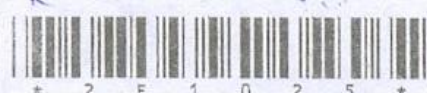
- 3 (a) Explain in detail the construction, working principle and emf equation of a single phase transformer. 8
- (b) A $\frac{200}{27.5}V$, 400 Hz transformer is to be operated at 60 Hz. Find :
- (i) The highest safe input voltage.
 - (ii) Transformation ratio in both frequency situations. 8

OR

- 3 (a) Describe the different types of DC generators drawing the neat diagrams. 8
- (b) A shunt generator has an induced emf of 254 volt. When the generator is loaded, the terminal voltage is 240 V. Neglecting armature reaction. Find the load current if the armature resistance is 0.04 ohm, and the field resistance is 24 ohm. 8

UNIT - IV

- 4 (a) Draw the output characteristic of a NPN transistor operation in CE configuration. 8
- (b) A transistor is connected in common emitter (CE) configuration shown below in fig. 6 in which $\beta=40$ and voltage across $2 k\Omega$ collector resistance is 2V. Calculate the emitter current.



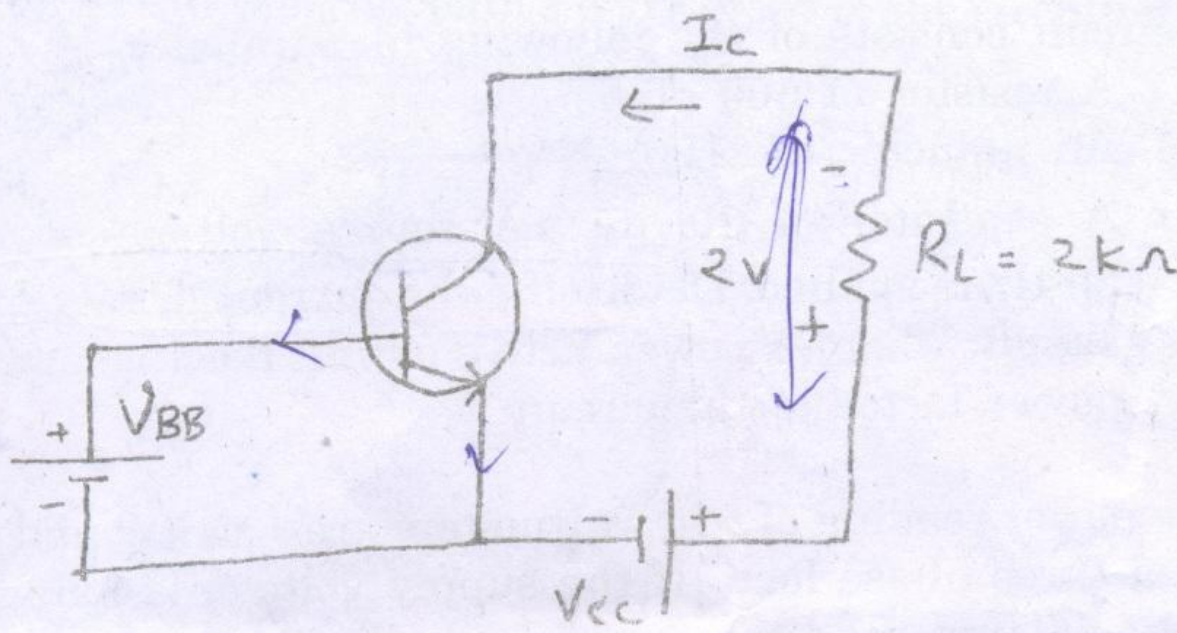


Fig. 6

I_E

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OR

- 4 (a) Draw the two transistor model of thyristor and explain its working. 8
- (b) Describe the equivalent circuit and characteristics of Unijunction transistor (UJT). 8

UNIT - V

- 5 (a) Give the block diagram of a superheterodyne receiver and explain function of each component. 8
- (b) A frequency modulated wave is represented by the voltage equation as
- $$v(t) = 12 \cos(6 \times 10^8 t + 5 \sin 1250 t)$$
- determine :
- (i) Carrier frequency
 - (ii) Modulating frequency
 - (iii) Modulation Index.

OR

- 5 Write short notes on :
- (a) Satellite Communication 8
- (b) Optical fibre Communication. 8

