Roll No. ..... Total Pages : 03

BT-1/D-22 41044

# BASIC ELECTRICAL ENGINEERING

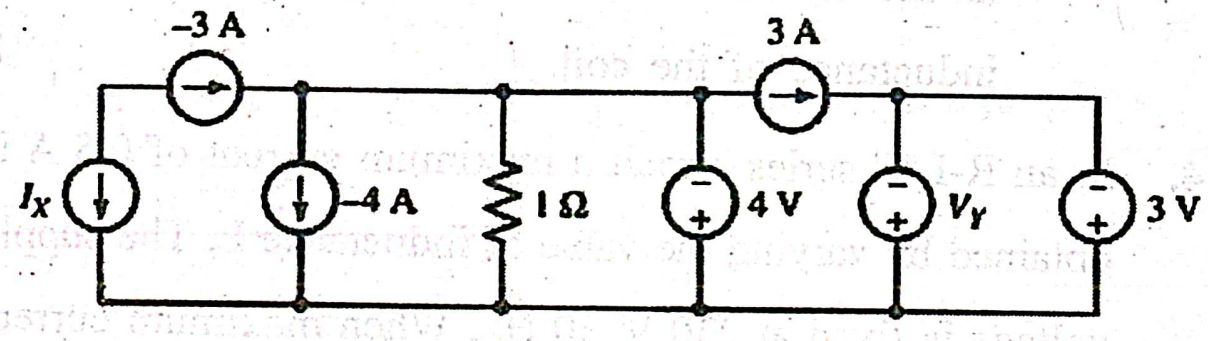
## ES-101A

Time : Three Hours] [Maximum Marks : 75

**Note :** Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

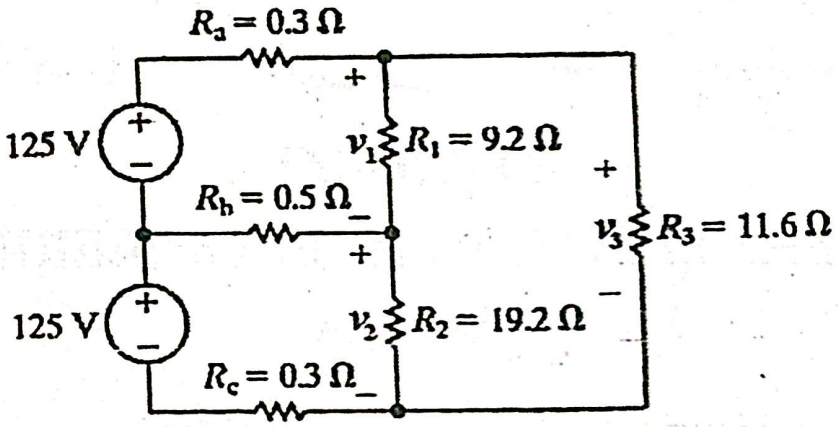
### Unit I

**1.** (a) State KCL and KVL. Determine the values for $I_X$ and $V_Y$ in the circuit shown in figure. **8**




(b) State and explain superposition theorem. **7**

**2.** (a) In the circuit shown in figure, calculate (i) $v_1$, $v_2$ and $v_3$ (ii) power delivered to $R_1$, $R_2$ and $R_3$. **10**




(b) Explain Star-Delta transformation for resistors. 5

## Unit II

3. (a) Explain how is the sinusoidal waveform represented as a phasor quantity with example. 7

(b) A coil is connected in series with a capacitor of 20 μF to a 200 V variable frequency supply. The current is a maximum at 50 A, when the frequency is set to 50 Hz. Determine the resistance and inductance of the coil. 8

4. In an R-L-C series circuit a maximum current of 0.5 A is obtained by varying the value of inductance L. The supply voltage is fixed at 230 V, 50 Hz. When maximum current flows through the circuit; the voltage measured across the capacitor is 350 V. What are the values of the circuit parameters ? 15

## Unit III

5. Explain the measurement of 3-phase power by two wattmeter method for a delta connected balanced load with the help of phasor diagram. **15**

6. (a) From the fundamentals, derive the expression for the EMF equation of a single-phase transformer. **7**

   (b) A 50 kVA, single-phase transformer has 500 turns on the primary and 200 turns on the secondary. The primary is connected to 2000 V, 50 Hz supply. Determine : (i) The secondary voltage and (ii) The maximum value of flux. **8**

## Unit IV

7. Explain the construction and working principle of a 3-phase Induction motor with Torque-slip characteristic. **15**

8. (a) What is ELCB ? Explain the working principle of ELCB. **8**

   (b) What are the different types of wires and cables ? Explain. **7**