[2+1]

END SEMESTER EXAMINATION : JAN-2023

BASIC ELECTRICAL ENGINEERING

Time : 3 Hrs. *Maximum Marks : 60*

Note: ***Attempt questions from all sections as directed. Use of Scientific Calculators are alllowed.***

SECTION – A (24 Marks)

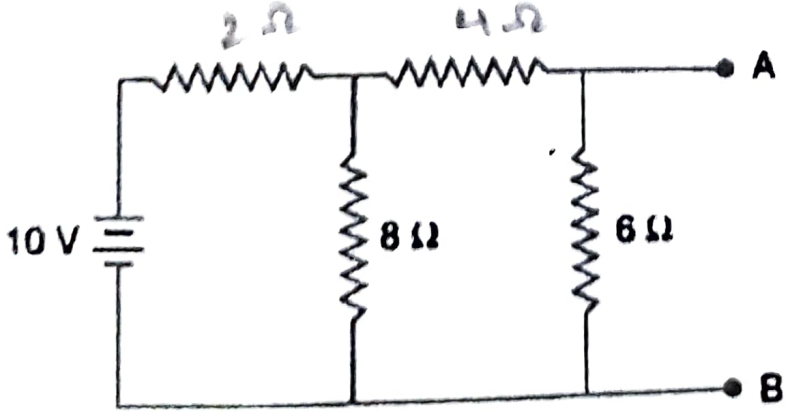
Attempt any **four** *questions out of* **five.**

Each question carries **06** *marks.*

1. Determine the equivalent

   (a) Thevenin' s and

   (b) Norton's circuits which may be used to represent the given network at the terminals AB.

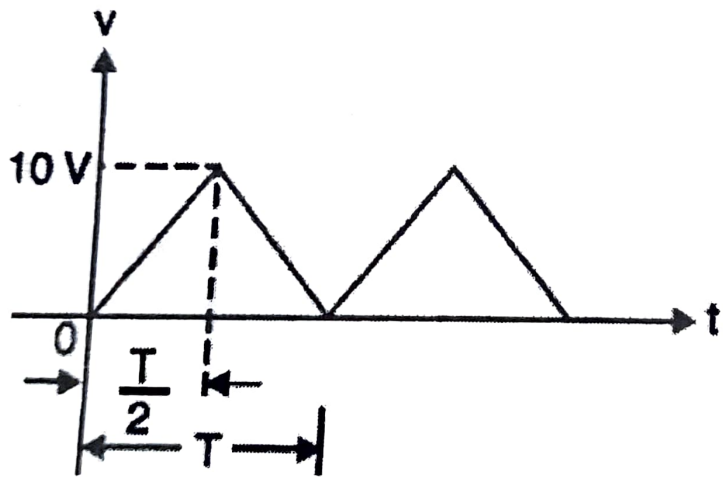


P.T.O.

2. Find

(i) the r.m.s. value

(ii) form factor for a symmetrical triangular wave shown in Fig below



3. A permanent-magnet moving-coil instrument gives full-scale deflection with 5 mA and has a resistance of 5Ω. Calculate the resistance of the necessary components inorder that the instrument may be used as

(i) a 2 A ammeter

(ii) a 100-V voltmeter.

4. A star-connected load having R =42.6 ohm/phase and XL = 32 ohm/phase is connected across 400 V, 3-phase supply. Calculate : (i) Line current, reactive power and power loss.

5. Discuss working principle of single phase transformer with the help of neat diagram.Also decsribe turns ratio.

SECTION – B (20 Marks)

Attempt any **two** *questions out of* **three**.

Each question carries **10** *marks*.

6. (a) A 1200 ohm resistor, a 0.7 H coil and a 0.001μF capacitor are in series across a 120 V source. Determine

(i) the resonant frequency

(ii) the voltage across the capacitor at resonance and

(iii) Q-factor of the circuit at resonance. (5)

(b) Discuss with the help of phasor diagram behavior of voltage and current in RLC Series circuit when ac voltage is applied across it. (5)

7. (a) Explain with the help of connection diagram how power is measured in three phase circuit using Two Wattmeter method. (5)

(b) A 3-phase motor load has a p.f. of 0.397 lagging. Two wattmeters connected to measure power show the input as 30 kW. Find the reading on each wattmeter (5)

8. (a) Derive EMF Equation of a DC Machine.Also show their connection diagrams (5)

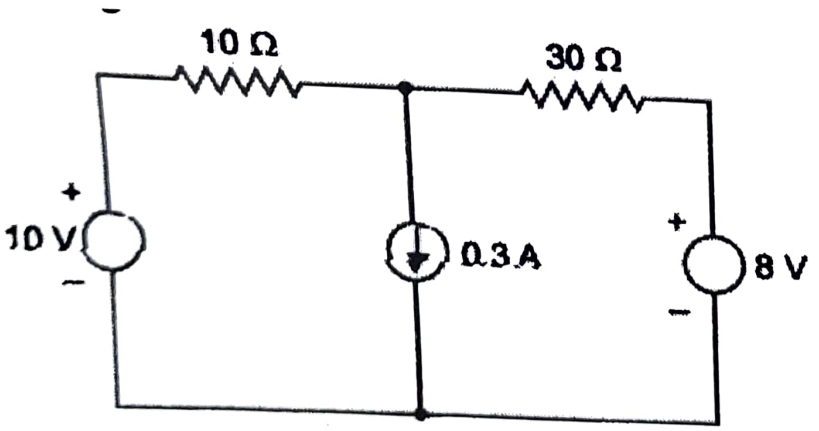
(b) A shunt generator has an induced voltage on open circuit of 127 V When the machine is on load the terminal voltage is 120 V.Find the load current if the field circuit resistance be 15 ohms and the armature resistance 0.02 ohms. Ignore armature reaction. (5)

SECTION – C (16 Marks)

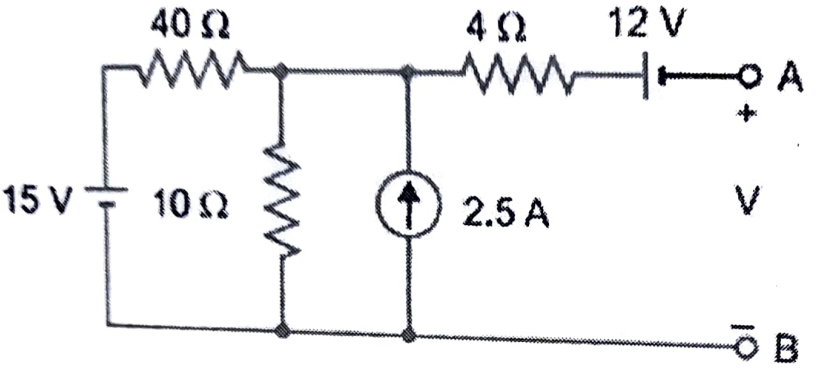
(Compulsory)

9. (a) Descibe the construction and working of Moving Iron Instruments.Alse derive the expression for deflecting torque.

(b) Use mesh current method to determine currents through each of the components in the circuit shown in Fig



(c) Use superposition theorem to find the voltage V in Fig below


40 Ω
4 Ω
12 V
A
+
15 V
10 Ω
2.5 A
V
B