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ES103

Enrol. No.

[ET]

END SEMESTER EXAMINATION : April-May, 2023

BASIC ELECTRICAL ENGINEERING

Time : 3 Hrs.

Maximum Marks : 60

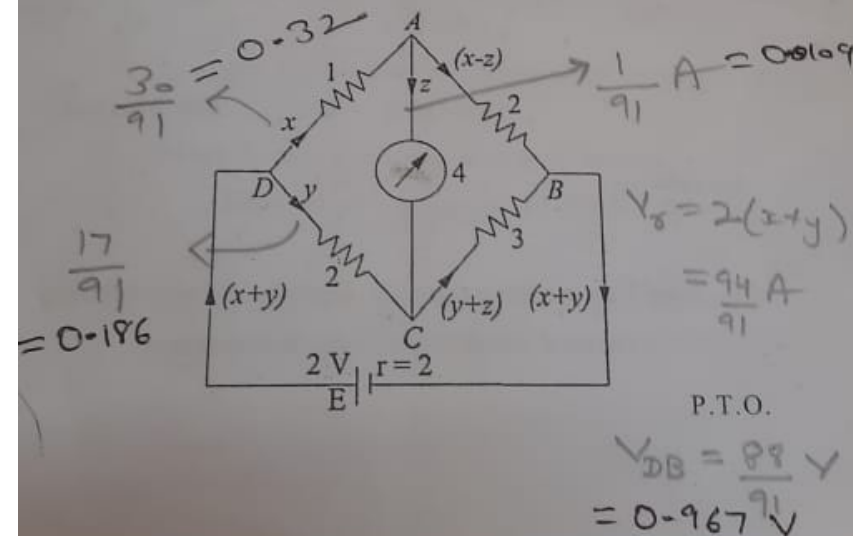
Note: Attempt questions from all sections as directed.

SECTION - A (24 Marks)

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

Each question carries **06** marks.

1. Determine the currents in the unbalanced bridge circuit of figure below. Also, determine the p.d. across BD.



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2. A circuit has a resistance of 40Ω and an inductance of $0.2H$. It is connected to a $500V$, $50Hz$ supply. Find its reactance, impedance, current taken and the angle of lag.

$$X_L = 62.83 \Omega$$

$$Z = 74.49 \Omega$$

$$I = \frac{V}{Z} = \frac{500}{74.49} = 6.71 A$$

$$\phi = \cos^{-1} \left(\frac{R}{Z} \right) = \cos^{-1} \left(\frac{40}{74.49} \right) = 57.9^\circ$$

3. Describe the construction and working of a single phase dynamometer wattmeter.

4. Describe the 3 wattmeter method.

5. A single phase transformer has a core whose cross section area is $0.015 m^2$; it operates at a maximum flux density of $1.2 Wb/m^2$ from a $50 Hz$ supply. If the secondary winding has 15 turns. Determine the current in the secondary if a load of 10Ω is connected to the output.

$$V_2 = 4.44 f N_2 B_m A$$

$$= 59.11 V$$

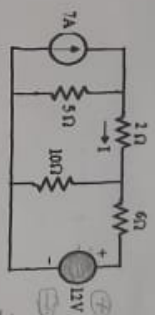
$$I_2 = \frac{V_2}{10} = 5.91 A$$

SECTION - B (20 Marks)

Attempt any two questions out of three.
Each question carries 10 marks.

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$$I_1' = 3.27 A$$

$$I_1'' = 1.18 A$$

$$I_1''' = 0.648 A$$

$$I = I_1' - I_1'' = 2.087 A$$

7. Define resonance in series RLC circuits. Mention its application. Derive expression of resonance frequency for series RLC circuit. A series circuit consists of a resistance of 10Ω , and inductance of $50 mH$ and a variable capacitance in series across a $100V$, $50Hz$ supply. Calculate the value of capacitance to produce resonance and Voltage across the capacitance.
8. (a) What are shunts and multipliers? Show applications of shunts and multipliers by giving examples.

- (b) Describe the working of a three phase generator.

SECTION - C (16 Marks)
(Compulsory)

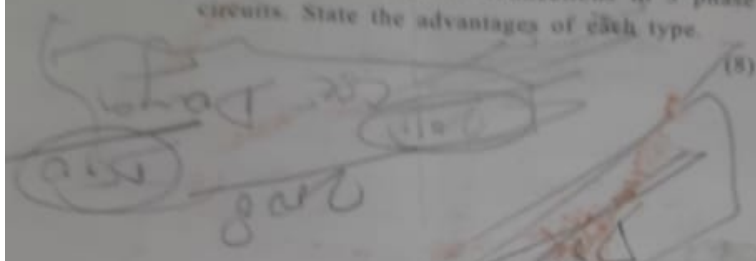
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maximum core flux in a transformer at 110V and 50Hz. Determine the required number of turns in the primary.

$$N_1 = \frac{E_1}{4.44 f \Phi_m} = \frac{110}{4.44 \times 50 \times 0.001} = 495 \quad (8)$$

(b) Explain star and delta connections in 3 phase circuits. State the advantages of each type.



23771-9
Avg of 3
Academic
↓ SI → 60%
1:20 - f:s ratio