B. Tech. Examination, 2026

(Even Semester)

BASIC ELECTRICAL ENGINEERING

Time : Three Hours] *[Maximum Marks : 60*

Note :– Attempt all questions.

SECTION – A

1. Attempt all parts of the following : $8 \times 1 = 8$

   (a) Difference between active element and passive element.

   (b) Difference between linear element and non-linear element.

   (c) Define impedance.

   (d) What do you understand by term bandwidth?

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(e) What are the applications of auto transformer?

(f) Define the following :

(i) Hysteresis loss

(ii) Eddy current loss

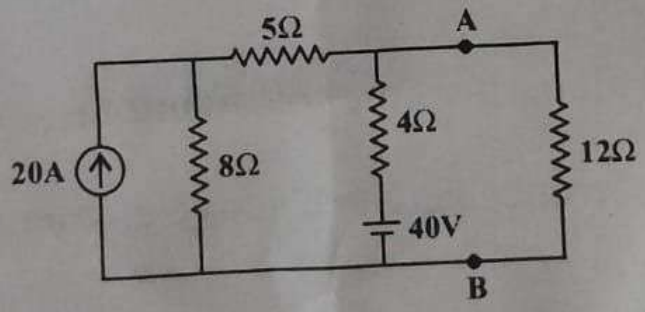
(g) Write emf equation for D. C. generator.

(h) Define slip.

SECTION – B

2. Attempt any two parts of the following : $2 \times 6 = 12$

(a) Find the current in 12 Ω resistance using Thevenin's theorem :



(b) In a purely capacitive circuit prove that the current leads the voltage by an angle 90^0 and the power consumed is zero.

(c) Describe the construction and working of moving iron instrument.

(d) Why the synchronous motor is not self starting?

SECTION – C

Note :– Attempt all questions. Attempt any two parts from each questions. $8 \times 5 = 40$

3. (a) How delta is connected network converted into equivalent star connected network?

   (b) State and prove maximum power transfer theorem.

   (c) State and explain Norton's theorem to solve network problems. Mention two advantages of Norton's theorem.

4. (a) For LCR series circuit drive an expression for resonant frequency, dandwidth and quality factor. Prove :

$$w_0 = \sqrt{w_1 \cdot w_2}$$

   (b) A coil having resistance of 10Ω and inductance of 0.05 Henry is connected in series with a capacitor of 100 μF. The whole circuit has been connected to a 200 V, 50 Hz single phase ac supply. Calculate :

(i) Impedance

(ii) Current

(iii) Power factor

(iv) Active, reactive, apparent power

(c) Draw the phasor diagram and find the resultant voltages and RMS value for the following voltages acting in series :

$V_1 = 100 \sin 500\ t$

$V_2 = 200 \sin (500\ t + \pi/3)$

$V_3 = 50 \cos 500\ t$

5. (a) Draw and explain working of PMMC (permanent magnet moving coil) type instrument.

(b) Derive EMF equation of single phase transformer.

(c) A 30 KVA, 2000/200V, single phase, 50 Hz transformer has a primary resistance of 3.5Ω and reactance of 4.5Ω. The secondary resistance and reactance are 0.015 ohm and 0.02 ohm respectively. Find :