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Following Paper ID and Roll No. to be filled in your Answer Book.

PAPER ID : 33302 Roll No.

B. Tech. Examination 2021-22

(Even Semester)

BASIC ELECTRICAL ENGINEERING

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

Note :– Attempt all questions.

SECTION–A

1. Attempt all parts of the following : 8×1=8

(a) Give the statement of Tellegen's theorem.

(b) What are the Kirchhoff's current and voltage laws?

(c) What do you understand by term 'Form Factor'?

(d) An alternating voltage is expressed by E = 120 sin (100 t) the rms voltage and frequency will be.

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(e) Draw the equivalent circuit diagram of transformer.

(f) When is the indicating instruments said to be dead-beat?

(g) Explain the term 'slip' in induction motor.

(h) Write two application of D. C.shunt motor.

SECTION – B

2. Attempt any two parts of the following : 2×6=12

(a) State and prove maximum power transfer theorem and also prove that maximum efficiency is 50%.

(b) Explain the construction and working of PMMC type instrument. What are their advantages and disadvantages?

(c) Drive e.m.f. equation of a d.c. generator what will be the change in e.m.f. induced if the flux is reduced by 10% and the speed is increased by 10%.

(d) A coil having a resistance of 7Ω and inductance of 31.8 milli-Henary is connected to 230V, 50 Hz supply then calculate. Figure-(A) :

(i) Current
(ii) Power factor
(iii) Real power

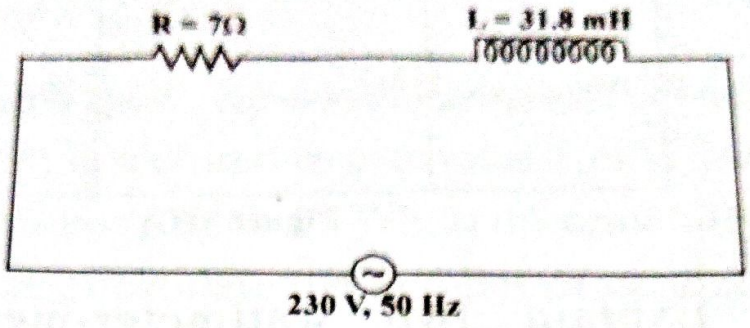

Figure-(A)

SECTION – C

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

3. (a) State and explain superposition theorem to solve network problems.

(b) Calculate the value of resistance in between B & C using star/delta transformation. Figure-(B).

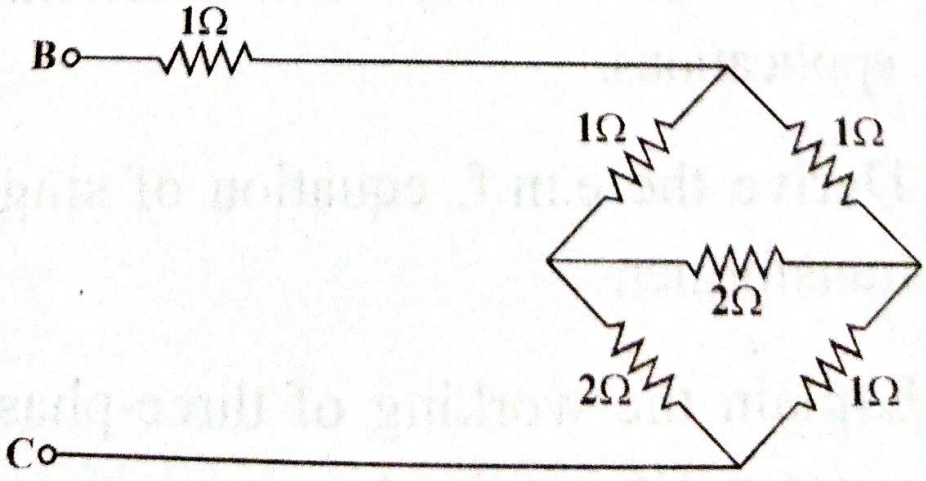

Figure - (B)

(c) Calculate the current in branch AB using Nodal analysis. Figure-(C) :

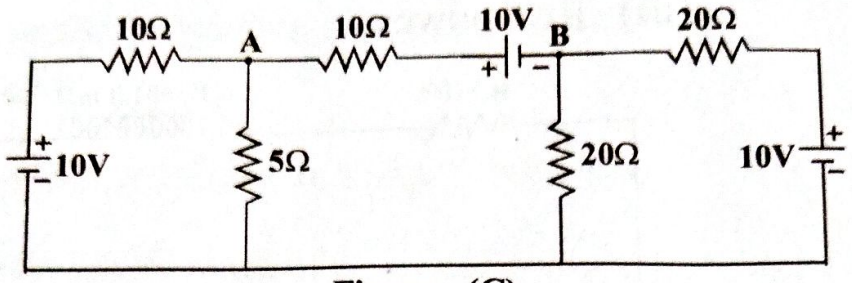

Figure - (C)

4. (a) Explain two wattmeter-methods for measurement of three phase power.

(b) For star connected system in three phase circuit prove that :

$$V_L = \sqrt{3}\, V_{PR}, I_L = I_{Ph}$$

(c) Prove that the average power consumed in a pure resistive circuit is :

$$P_{aug} = V_{rms} \cdot I_{rms}$$

5. (a) Explain the working of auto transformer and its applications.

(b) Derive the e.m.f. equation of single phase transformer.

(c) Explain the working of three-phase energy meter and its application.

6. (a) State the advantages and disadvantages of a synchronous motors.

(b) Single phase induction motor is not self-starting. Explain.

(c) An 8- pole, lap-wound armature rotates at 350 rpm is required to generates 260 V. The useful flux per pole is .05 Wb. If the armature has 120 slots, calculate the number of conductors per slots.

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