Subject code : BEET-201

PAPER ID-

Roll No. to be filled in your Answer Book

Roll No. | | | | | | | | | | |

B.Tech.
First Year (I^{st}),2^{nd}
Basic Electrical Engineering (BEET-201)

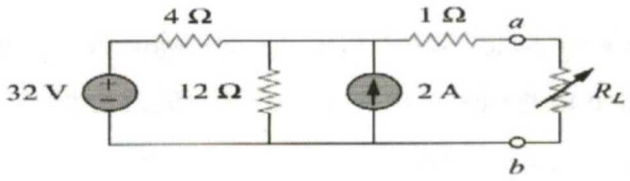
Time- 3 Hours **Max marks: 100**

NOTE:

i. All questions are compulsory.
ii. Draw diagrams wherever necessary.
iii. All questions carry equal marks. .

1. Attempt any **FOUR** parts of the following. 5 X 4=20

(A) Find the Thevenin's equivalent circuit for the given circuit across the terminals a-b. Then find the current through R_L=6, 16, and 36Ω.

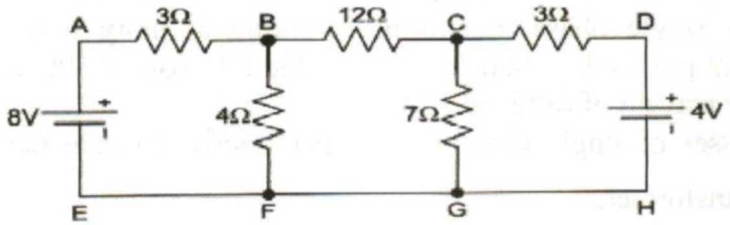


(B) Derive an expression for the r.m.s. value of a sinusoidal current in term of its maximum value.

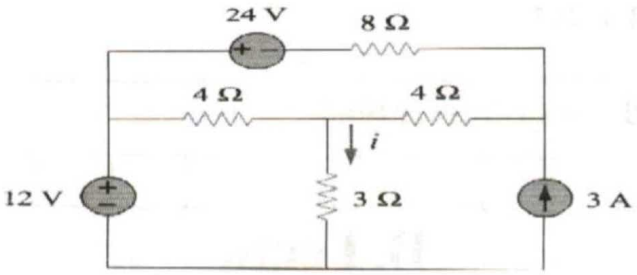
(C) Explain the KCL and KVL with the appropriate examples.

(D) Define Norton's Theorem with an appropriate example.

(E) Find the magnitude and direction of the current flowing through 7Ω resistor in the following network. Using Nodal Analysis



(F) Find current i using superposition theorem for given circuit.



2. Attempt any **FOUR** parts of the following 5 X 4=20

(A) What do you mean by resonance in a series a.c. circuit? Derive an expression for resonant frequency in a series a.c. circuit.

(B) Determine (i) line current, (ii) resonant frequency, (iii) Q- factor, for series RLC circuit consists of a resistance of 1000Ω, an inductance of 100mH and capacitance of 10 pF. If voltage of 100V is applied across the combination.

(C) Derive the expression for Star to delta transformation.

(D) Derive the relation between line current and phase current of three phase delta connections.

(E) A periodic voltage having following values for the equal time intervals changing suddenly form one value to the next:-0, 5, 10, 20, 50, 60, 50, 20, 10, 5, 0, -5, -10 V etc. Calculate (i)R.M.S. value(ii)Form Factor(iii)Peak factor

(F) Define the following terms for a Magnetic circuit:
(i)Magnetomotive force(MMF)(ii)Magnetic Field Intensity(iii)Permeability of free space(iv)Reluctance and Permeance(v)Magnetic Flux

3. Attempt any **TWO** parts of the following 10X2=20

(A) Derive an emf equation of single phase transformer and explain the working of transformer. A single phase transformer working at unity power factor has an efficiency of 0.9 p.u. both at half load and at the full load of 500 W. Determine the efficiency at 75 percent of full load.

(B) Explain the losses of single phase transformer briefly. Explain the construction of single phase transformer.

(C) A 5 KVA, 200/400 V, 50 Hz, single phase transformer gave the following test result:-

O.C. Test: 200 V, 1.3 A, 72 W . . . . . On L.V. side

S.C. Test: 8 V, 27 A, 80 W . . . . . On H.V. side

Calculate:(i) The magnetizing current and the component corresponding to core loss at normal frequency and voltage.(ii)The magnetizing branch impedances as R_0 and X_0(iii) Short Circuit Components

4. Attempt any **TWO** parts of the following 10X2=20

(A) Explain the construction part of D.C. Generator with magnetic circuit diagram. Derive an emf equation of D.C. Generator. Derive the torque equation of D.C. Motor

(B) Single phase Induction Machine is not self-starting. Explain this statement. Define slip and Synchronous speed.

(C) Draw and Explain the Full Load Phasor diagram of single phase transformer for lagging load.

5. Attempt any **TWO** parts of the following 10 X 2=20

(A) Explain the Torque-Slip Characteristics of Three Phase Induction Machine and Explain the Rotating Magnetic Field Theory of Three Phase Induction Machine.

(B) Explain the DC-DC Buck and Boost Converters with the advantages and applications.

(C) Explain the following components are using in the Switch Gear:(i) Switch Fuse Unit (SFU) (ii) MCB(iii) ELCB(iv)MCCB (v) Types of Wires, Cables and Earthing