

Roll No. to be filled in your Answer Book

Roll No.

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

B.Tech.
First Year (Ist), 2nd
Basic Electrical Engineering (BEET-201)

Time- 3 Hours

Max marks: 100

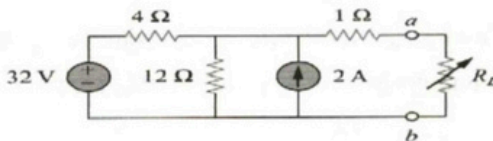
NOTE:

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

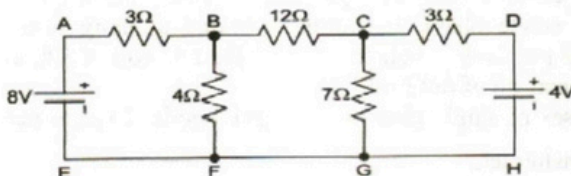
1. Attempt any **FOUR** parts of the following.

5 X 4=20

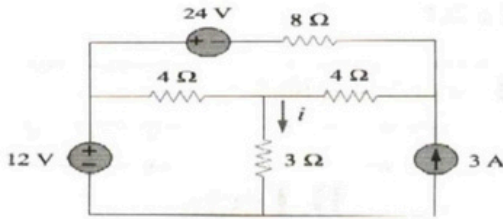
- (A) Find the Thevenin's equivalent circuit for the given circuit across the terminals a-b. Then find the current through $R_L=6, 16, \text{ and } 36\Omega$.



- (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 , $200/400\text{ V}$, 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.

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