U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

September / October 2023 Semester End Main Examinations

Programme: B.E. **Semester: I / II**
Branch: Common to all Branches **Duration: 3 hrs.**
Course Code: 21EE1ESBEE / 21EE2ESBEE **Max Marks: 100**
Course: Basic Electrical Engineering

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

MODULE-1

1. a) State and prove Maximum power transfer theorem applied to dc series circuit. **06**

b) Compute (i) the current at node D & its direction (ii) all the branch currents & (iii) voltage across A & D terminals for the circuit shown in Figure1b. **07**

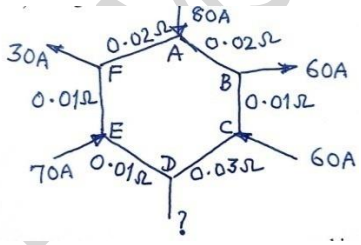

Figure 1 b

c) Show that the current through a pure inductive circuit lags the voltage by an angle 90^0. Sketch the waveforms of voltage, current & power. **07**

MODULE-2

2. a) Show that in a series RL circuit, the average power consumed is **05**

V rms I rms cosø.

b) An alternating voltage of (80+j60) V is applied to a circuit & the current flowing is (-4+j10) A. Find (i) the impedance of the circuit (ii) the power consumed (iii) power factor. **05**

c) With the help of circuit diagram & phasor diagram, derive the relationship between the line & phase values of voltage & current in three phase star connection. **06**

d) List any four advantages of three phase system over single phase system. **04**

MODULE-3

3.	a)	Draw the cross sectional view of a dc machine. Mention the function of each part	**08**
	b)	A 4 – Pole, 500V DC Shunt motor has 720 wave connected armature conductors. The full load armature current is 50A and flux/pole is 0.03wb. Armature resistance is 0.2Ω and contact drop is 1V per brush. Calculate the full load speed of motor.	**06**
	c)	Explain principle of operation of a single phase transformer and derive the emf equation.	**06**

OR

4.	a)	With a neat diagram, compare shell type and core type transformers.	**06**
	b)	A 25 kVA , single phase 11000/415V, 50Hz transformer has 80 turns on the secondary. Determine (i) the number of primary turns (ii) maximum value of core flux (iii) the rated primary & secondary currents.	**04**
	c)	Deduce the equation for armature torque of a DC motor.	**05**
	d)	Deduce the condition for maximum efficiency in single phase transformer.	**05**

MODULE-4

5.	a)	Discuss the important features of squirrel cage and phase wound rotor construction in an induction motor.	**07**
	b)	A three phase , 6 pole induction motor operates from 50 Hz supply. Compute (i) the speed of the revolving magnetic field produced by the stator (ii) estimate the number of poles in order to get a synchronous speed of 1500 rpm & also compute the rotor speed , if the motor operates at 3% slip.	**06**
	c)	Derive the expression for phase emf & line emf of a three-phase star connected alternator considering pitch factor & distribution factor.	**07**

OR

6.	a)	With sketches distinguish between salient pole & non salient pole alternators.	**07**
	b)	A three phase 50HZ,16 pole alternator with star connected armature winding has 144 slots with 10 conductors/slot.The flux /pole is 0.03 weber. Take winding factor of 0.96, Compute (i) Synchronous speed (ii) Phase emf and (iii) Line emf.	**06**
	c)	With the help of relevant phasor diagrams, explain when the three phase symmetrical supply is given to the stator winding of a three phase induction motor a revolving magnetic field is produced in the airgap.	**07**

MODULE-5

7.	a)	What is earthing? Why earthing is needed? With a neat sketch ,explain plate earthing method.	**08**
	b)	Explain the comparison between fuse and miniature circuit breaker.	**05**
	c)	Draw a single line diagram of a typical power supply system. Locate various sections of it and mention typical voltages of generation ,transmission and distribution.	**07**

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