U.S.N.										

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

Autonomous Institute Affiliated to VTU

May 2023 Semester End Main Examinations

Programme: B.E. **Semester: I**
Branch: Common to all Branches **Duration: 3 hrs.**
Course Code: 22EE1ESEEE **Max Marks: 100**
Course: ELEMENTS OF ELECTRICAL ENGINEERING **Date: 15.05.2023**

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

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

UNIT - I

1 a) Explain KCL and KVL with examples. **05**

b) Explain the construction and working of a DC machine. **08**

c) Find the current in all the branches of the network shown in figure:1. **07**

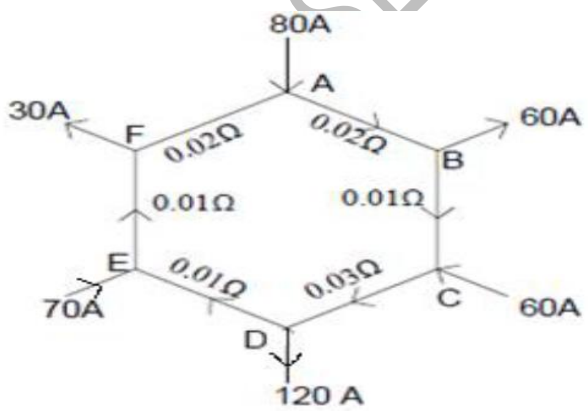

Figure : 1

OR

2 a) Determine the current supplied by each battery for the circuit shown, in the Figure:2 By using Kirchhoff's laws **08**

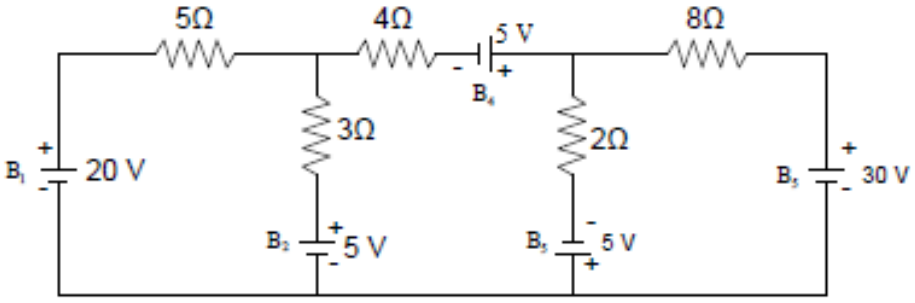

Figure : 2

b) A 4 Pole 250V, dc series motor has a wave-connected armature with 200 conductors. The flux per pole is 25mwb when the motor is taking 60A from the supply. The armature resistance is 0.15Ω, while series field winding resistance is 0.2Ω. Calculate the speed of the motor under this condition. **06**

c) Explain the N versus I_a characteristics of a DC shunt and DC series motor. **06**

UNIT - II

3 a) Derive the RMS and average of value of a sinusoidal alternating quantity and find out form factor for the same. **08**

b) An alternating voltage of (160 + j120) is applied to a circuit and the current is given by (6 + j8) A. Find the values of element of the circuit assuming 50Hz frequency, power factor of the circuit and power consumed. **06**

c) Define form factor, peak factor and frequency **06**

UNIT - III

4 a) Derive the relation between line voltage and phase voltage in star connected network and calculate the power. **08**

b) Three impedances each of 6 + *j*8Ω are connected in delta across 415V, 3φ, 50Hz ac supply. Determine (i) Line Current, (ii) Power factor, (iii) Active Power (P), (iv) Reactive Power (Q), (v) Apparent Power (S) **08**

c) Explain the advantages of three phase system over single phase system. **04**

UNIT - IV

5 a) Explain the concept of rotating magnetic field by considering 3 phase induction motor. **07**

b) Derive the EMF equation of a transformer. **05**

c) In a 25 kVA 2000V/200V, single phase transformer the iron and full load copper losses are 350W and 400W respectively. Calculate the efficiency at unity power factor on **08**
(i) Full Load
(ii) Half full Load

OR

6 a) Explain the construction and working of a single phase transformer. **08**

b) Define slip, rotor frequency and slip speed. **06**

c) The frequency of emf in the stator of a 3ϕ, 4 pole induction motor is 50Hz that in the rotor is 1.5Hz. What is the slip? At what speed the motor is running. Also determine synchronous speed. **06**

UNIT - V

7 a) With a neat sketch explain the necessity of earthing and explain plate earthing. **08**

b) Define fuse and its characteristics. **05**

c) With neat block diagram explain the working of Electric vehicle. **07**

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