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First/Second Semester B.E. Degree Examination, Jan./Feb. 2023
Basic Electrical Engineering

Time: 3 hrs.　　　　　　　　　　　　　　　　　　　　　　　Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1　a. State KCL and KVL. **(04 Marks)**
　b. Obtain an expression for average value in text of maximum value for alternative quantity. **(06 Marks)**
　c. Two coils are connection in parallel and a voltage of 200V is applied between the terminals. The total current taken is 25A and power dissipated in one of the resistor in 1500W. Find the resistance of two coils. **(10 Marks)**

OR

2　a. Define the i) BMS value　ii) Average value　iii) Form factor　iv) Peak factor. **(08 Marks)**
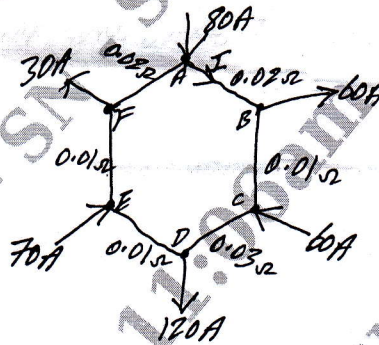　b. Find the current in all branches.

Fig Q2(b) **(12 Marks)**

Module-2

3　a. Prove that in a purely inductive circuit the current lags voltage by 90°. Also obtain equation for power consumed in it with the relevant phasor diagram. **(10 Marks)**
　b. Obtain the relationship between line and phase value of current and voltage in 3 phase balanced Delta connected system with relevant phasor diagram. **(10 Marks)**

OR

4　a. With circuit diagram and phasor diagram show that in a 3ϕ balanced circuit, two wattmeters are sufficient to measure the total 3ϕ power for star connected load. **(10 Marks)**
　b. A circuit consists of resistance of 10Ω, an inductance of 16mH and a capacitance of $150\mu f$ connected in series. A supply of 100V at 50Hz is given to circuit. Find the current pf, power by the circuit. **(10 Marks)**

Module-3

5　a. Derive the emf equation for single phase transformer. **(06 Marks)**
　b. Explain the necessity of Earthing? With neat diagram explain the pipe earthing. **(10 Marks)**
　c. Write the precaution to be taken to prevent electric shock. **(04 Marks)**

OR

6 a. Explain two way and three way control to lamp with truth table and connection diagram.
(10 Marks)

b. Write the different losses in transformer and how to minimize it? (05 Marks)

c. Find the efficiency of 150KVA 1-ϕ transformer at i) Full load, upf ii) 50% of full load, 0.8pf. If the copper loss at full load is 1500W and iron loss is 1200W. (05 Marks)

Module-4

7 a. Obtain an expression for emf generated in a DC generator. (06 Marks)

b. A 4 pole DC shunt motor takes 22A from 220V supply. The armature and field resistances are respectively 0.5Ω and 100Ω. The armature is lap connected with 300 conductors. If the flux per pole is 20mwb, calculate the speed and gross torque. (10 Marks)

c. What is back emf? State is significance? (04 Marks)

OR

8 a. Explain the various characteristics of dc series motors. Give two applications. (10 Marks)

b. Obtain the torque equation of DC motor. (06 Marks)

c. A 4 pole lap connected DC generator has 600 conduction and runs at 1200rpm if flux for pole 0.06wb. Calculate emf induced. Also find the speed at which it should drive to produce same emf when it is wave connected. (04 Marks)

Module-5

9 a. Explain with phasor diagram production of RMF in induction motor. (06 Marks)

b. Define slip? Obtain the relation between slip frequency and rotor frequency. (06 Marks)

c. The stator has 90 slots and 12 conductors per slot. The flux per pole is 0.5 wb. Calculate the time voltage generated by the machine if the winding factor is 0.97 and coil is full pitched.
(08 Marks)

OR

10 a. Distinguish between the types of synchronous generator with diagram. (10 Marks)

b. A 3 phase, 6 pole, 50Hz induction motor has a slip of 1% at no load and 3% at full load. Determine: i) synchronous speed ii) no load speed   iii) full load speed   iv) frequency of rotor current at stand still v) frequency of rotor current at full load. (06 Marks)

c. State the advantages of rotating field over rotating armature in Alternator. (04 Marks)

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