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First/ Second Semester B.E. Degree Examination, June/July 2015
Basic Electrical Engineering

Time: 3 hrs. Max. Marks:lab ite

Note: *Answer any FIVE full questions, selecting ONE full question from each part.*

PART-1

1 a. State and explain Faraday's laws of electromagnetic induction. (06 Marks)

b. An air cored solenoid has a length of 50 cm and a diameter cm. Calculate its inductances if it has 1000 turns and also find the energy stored in in Nie current rises from zero to 5A. (06 Marks)

c. If the total power dissipated in the circuit shown is 18W, c!'the value of 'R.' and its current. (08 Marks)

OA.

Fig.Q1(c)

2 a. State the following :
i) Fleming's right hand
ii) Fleming's left han (06 Marks)

b. A closed iron ring o diameter 12 cm is made from round iron bar of diameter 2 cm. It has a uniform wiie, of 1000 turns. Calculate the current required to produce a flux density of 1.5 wb/m^{2}ii:e. that relative permeability is 1250. Hence calculate the self inductance. (08 Marks)

c. What is ential difference between the point x and y in the network shown? (06 Marks)

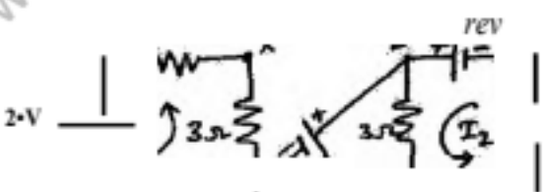

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Fig.Q2(c)

PART-2

3 a. Explain the characteristics of DC series motor with a neat diagram. (06 Marks)

b. Explain the significance of back emf in DC motor. (05 Marks)

c. 4 pole DC shunt motor takes 22.5A from a 250V supply, $R_a = 0.50$ and $R_{sh} = 1255$. The armature is wave wound with 300 conductors. If the flux per pole is 0.02wb. Calculate :
i) speed
ii) torque developed
iii) power developed. (09 Marks)

4 a. With a neat diagram, explain the construction and working of dynamo-meter type wattmeter. (06 Marks)

b. A 4 pole generator with wave wound armature has 51 slots, each having 24 conductors. The flux per pole is 0.01 wb. At what speed must the armature rotate to give an induced emf of 220V? What will be the voltage developed if the winding is lap and the armature rotates at the same speed. (10 Marks)

c. Explain with a diagram, the construction features of various parts of aDC generator. (04 Mael)

PART-3

5 a. What is meant by power factor in AC circuit? What is its significance in A C circ ? 46 Marks)

b. Draw and explain the wiring diagram for the 3 — way control of lamp. (06 Marks)

c. A series circuit with resistance of 10 S2, inductance of 0.2H and cap ice of 40 .tF is supplied with a 100 V supply at 50 Hz. Find the current, power ewer factor of the circuit. (08 Marks)

6 a. State form factor of an alternating quantity. Derive the expres sion for it. (08 Marks)

b. Show that the average power consumed in a pure ca 'tltnce is zero. Draw the neat waveform for voltage, current, power. (06 Marks)

c. With a neat diagram, explain pipe earthing. (06 Marks)

PARTN.,

7 a. With the usual notation, derive the expressioEg,rlsifF equation of an alternator. (06 Marks)

b. Establish the relationship between phase areiine values of voltage and currents in 3 phase delta connected circuit. Show the phas diagram neatly. (06 Marks)

c. A balanced star connected load o) Wphase is connected to 3 phase, 230V supply. Find the line current, power facto r reactive volt-ampere and total volt-ampere. (08 Marks)

8 a. Show that the power in a bal ..d 3 — phase circuit can be measured by 2 wattmeters. Draw the circuit and vector dia (08 Marks)

t. Explain the generation — phase AC voltage. (04 Marks)

c. A 3 — phase, 50 Hr, pole generator with star connected winding has 144 slots with conductor /slot i/32fllie flux per pole is 24.8 m wb is sinusiodally distributed. The coils are full pitched. ktiti-T i) speed ii) the line emf. (08 Marks)

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PART-5

9 a. Exp - e construction and working principle of a transformer with a neat sketch. (08 Marks)

b. E the concept of rotating magnetic field in a 34) induction motor. (06 Marks)

c. equency of the emf in the stator of a 4 pole induction motor is 50 Hz and in the rotor is 1.5 Hz. What is the slip and at what speed is the motor running? (06 Marks)

10 a. What is 'slip' in an induction motor? Explain why slip is never zero in an induction motor. (06 Marks)

b. A single phase transformer has 400 turns primary and 1000 secondary turns. The net cross — sectional area of the core is 60 cm^2. The primary winding is connected to a 500V, 50 Hz supply. Find :

i) Peak value of flux density

ii) emf induced in the secondary winding. (06 Marks)

c. The maximum efficiency at full load and unity p.f. of a single phase 25 KVA, 500/1000V, 50Hz transformer is 98%. Determine its efficiency at

i) 75% load, 0.9 p.f. and

ii) 50% load, 0.8 p.f. (08 Marks)

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