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**B.E. End Semester DEGREE EXAMINATION, MAY 2013**

Second Semester

Industrial Engineering

**EE8202 - FUNDAMENTALS OF ELECTRICAL ENGINEERING**

(REGULATION 2012)

Time : 3 Hours

Answer ALL Questions

Max. Marks: 100

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**PART A (10 x 2 = 20 Marks)**

1. Explain the term power factor in connection with ac circuits.
2. Define RMS Value.
3. What are the losses present in a three phase Induction Motor?
4. Why transformer is rated in KVA?
5. What are the advantages and disadvantages of squirrel cage Induction motor?
6. When a three phase supply system is called a balanced supply system?
7. A single phase transformer 2200/250V, 50 Hz transformer has a net core area of  $36 \text{ cm}^2$  and a maximum flux density of  $6 \text{ Wb/m}^2$ . Calculate the of turns of primary and secondary.
8. Compare moving coil and moving iron instruments based on any two salient features.
9. How can ammeter and voltmeter are connected in a circuit? Why?
10. What is the condition for maximum efficiency in d.c. generator and write the load current corresponding to maximum efficiency.

**PART B (5 x 16= 80 Marks)**

11. (i) Derive the EMF equation of the dc generator. (6 Marks)  
(ii) A compound generator is to supply a load of 250 lamps, each rated at 100W, 250V. The armature, series and shunt windings have windings have resistances of  $0.06 \Omega$ ,  $0.04 \Omega$  and  $50 \Omega$  respectively. Determine the generated e.m.f when the machine is connected in (i) long shunt (ii) short shunt. Take drop per brush as 1V. (10 Marks)
- 12 (a) With neat diagrams explain the working of two point and three point starters of dc motor. (16 Marks)  
(OR)  
12. (b) Find the currents in the Resistances R3, R4 and R5 in the Figure 1. (16 Marks)

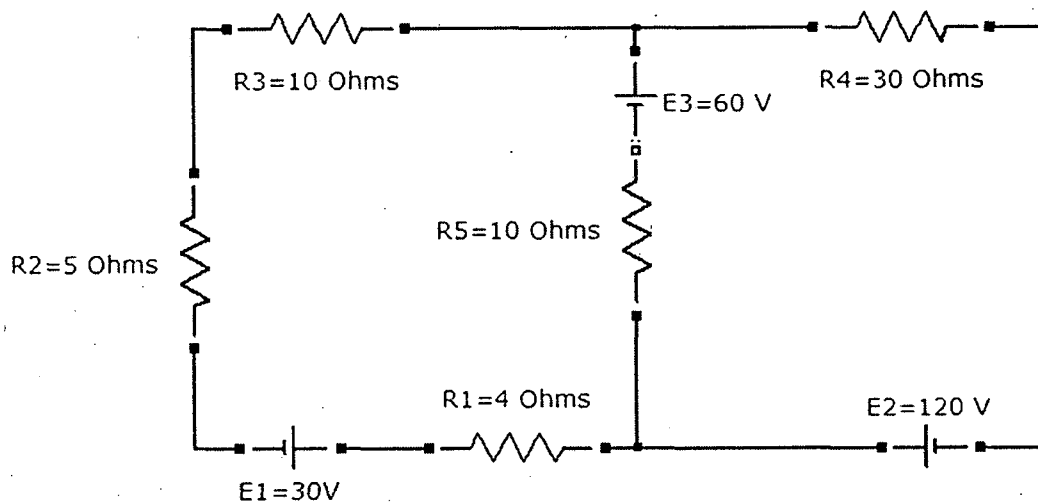


Figure 1.

13. (a) With a neat diagram, explain how the power in a balanced three phase circuit measured by a two wattmeter method, will be the sum of two wattmeter readings and verify it by deriving equation for a star connected load. Draw the Phasor diagram. (16 Marks)

(OR)

13. (b) (i) Derive the EMF equation of the transformers (8 Marks)  
(ii) In detail explain the Auto Transformers with necessary diagrams. (8 Marks)

14. (a) Explain the construction and principle of operation of three phase induction motor with neat diagram. (16 Marks)

(OR)

14. (b) Derive the torque equation of a three phase Induction motor and obtain the condition for maximum torque. Draw the Speed-Torque characteristics of a three phase Induction Motor. (16 Marks)

15. (a) Explain the construction working principle of using dynamometer type Wattmeter instrument with its advantages and disadvantages. Derive the Equation for deflecting torque. (16 Marks)

(OR)

15. (b) Write short notes on (i) Megger (8 Marks)  
(ii) Instrument transformers (CT & PT) (8 Marks)