Reg. No. :

Question Paper Code: 31032

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2015.

Third Semester

Electrical and Electronics Engineering

01UEE302 - DC MACHINES AND TRANSFORMERS

(Regulation 2013)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. What is hysteresis loss?

2. Define fringing effect in magnetic circuit.

3. What is critical resistance? How to find the critical resistance from magnetic characteristics?

4. What is inter poles? What is the role of it in DC generator?

5. Mention the types of DC compound motor.

6. Why DC shunt motor called as constant speed machine?

7. Mention the conditions for parallel operation of transformers.

8. Why transformer rating is mentioned in KVA?

9. Derive the expression for the condition of maximum efficiency of DC motor.

10. Compare direct and indirect test on machines.

11. (a) (i) Explain an expression for co-energy of multiply excited magnetic field systems with neat sketch. (12)

    (ii) Distinguish between magnetic and electric circuits. (4)

Or

(b) Describe the details of torque in wound rotor machine with relevant diagram. And also derive the expression of torque. (16)

12. (a) (i) A 4 pole generator supplies a current of 143 A. It has 492 armature conductors (A) wave wound (B) lap wound. When delivering full load, the brushes are given an actual lead of 10°. Calculate the demagnetizing amp-turns/pole. This field winding is shunt connected and takes $10A$. Find the number of extra shunt field turns necessary to neutralize this demagnetization. (6)

    (ii) Write short notes on commutation process take place in DC generator. (10)

Or

(b) What are the types of DC generator? Explain briefly the various types of DC generator with its characteristics. (16)

13. (a) Draw the diagram and explain the working of three point starter of a DC shunt motor. Also compare the three point and four point starters. (16)

Or

(b) (i) A 220 volt DC series motor is running at a speed of 800 rpm and draws 100A. Calculate at what speed the motor will run when developing half the torque. Total resistance of the armature and field is 0.1Ω. Assume that the magnetic circuit is unsaturated. (6)

    (ii) Explain the constructional features of DC motor with neat diagram. (10)

14. (a) (i) Derive the expression for the EMF equation of single phase transformer. (8)

    (ii) Two 100 kW single phase transformers are connected in parallel both on the primary and secondary. One transformer has on ohmic drop of 0.5% and an inductive drop of 8% at full load current. The other an ohmic drop of 0.75% and inductive drop of 2%. Show how they will share the load of 180kW at 0.9 power factor. (8)

31032

(b) Draw and explain the step by step procedure of approximate equivalent circuit of single phase transformer by equivalent resistance and reactance of transformer.   (16)

15. (a) Determine the open circuit and short circuit test on single phase transformer. From that explain how to calculate regulation and efficiency of transformer.   (16)

Or

(b) When running on no-load, a $400V$ shunt motor takes $5A$. Armature resistance is $0.5\,\Omega$ and field resistance of $200\,\Omega$. Find the output of the motor and efficiency when running at full load and taking a current of $50A$. Find the percentage of change in speed from no load to full load.   (16)

——————————