Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 18

B.Tech.(Electrical & Electronics Engg./Electronics & Electrical Engg.)
(2018 Batch) (Sem.–3)

ELECTRICAL MACHINES-I

Subject Code : BTEEE-303-18
M.Code : 76465

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

Write briefly :

1. Explain Fleming's right hand rule.
2. On what factors does the eddy current loss depend?
3. Explain the purpose of compensating winding in a dc machine.
4. Why is the pole shoe section of a dc machine made larger than its body?
5. Differentiate between dc shunt and series motor.
6. Explain open-circuit characteristics of a dc generator.
7. Define speed regulation.
8. Why stepped core section is preferred to a square section for transformers?
9. How is magnetic leakage reduced to a minimum in transformers?
10. List the information obtained from open and short circuit tests of a transformer.

SECTION-B

11. An iron ring of 20 cm mean diameter having a cross-section of 100 cm^2 is wound with 400 turns of wire. Calculate the exciting current required to establish a flux of 1 Wb/m^2, if the relative permeability of iron is 1000. What is the value of energy stored?

12. Derive the expression of emf in a dc machine.

13. Draw speed-torque characteristics of different types of dc motors and mention one application of each type.

14. In an autotransformer, the power transferred from primary to secondary circuit is partly by conduction and partly by induction. Explain.

15. What is meant by vector group of transformers? What are the distinguishing features of different groups?

SECTION-C

16. a) Explain linear commutation.

    b) A 4-pole generator has wave wound armature with 722 conductors, and it delivers 100 A on full load. If the brush lead is 8°, calculate the armature demagnetizing and cross-magnetizing ampere-turns per pole.

17. a) Explain the factors affecting the speed of the dc motor.

    b) A dc shunt motor having armature resistance of 0.4 Ω takes armature current of 20 A on full load and runs at 600 rpm. If resistance of 0.5 Ω is placed in the armature circuit, find the speed at half the full load torque. What is the ratio of stalling torque to full-load torque?

18. a) Deduce the expression for load shared two transformers connected in parallel having unequal turns ratio.

    b) The maximum efficiency 100 kVA, 50 Hz, single-phase transformer is 95% and occurs at 90% of full load at 0.85 pf. If the leakage impedance of transformer is 5%, find the voltage regulation at rated load 0.8 pf lagging.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.