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

Total No. of Questions : 09

B.Tech.(EE) (2018 Batch)   (Sem.–3)
ELECTRICAL MACHINES-I
Subject Code : BTEE-302-18
M.Code : 76383

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

1. **Write briefly :**

   (a) What is the magnetic field outside a solenoid? Explain.

   (b) Discuss the strength of magnetic field.

   (c) Discuss the relative permeability of ferromagnetic material.

   (d) What is commutation in DC machine?

   (e) Define armature reaction and its effect on main flux of DC machines.

   (f) What is Cumulative compound DC generator?

   (g) Write emf equation of DC generator.

   (h) How speed of the DC shunt motor can be increased?

   (i) What is ideal transformer?

   (j) Why open circuit test is carried out on single phase transformer?

SECTION-B

2. Draw the phasor diagram of the single phase transformer on load for

    (a) lagging power factor

    (b) leading power factor.

3. Discuss the polarity test of a single phase transformer with suitable circuit diagram.

4. A 400V DC shunt generator has a full load current of 200 A. The resistance of the armature and field windings are 0.06 Ω and 100 Ω respectively. The stray losses are 2000 W. Find the kW output of prime mover when it is delivering full load and find the load for which the efficiency of the generator is maximum.

5. Explain the torque speed characteristics of separately excited DC shunt motor.

6. Derive the torque equation of DC motor.

SECTION-C

7. (a) A 2200/220 V, 50 Hz single phase transfer has exciting current of 0.6 A and a core loss of 361 watts. When its H.V. side is energised at rated voltage. Calculate the two components of the exciting current.

    (b) If the transformer of part (a), supplies a load current of 60 A at 0.8 p.f. lag on its L.V side, then calculate the primary current and its power factor. Ignore leakage impedance drops.

8. A 24 kW, 250 V, 1600 rpm separately excited DC generator has armature circuit resistance of 0.1 Ohm. The machine is first run at rated speed and field current is adjusted to give an open circuit voltage of 260 V, Now, when the generator is loaded to deliver its rated current, the speed of the driving motor is found to be 1500 rpm. Compute the terminal voltage of the generator under these conditions. Field flux remains unaltered.

9. (a) Discuss the constructional details and principle of operation of autotransformer also compare with two winding transformer.

    (b) Discuss B-H curve of magnetic core material.

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.