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Total No. of Pages : 02

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**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****1. Write briefly :**

- (a) Explain Fleming's left hand rule.
- (b) On what factors does the hysteresis loss depend?
- (c) Explain the electrical connection of compensating winding between armature and why?
- (d) Explain the purpose of field winding in a dc machine.
- (e) Differentiate dc shunt and series generator?
- (f) Explain critical resistance of a dc series generator.
- (g) Why the motors are not operated to develop maximum power in practice?
- (h) Enumerate the advantages of sandwiched coils.
- (i) Why it is more difficult to cool a transformer than any other electrical machine?
- (j) List the information obtained from open and short circuit tests of a transformer.

**SECTION-B**

2. Two coils having 100 and 150 turns respectively are wound side by side on a closed iron circuit of section  $125 \text{ cm}^2$  and mean length 250 cm. If the permeability of iron is 2000, calculate
  - (a) self-inductance of each coil
  - (b) the mutual
  - (c) the emf induced in the second coil if current in the first changes from 0 to 5 A in 0.02 s.
3. Explain armature reaction in a dc machine.
4. Compare speed-torque characteristics of different types of dc motors.
5. Explain the function and operation of on-load tap changing transformers.
6. Explain with the help of connection and phasor diagrams, how a SCOTT connection is used to obtain two phase supply from three-phase supply.

**SECTION-C**

7.
  - (a) Explain the process of voltage build up in a dc shunt generator.
  - (b) An 8-pole lap wound armature rotated at 350 rpm is required to generate 260V. The useful flux per pole is about 0.05 Wb. If the armature has 120 slots, calculate a suitable number of conductors per slot and hence determine the actual flux required to generate the same voltage.
8.
  - (a) Derive the torque equation of a dc machine.
  - (b) A dc series motor drives a load, the torque of which varies as the square of speed. The motor takes a current of 15 A at 600 rpm. Calculate the speed and current when the motor field winding is shunted by a diverter of the same resistance as that of the field winding. Mention the assumptions made if any.
9.
  - (a) State the conditions to be fulfilled for operating two three-phase transformers in parallel. Also enumerate the advantages of parallel operation.
  - (b) A 100 kVA, 50 Hz, 440/11000 V, single-phase transformer has an efficiency of 98.5% when supplying full load current at 0.8 pf lagging and an efficiency of 99% when supplying half full load current at unity power factor. Find the core and copper loss corresponding to full load current. At what value of load current will the maximum efficiency be attained?

**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.**