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## B.Tech.(EE) PT (Sem.-1) TRANSFORMERS AND DIRECT CURRENT MACHINES Subject Code : BTEE-302 M.Code : 70972

Time: 3 Hrs.

Max. Marks : 60

## INSTRUCTION TO CANDIDATES :

- 1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- 2. SECTION B & C. have FOUR questions each.
- 3. Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.
- 4. Select atleast TWO questions from SECTION B & C.

## **SECTION-A**

#### 1. Answer briefly :

- a. How is energy transferred from one circuit to another in a transformer?
- b. What is voltage regulation? Explain.
- c. Why is it preferable to install two or more transformers in parallel than one large unit?
- d. What is the significance of a phasor diagram? Explain.
- e. Explain the principle of a DC generator.
- f. What are the various disadvantage(s) of three phase transformers? Discuss.
- g. What is meant by armature reaction? Explain.
- h. What do you mean by plugging? Explain.
- i. List the various causes of bad commutation.
- j. Discuss the significance of efficiency.



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### **SECTION-B**

2. A short circuit test, when performed on a high voltage side of a 10kVA, 2000/400V, single phase transformer gave the following data :

60V, 4A, 100 watts

If the low voltage side is delivering full load (or rated) current at 0.8 p.f. lag and at 400V, find the voltage applied to high voltage side.

- 3. Discuss the principle of operation and construction of an auto transformer. Also compare it with two winding transformer.
- 4. Derive the expressions for the emf and torque generated in a dc machine.
- 5. Explain the delta/delta connections of three phase transformers.

## **SECTION-C**

- 6. Describe the working of a three point starter for a DC shunt motor, with the help of a neat diagram.
- 7. a) The emf per turn for a single phase, 2310/220 V, 50 Hz transformer is approximately 13 V. Calculate :
  - i) The number of primary and secondary turns
  - ii) The net cross sectional area of the core, for a maximum flux density of 1.4 T.
  - b) List the various methods of improving the commutation. Explain any one of these in detail.
- 8. Discuss the following :
  - a) Hopkinson test
  - b) One method for speed control of DC motors
- 9. Discuss in detail the parallel connections of three phase transformer.

# 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.