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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(EE) PT (Sem.-1)

TRANSFORMER AND DIRECT CURRENT MACHINE

Subject Code : BTEE-302

Paper ID : [A2225]

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 Explain the principle of transformer.
- b What do you mean by voltage regulation? Explain.
- c Define an auto transformer.
- d Draw the phasor diagram of a transformer at no load.
- e List the various advantages of three phase transformers.
- f Explain the disadvantages of auto transformer.
- g Discuss the functions of a commutator in d.c. machines.
- h Explain the principle of working of a d.c. generator.
- i A dc motor fails to start when switched ON. What could be the possible reasons? Explain.
- j Explain why the e.m.f. generated in the armature of a dc motor is called back e.m.f.

SECTION-B

2. Describe a test on a single phase transformer that gives its core losses. Discuss the determination of equivalent circuit parameter which can be obtained from this test.
3. Discuss the principle of operation of an auto transformer. Also discuss its advantages over two winding transformer.
4. Explain the delta/delta connections of three phase transformers.
5. Derive an expression for the e.m.f. generated in a dc machine.

SECTION-C

6. Explain the armature control method for speed control of a dc motor.
7. Three 400kVA, 11,000/6600 V, 50 Hz single phase transformers gave the following data, when operated at rated current with their low voltage winding short circuited.

Transformer 1 360V, 3025 Watts

Transformer 2 400V, 3200 Watts

Transformer 3 480V, 3250 Watts

These three transformers are operating in parallel with their primary voltage held constant at 11kV.

- a) What is the greatest load at unity power factor that can be put on these three transformers in parallel without overloading any of them?
 - b) What is the secondary terminal voltage under the condition of part (a)
8. Two identical d.c. shunt machines were tested by Hopkinson's method, gave the following data:

Line voltage = 230V; Line current excluding both the field currents = 30A; motor armature current = 230A, field currents 5 A and 4 A.

If the armature resistance of each machine (including brushes) is 0.025 ohm, calculate efficiency of both machines.

9. Discuss the following :
 - a) Swinburn's test
 - b) Any one method for improving commutation