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

Total No. of Questions : 09

B.Tech.(EE) PT (Sem.–1)

TRANSFORMERS AND DIRECT CURRENT MACHINE

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

Q1. Answer briefly :

a) Give working principle of generator.

b) State Flemings left hand rule.

c) Why the core of a transformer is laminated?

d) What is armature reaction in dc machines?

e) Open circuit test is performed on which side and why?

f) Give the conditions required for build-up of voltage in shunt generator.

g) What are the applications of auto-transformers?

h) Define all day efficiency of transformer.

i) What is meant by regenerative breaking?

j) What is an open delta system?

SECTION-B

Q2. Draw and explain the equivalent circuit of transformer and hence draw phasor diagram of transformer for resistive loading.

Q3. The efficiency at unity power factor of a 250 KVA, 6600/440V transformer is 98% both at full load and half load. The power factor on no load is 0.2 and full load regulation at a lagging power factor of 0.8 is 4%.Calculate the equivalent circuit referred to 440V side.

Q4. A 200 KVA, 2500/250 V, 50 Hz, 2- winding transformer is used as an auto-transformer having a single winding in order to step up the voltage of a 2500 V to 2750 V. If the transformer has 3% loss on full-load 3.2% regulation and impedance of 4.3% as a 2-winding transformer, determine the following as an auto-transformer :

a) Voltage and current rating of each side b) KVA rating

c) Efficiency d) Regulation

Q5. a) Give the conditions for parallel operation of three phase transformer.

b) Draw the Scott connection of transformers and mark the terminals and turn ratio.

SECTION-C

Q6. Draw and explain the load circuit characteristics of shunt generator. Hence show that it is self protecting in nature.

Q7. a) Explain the process of commutation in dc machines and describe the methods to improve it.

b) A 4 pole 440V dc compound generator has an armature, series field and shunt field resistance of 0.5 ohm, 1.0 ohm and 200 ohm respectively. Calculate the generated voltage while delivering 40A to external circuit for both long shunt and short shunt connections.

Q8. A 230V DC shunt motor having field resistance of 230ohm and armature resistance of 0.5ohm has rated speed of 1600rpm.Find the value of resistance required to increase the speed by 25% and the resistance required to decrease the speed by 25%. Given the rated current drawn by motor is 21 amp.

Q9. The Hopkinson test on two shunt machines gave the following results for full load Line voltage 250V, line current 45A excluding field currents, motor armature Current 385A, field currents 5A ad 4.0A. Calculate the efficiency of each machine. Armature resistance of each machine 0.015 ohm.

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.