G 1538

(Pages : 3)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Fourth Semester

Branch : Electrical and Electronics Engineering

EE 010 402—DC MACHINES AND TRANSFORMERS (EE)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. What are the functions of interpoles in DC Machines ?
2. How is parallel operation of two series generators made possible ?
3. List out advantages and disadvantages of Swinburne's Test.
4. Give reason why core loss is neglected during SC test.
5. How is the problem of shifting neutral eliminated in star-star connection ?

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Explain the types of armature windings in DC machines.
7. Explain no load characteristics of DC shunt generator. What are the conditions for voltage built up ?
8. With operating characteristics. Compare the performance of shunt and series motors.
9. With phasor diagram, explain the operation of transformer when loaded.
10. Explain how three-phase to two-phase transformation can be accomplished using two transformers.

(5 × 5 = 25 marks)

Turn over

Part C

Answer **all** *questions.*
Each full question carries 12 *marks.*

11. (a) Explain Armature Reaction process in DC machines.

(b) A 6 pole lap wound generator having a commutator ring of diameter 45 cm. ru
1000 r.p.m. The brush width is 2 cm. and thickness of mica insulation is 0.2 cm. It de
115 A and the shunt field current is 5 A. The self inductance of armature coil is 0.1
Determine the reactance voltage of commutation is linear.

(6 m

Or

12. With neat sketches, explain the constructional details of DC generator. What are the functio
each part ?

13. (a) Explain the various losses in DC machines.

(b) A shunt generator has FL current of 196 A at 220 V. The stray losses are 720 W and the sh
field resistance is 55 Ω. It has FL efficiency of 88 %, find the armature resistance. Also
the load current corresponding to maximum efficiency.

(6 ma

Or

14. (a) Explain the load characteristics of shunt generator.

(b) Two shunt generator are operating in parallel. The emf induced in one machine is 260 V a
that induced in other machine is 270 V. The total load current supplied is 1800 A. If ea
machine has an armature resistance of 0.04 Ω and field resistance 50 Ω, determine (i) Termi
voltage ; (ii) Output of each machine.

(6 mar

15. (a) With neat sketch, explain the working of three point starter.

(6 mark

(b) A 4 pole 500 V shunt motor takes 7A on no load, the no load speed being 750 r.p.m. It h
shunt field current of 2 A. Calculate the full-load speed if it takes 122 A on full-load. Armatu
resistance = 0.2 Ω. Contact drop/brush = 1 V. Armature reaction weakens the field by 4 % o
full-load.

(6 mark

Or

16. (a) Explain the various methods of speed control in DC series motors.

(6 marks

(b) Brake test on a DC shunt motor gave the following results-supply voltage = 240 V, Armatur
current = 35 A. Field current = 5 A. Tension of the two sides of the brake = 60 kgf and 15 kgf
Diameter of brake pulley = 35 cm., speed = 1000 r.p.m. Determine the output torque, HP
output and efficiency.

(6 marks)

17. (a) Explain how efficiency of transformer can be predetermine from Sumpner's test. (6 marks)

(b) Two single-phase transformer with equal turns have impedance of $(0.5 + j3)\ \Omega$ and $(0.6 + j\ 10)\ \Omega$ with respect to secondary. If they operate in parallel, determine how they will share total load of 100 kW at 0.8 pf lagging.

(6 marks)

Or

18. (a) Explain the parallel operation of two single-phase transformers. (6 marks)

(b) A 100 kVA, 6600/330 V, single-phase transformer took 10 A and 436 W at 100 V in SC test with LV shorted. Calculate the approximate voltage drop referred to secondary and the secondary terminal voltage at full load, 0.8 pf lag when primary is connected to 6600 V supply.

(6 marks)

19. Describe in detail, the four phasor groups in three-phase transformer connections. Draw the phasor diagrams and connection schemes for each of these four groups.

Or

20. (a) Explain all day efficiency and how is it determined. (6 marks)

(b) A 500 kVA, three-phase transformer has line voltages 33/11 kV and is delta/star connected. The iron loss is 3 kW. The resistances per phase are 35 Ω and 0.9 Ω on HV side and LV side. Calculate the efficiency of the transformer at 3/4 full-load, 0.8 pf.

(6 marks)

[5 × 12 = 60 marks]