

Total No. of Printed Pages:02

SUBJECT CODE NO: H-330
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (EEP/EE/EEE)
Transformers & DC Machines
(OLD)

[Time: Three Hours]

[Max. Marks: 80]

N.B Please check whether you have got the right question paper.

- i) Q. No. 1 and Q. No. 6 are compulsory.
 ii) Solve any two questions from Q.2 to Q.5.
 iii) Solve any two questions from Q.7 to Q.10.
 iv) Assume suitable data wherever necessary

Section A

- Q.1 Attempt the following (any five) 10
1. State the working principle of transformer.
 2. Why core of transformer is laminated?
 3. What are the losses in transformer? How do they vary with load?
 4. The maximum flux density in the core of 250/3000 volts, 50 Hz single phase transformer is 1.2 tesla if the emf per turn is 8 volts determine primary and secondary turns.
 5. In a 25KVA, 2000/200v, single phase transformer the iron and full load copper losses are 350 watt and 400 watt respectively. Calculate efficiency at full load 0.8 lagging power factor.
 6. Why it is necessary to connect two transformers in parallel?
 7. State the applications of stepper motor.
 8. Define regulation of transformer? What should be the Ideal value of regulation?
- Q.2 05
- a) Derive the emf equation of single phase transformer. 05
 - b) Explain the working of transformer with phasor diagram on load. 05
 - c) A 230/460 volt Transformer has primary resistance of 0.2Ω and reactance of 0.5Ω and corresponding 05 values for secondary are 0.75Ω and 1.8Ω respectively. Find the secondary terminal voltage when supplying 10Amp at 0.8 Pf lagging. 05
- Q.3 05
- a) Explain with diagram open circuit and short circuit test performed on single phase Transformer. 05
 - b) Derive the condition for maximum efficiency of transformer. 05
 - c) For 20KVA, 2200/200 volt, 50Hz transformer. The O.C. and S.C. test results are as follows 05
 O.C. test : 220v , 4.2A, 148watt (l.v.side).
 S.C. test: 86v, 10.5A, 360watt (h.v.side).
 Determine the regulation at 0.8Pf lagging and at full load
- Q.4 08
- a) Explain construction and working of any one type of stepper motor. 08
 - b) Explain construction and working of PMDC motor. 07
- Q.5 Explain the following (any three) 15
- a) Auto transformer
 - b) Scott connection
 - c) Three winding transformer

- d) PMDC motor
- e) D.C. servo motor

Section B

Q.6 Attempt any five

10

- a) Enlist the different types of D.C. generator
- b) Give the function of yoke and pole shoes in D.C. generator
- c) Why D.C. series motor never started on no load?
- d) What is the function of commutator in DC machine?
- e) Enlist the various losses occurring in D.C. machine
- f) A 4-pole d.c shunt generator has wave wound armature with 792 conductors the flux per pole is 0.0121 wb. Determine the speed at which it should run to generate 240v on no load
- g) What do you mean by armature reaction?
- h) Why D.C. shunt motor called as constant speed motor?

- Q.7
- a) Explain with neat diagram compunction of D.C machine. 05
 - b) Derive emf equation of D.C. generator. 05
 - c) An 8 pole d.c. shunt generator with 778 waves. Connected armature conductor and running at 500rpm. Supplies a load of 12.5 Kw resistances at terminal voltage of 250 volts the armature resistance is 0.24Ω and field resistance is 250Ω . Find armature current induced emf and flux per pole. 05

- Q.8
- a) What are the different motor characteristics? Draw and explain them for D.C. shunt motor. Write its application. 09
 - b) A D.C series motor having a resistance of 1 ohm between terminals, runs at a speed of 800 rpm at 200v with a current of 15A. Find the speed at which it will run when connected in series with a 5 ohms resistance taking the same current at the same supply voltage. 06

- Q.9
- a) Draw and explain the torque armature current, speed armature current and speed torque characteristics of D.C series motor. 05
 - b) Explain various speed control methods of D.C shunt motor. 05
 - c) A 250 volts D.c shunt motor has armature resistance of 0.2 ohm on load it takes an armature current of 50A and runs at 750rpm if the flux of motor is reduced by 10% without changing the load torque find the new speed of motor. 05

Q.10 Attempt any three

15

1. Three point starter
2. Swinburne test
3. Armature windings in D.C machine
4. Solid state starter
5. Parallel operation of D.C generator