

SUBJECT CODE NO:- P-45
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(EEP/EE/EEE) Examination May/June 2017
Transformers & DC Machines
(Revised)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

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

Section A

- Q.1 Attempt any five 10
- a) Why rating of transformer in KVA.
 - b) Write two comparisons of core and shell type transformer.
 - c) What are the losses in transformer?
 - d) Why parallel operation of transformer is necessary.
 - e) What is Ideal transformer? Draw it's no load phasor diagram.
 - f) Why efficiency of transformer is maximum in comparison with all electrical machines.
 - g) A 2200 v/220v transformer takes 0.5A. at pf of 0.3 on open circuit. Find magnetizing and active component of no load primary current.
 - h) Give two applications of stepper motor.
- Q.2 05
- a) Draw a complete phasor diagram for a transformer when the load power factor is lagging. 05
 - b) Discuss the procedure for conducting O.C and S.C test on single phase transformer. 05
 - c) A 10 KVA, 500 V/ 250V, 50 HZ, 1 – phase transformer has net area of cross section 90cm^2 and maximum flux density is 1.2 Tesla. Calculate the no of turns on both primary and secondary winding. 05
- Q.3 05
- a) Explain the construction details of – 3 – phase transformer with neat diagram. 05
 - b) Discuss the conditions to be full filled for operating two three phase transformers in parallel. 05
 - c) A transformer is rated at 100 KVA at full load its copper loss is 1200 watt and its iron loss is 960 watt: calculate 05
 - i. Efficiency at half load, unity power factor
 - ii. Efficiency at half load, 0- 8 power factor
- Q.4 05
- a) Explain construction and operating principle of brushless D.C motor 05
 - b) Explain construction and working principle of PMDC motor. 05
 - c) Explain the operation of D.C servo motor. 05
- Q.5 Attempt any three 15
- i. Open delta or V.V connection & transformer
 - ii. Scott connection
 - iii. Phasor groups & transformer as per clock notation
 - iv. Tertiary winding

v. Three winding transformer.

Section B

- Q.6 Solve any five 10
- a) What is working principle of D.C generator?
 - b) What is the function of yoke in D.C machine?
 - c) What is the significance of back emf?
 - d) Why D.C shunt motors called as constant speed motors.
 - e) A supply voltage of D.C shunt motor is 120V and back emf is 110V. and armature resistance is 0.4Ω what is current drawn by motor?
 - f) Why starter is necessary for starting D.C motor.
 - g) What is function of commutator in D.C machine.
 - h) Suggest the P.C motor for following application.
 - i. Lathe machine
 - ii. Lift
 - iii. Crane
 - iv. Rolling industries
- Q.7 05
- a) Draw section of four pole D.C machine and write function of each part. 05
 - b) Derive emf equation of D.C generator. 05
 - c) A 4 pole D.C shunt generator with lap connected armature has field and armature resistance of 80Ω and 0.1Ω resp. It supplies power to 50 lamps, rated to 100 volts, 60 watt each. Calculate total armature current and generated emf. by allowing a brush drop of 1 volt per brush. 05
- Q.8 05
- a) Explain the process of voltage buildup in D.C shunt generator. 05
 - b) Draw and explain external characteristics of shunt and services generator. 05
 - c) Explain with dia speed control methods of D.C shunt motor. 05
- Q.9 05
- a) Derive torque equation of DC. Motor. 05
 - b) Explain and draw the various characteristics of D.C shunt motor. 05
 - c) A 220 V shunt motor takes 5A on no load and is running at 800 rpm. The resistance of armature and shunt field are 0.25Ω and 110Ω respt. Determine speed of motor when loaded and takes 40Amp. From the supply. 05
- Q.10 Attempt any three. 15
- i. Three point starter
 - ii. Interpoles and compensating winding
 - iii. Losses in D.C machines.
 - iv. Swinburne test
 - v. Solid state starter