

Notes: Answer only five questions except last question compulsory answer ..

Q1. A 4-pole dc short compound generator wave winding has (206) turns in armature, terminal voltage (400) v, . When load current is 50 A, armature resistance of (0.1)  $\Omega$ . series resistance of (0.1)  $\Omega$  and field resistance (40)  $\Omega$  ,flux per pole  $\Phi = 0.1$  wb .Find the a . EMF of generator. b. The speed at which running the generator c. Output power. d. Useful torque. (20marks)

Q2 Q2 DC shunt motor  $v=400V$ ,  $R_a=1.2\Omega$ ,  $R_f=400\Omega$ , at no load current is  $I_o=4A$ , speed=1000R.P.M. What is speed when full load current=26A.

1. if added resistance=2.3  $\Omega$  in series with armature. 2. added  $R=80$  to  $R_f$ .
  2. decrease in field current 10% for case 1 .
- (20 Marks)

Q3. A 110v battery is connected to the same bus-bar as a d.c generator. Battery resistance is 0.025  $\Omega$  and generator resistance is 0.1  $\Omega$ . The battery current is zero when load current is 100A. Find the generator output when: 1. Load current 50A. 2. Load current is 100A. (20 Marks)

Q4. A 10 KVA single phase transformer has maximum efficiency of (98%) at (3/4) full-load and power factor (0.8). Find all day Efficiency if the transformer loaded as a following:

- a. 4 hours at (2.5)KVA. b. 8 hours at (5)KVA . c. 6 hours at (7.5)KVA . d. 6 hours at (10)KVA . All cases at p. f = 0.8.
- (20mark)

Q5. A 4-pole, 250V, 50Hz single phase induction motor has rotor frequency 2 Hz, in starting has following parameters: main winding  $R_m=2\Omega$  ,  $X_m=4\Omega$  and starting winding :  $R_s=4\Omega$  ,  $X_{Ls}=2\Omega$  , capacitance of capacitor is= 398 $\mu F$  .

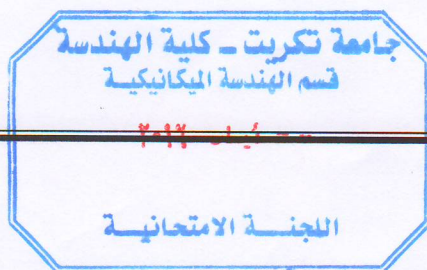
Find : speed of motor,  $I_m$  ,  $I_s$  ,  $\theta_m$   $\theta_s$ ,  $\alpha$  and p.f. (20mark)

Q6. Answer following: (20mark)

1. Compare between squirrel cage rotor and slip ring rotor in induction machines.
2. Explain briefly shaded pole motor.
3. Compare between salient pole and cylindrical pole in synchronous machines.
4. how can start synchronous motor?
5. Plot the curve torque-speed of three operating mode of three phase induction motor and indicate  $N_s$ ,  $N_r$ ,  $S$  for each case.

Lecturer

Kamil J. Ali



Head of Dept.

Dr. Hameed J. Khalaf