

SE (ETRX) Sem IV EM 16/6/2014
(CBGS)
QP Code : NP-19871

Duration 3 Hours

Total marks assigned to the paper- 60

- N.B. 1. Question No. 1 is compulsory
2. Solve any three out of remaining five questions
3. Figures on right indicate full marks
4. Assume suitable data, if necessary.

Q1) solve any three

[15]

- a) The armature of d.c. generator has 81 slots and the commutator has 243 segments. It is wound to give lap winding having 1 turn per coil. If the flux per pole is 30 mwb, calculate the generated emf, at a speed of 1200 r.p.m. number of poles is 6.
- b) Explain the necessity of starter in D.C. motor.
- c) What is slip in induction motor? If a 6 pole 3 phase induction motor is connected to 50 Hz supply. If it is running at 970 r.p.m. find the slip.
- d) Which are the methods employed to make the single phase induction motor self-starting.
- e) State the application areas of brushless d.c. motor.
- f) Calculate the stepping angle for 1. A 3 phase, 16 tooth rotor variable reluctance motor.
2. A 3 phase, 24 pole variable reluctance.

Q2) a) Explain with neat sketches the armature reaction in d.c. machine.

[7]

b) A 240 V d.c. shunt motor runs at 800 r.p.m. And takes armature current of 2A. Find the resistance required in series with the shunt winding so that the motor may run at 950 r.p.m. when taking an armature current of 28A. Assume flux is proportional to field current. Shunt field resistance is 160Ω , armature resistance is 0.4Ω .

[8]

[TURN OVER

Q3) a) the power input to a 6 pole, 3 phase, 50 Hz induction motor is 42 KW, the speed is 970 r.p.m. the stator losses are 1.2 KW and the friction and windage losses are 1.8 KW. Find 1. The slip 2. The rotor copper loss 3. The b.h.p. and 4. The efficiency. [8]

b) Explain different starting methods of 3 phase induction motor. [7]

Q4) a) A 2 pole, 240V, 50 Hz, single phase induction motor has following constants referred to the stator

$$R_1 = 2.2\Omega, X_1 = 3.0\Omega, R_2' = 3.8\Omega, X_2' = 2.1\Omega, \text{ and } X_m = 86\Omega.$$

Find the stator current and input power when the motor is operating at a full load speed of 2820 r.p.m. [8]

b) Explain the double field revolving theory in single phase induction motor. [7]

Q5) a) Explain construction, working and operation of switched reluctance motor with its advantages. [8]

b) Explain construction and operation of variable reluctance stepper motor. [7]

Q6) a) State the advantages of brushless d.c. motor and explain any one brushless d.c. motor [7]

b) Explain working principle of 3 phase induction motor and how the rotating magnetic field is produced in 3 phase induction motor. [8]