Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (EE) PT (Sem.–3)

ASYNCHRONOUS MACHINES

Subject Code : BTEE-401

M.Code : 72163

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt ANY FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt ANY TWO questions.**

SECTION-A

Answer briefly :

1) Why does an induction motor never run on synchronous speed?

2) What will the effect on torque developed by an induction motor if applied voltage is reduced to half with frequency unchanged?

3) Define Crawling in 3-phase Induction machines.

4) Why single phase motor is not self-starting?

5) Explain in brief the voltage build-up of an isolated induction generator.

6) What is universal motor?

7) A 3-phase slip ring induction motor runs at 290 r.p.m. at full load, when connected to 50 Hz supply. Calculate the number of poles, slip and slip frequency.

8) How can we increase the starting torque of an induction motor?

9) What is the need of excitation for induction generator?

10) Write two advantages of slip ring Induction motor over squirrel cage Induction Motor.

SECTION-B

11) A 746 kW, three phase, 50 Hz, 16 poles IM has rotor impedance of (0.02 + 0.15j) at standstill. Full load torque is obtained at 360 rpm. Calculate :

   a) Ratio of maximum to full load torque.

   b) The speed of maximum torque.

   c) The rotor resistance to be added to get maximum starting torque.

12) Describe the constructional features and principle of operation of a linear induction motor.

13) Describe constructional features and operating characteristics of capacitor start motor.

14) Name various methods of speed control of 3-phase cage rotor and wound rotor induction motor. Discuss any one of the method.

15) What is induction generator? Discuss its principle of operation. What are its limitations?

SECTION-C

16) a) A 4-pole, 50 Hz induction motor is to be used as a frequency changer. Find the motor speed, so as to give an output frequency of (a) 5 Hz (b) 80 Hz.

   b) The rotor resistance and standstill reactance/phase of a 3 phase slip ring induction motor are 0.05 ohm and 0.2 ohm respectively. What should be the value of external resistance per phase to be inserted in the rotor circuit to give maximum torque at starting?

17) a) Explain characteristics of 3 phase self excited induction generator.

   b) Prove that in 3-phase induction motor the ratio of maximum torque to starting torque is (1 + k2)/2k, where k is the ratio of rotor resistance to rotor reactance. Neglect stator impedance.

18) Write a technical notes on :

   a) Double field revolving theory

   b) Stepper Motor

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.