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Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (EE) (2012 Onwards)/(Electrical & Electronics)(2011 & 2012 Batch)/(Electrical Engineering & Industrial Control)(2012 to 2017)/(Electronics & Electrical)(2012 Batch) (Sem.-4)

ASYNCHRONOUS MACHINES

Subject Code : BTEE-401

M.Code : 57104

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS 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. "The rotating fields of the stator and rotor are stationary with respect to each other". Justify the statement.
2. Why is the efficiency of a 3-phase induction motor less than that of a 3-phase transformer?
3. Explain the function of two stator windings in a single-phase induction motor.
4. Draw the neat diagrams of single-phase capacitor-start capacitor-run induction motor.
5. Name the four types of starters used for 3-phase induction motor.
6. Why does a 3-phase induction motor always run at a speed less than the synchronous speed?
7. What is the effect of introducing resistance in the rotor circuit of a 3-phase induction motor?
8. State the condition for maximum torque in a 3-phase induction motor.
9. A voltmeter gives 120 oscillations per minute when connected to the rotor of an induction motor. Find the slip of the motor. The stator frequency is 50 Hz.
10. In case of induction motors, explain why the air gap length is kept as small as is mechanically possible?

SECTION-B

11. Derive the condition for maximum torque in a 3-phase induction motor.
12. Explain the principle of operation of a self-excited 3-phase induction generator. Give the condition under which this generator may fail to build-up.
13. When main winding of a single-phase induction motor is connected to 200 V, 50 Hz source, it takes a current 50 A at an angle of -60° at standstill position. Find the rotor circuit parameters. Neglecting stator leakage impedance and magnetizing current.
14. Explain how the speed of a 3-phase induction motor can be controlled by injecting a voltage in the rotor circuit of 3-phase induction motor.
15. Describe the construction and working of universal motor.

SECTION-C

16. Explain how the stationary, pulsating m.m.f. wave of a single phase induction motor can be considered as equivalent to two equal but oppositely rotating m.m.f. waves.
17. Describe the constructional features and working of a single-stack 3-phase 6/4-pole variable reluctance stepping motor.
18. The starting torque of 100 Nm is developed in a 3-phase squirrel-cage induction motor by an auto-transformer starter with a tapping 40%. Find the starting torque, if the tapping of the auto-transformer is changed to 80%.

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.