

Please check that this question paper contains 9 questions and 2 printed pages within first ten

[Total No. of Questions: 09]

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Uni. Roll No. ....

Program: B.Tech. (Batch 2018 onward)

Semester: IV

Name of Subject: Electrical Machines-II (ASM)

Subject Code: PCEE-106

Paper ID: 16187

Scientific calculator is Allowed

Detail of allowed codes/charts/tables etc.-Nil

Time Allowed: 03 Hours

Max. Marks: 60

NOTE:

- 1) Parts A and B are compulsory
- 2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice
- 3) Any missing data may be assumed appropriately

**Part – A**

**[Marks: 02 each]**

Q1.

- a) List two applications of induction generator.
- b) Outline the need of parallel operation.
- c) Illustrate the advantages of short pitch winding
- d) Interpret the reason of slip of an induction motor being always less than unity.
- e) A 3phase 6 pole 50Hz induction motor has a slip of 3% at full load. Determine synchronous speed and rotor current frequency at full load.
- f) Evaluate the condition for maximum running torque of induction motor.

**Part – B**

**[Marks: 04 each]**

Q2. Describe the working of high torque cage motors.

Q3. Explain why single phase induction motor is inherently not self-starting. Explain any one single phase induction motor working principle, characteristics and application.

Q4. Summarize the torque slip characteristics of induction machines.

- Q5. Explain armature reaction. Explain the effect of armature reaction on the terminal voltage of an alternator at zero leading pf.
- Q6. A 6 pole 3 phase 50Hz induction motor runs on the full load with a slip of 4%. The rotor standstill impedance per phase is  $(0.01 + j0.05)$  ohm. Determine the available maximum torque to full load torque ratio and also speed at which maximum torque occurs.
- Q7. Examine how load is shared between two alternators with identical speed load characteristics.

**Part – C**

**[Marks: 12 each]**

- Q8. Explain constructional features of synchronous machine. List down advantages of rotating field alternator.

OR

Compare cage and wound 3 phase induction motor with reference to construction, performance and applications.

- Q9. a) A 3-phase, 16pole synchronous generator has a flux of 0.06Wb per pole distributed sinusoidally. The stator has 2 slots per pole per phase and 4 conductors per slot are accommodated in two layers. The coil span is  $150^\circ$  electrical. Determine line and phase induced voltages when machine runs at 375rpm.
- b) The three phase star connected alternator is rated at 1500kVA, 11kV. The armature effective resistance and synchronous reactance are 1.2ohm and 24ohm per phase respectively. Calculate the percentage regulation for a load of 1200kW at 0.8 leading pf.

OR

A 3phase 4 pole, 50Hz induction motor at standstill has 120V induced across its star connected terminals. The rotor resistance and standstill reactance per phase are 0.2ohm and 1.0ohm respectively. Examine the speed when the rotor is drawing a current of 16A at a particular load. Also calculate the speed at which the torque is maximum and the corresponding value of rotor input

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