

Please check that this question paper contains 09 questions and 02 printed pages within first ten minutes.

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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

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) Summarize the conditions for parallel operation of three phase alternators.
- b) What are the causes of transients?
- c) Compare the salient pole and cylindrical rotors.
- d) Construct the characteristics of capacitor start capacitor run induction motor.
- e) The frequency of the emf in the stator of a 4pole induction motor is 50Hz and that in the rotor is 1.5Hz. Determine slip and synchronous speed.
- f) Evaluate the winding factor for a 36slot, 4pole, 3phase winding. Winding is full pitched.

Part – B

[Marks: 04 each]

- Q2. Explain the phenomena of crawling and cogging.
- Q3. Construct torque slip characteristics of an induction machine.
- Q4. Explain two bright and one dark lamp method for synchronizing of alternators.
- Q5. Show power angle characteristics of salient pole synchronous machine.
- Q6. Explain phasor diagram of alternator lagging power factor.
- Q7. A 3phase 4 pole 1440rpm, 50Hz induction motor has a star connected rotor winding having a resistance of 0.2ohm per phase and standstill leakage reactance of 1ohm per phase. When the stator is energised at rated voltage and frequency, the rotor induced

emf at standstill is 120V per phase. Deduct rotor current and rotor power factor both at starting and at full load.

## Part – C

[Marks: 12 each]

- Q8. Demonstrate with the help of double field revolving theory, that the starting torque of single phase induction motor is zero. Also explain the working principle and applications of shaded pole induction motor.

OR

Explain the construction and working principle of three phase induction motor with the help of neat sketches. Also develop the equivalent circuit for the same.

- Q9. The data obtained on 100kVA, 1100V, 3 phase alternator is  
 DC resistance test,  $E$  between line = 6Vdc,  $I$  in lines = 10A dc.  
 Open circuit test, Field current = 12.5A dc, Line voltage = 420V ac  
 Short circuit test, Field current = 12.5A dc, Line current = rated value. Calculate the voltage regulation of alternator at 0.8 lagging and 0.8 leading power factor if alternator is star connected.

OR

- a) A 4pole 50Hz star connected alternator has a flux per pole of 0.12Wb. It has 4 slots per pole per phase, conductors per slot being 4. If the winding coil span is  $150^\circ$ . Conclude the line emf. (6marks)
- b) 2 generators operate in parallel on a load impedance of  $Z$  ohms. Their emfs are  $E_1$  and  $E_2$  and synchronous impedances are  $Z_1$  and  $Z_2$ . Derive terminal voltage in terms of emfs and admittance  $Y_1$  and  $Y_2$  when load is shared between them. (6marks)

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