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**SUBJECT CODE NO:- H-139**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**S.E. (EEP/EE/EEE)**  
**AC Machines**  
**(REVISED)**

[Time: Three Hours]

[Max. Marks: 80]

Please check whether you have got the right question paper.

- N.B
1. Question no 1 & Question no 6 are compulsory.
  2. Attempt from each section any two questions from remaining questions.
  3. Assume suitable data whenever necessary.

**Section A**

- Q.1 Solve any five questions of the following. 10
1. Why can not 3 ph Induction motor run at synchronous speed
  2. Define the term crawling.
  3. Why does slip vary with the load?
  4. State different methods of speed control of 3 phase Induction motor
  5. A6 pole alternator running at 1000 rpm supplies an 8 pole induction motor. Find the actual speed of motor if the slip is 2.5%
  6. Slots of rotor of induction motor skewed why?
  7. What is the function of centrifugal starting switch in single phase induction motor
  8. What is difference between squirrel cage rotor and wound rotor
- Q.2 a) Draw and explain the torque slip characteristics of 3phase Induction motor 07
- b) 440 v, 3phase,50HZ star connected induction motor has a full load speed of 1425 RPM, rotor has a impedance of  $(0.4+j4)\Omega$  per phase and rotor/stator turn ratio is 0.8, calculate 08
- (1) Full load torque
  - (2) Rotor current
  - (3) Full load rotor copper loss.
- Q.3 a) Explain the working of star delta starter for 3phase I m. 07
- b) Draw the equivalent circuit of double cage Induction motor and describe all parameters 08
- Q.4 a) Explain in detail the principal of operation of single phase capacitor start, capacitor run motor with phasor diagram. 07
- b) Derive the torque equation of three phase induction motor 08
- Q.5 Write a short note on 15
- 1) A.C. servo meter
  - 2) Speed control of Induction motor by pole charging
  - 3) Repulsion motor

## Section B

- Q.6 Solve any five questions of following 10
- 1) Enlist the different methods of excitation system of alternator.
  - 2) What are advantages of short pitched windings in an alternator?
  - 3) What is meant by pull out torque?
  - 4) Write two differences between salient pole and smooth cylindrical rotor
  - 5) 3 phase, 50 HZ, star connected alternator has 180 conductor per phase and flux per pole is 0.0543wb, find EMF generated per phase and emf generated between line terminals.  
Assumptions-winding to be full pitched and Distribution factor to be 0.96
  - 6) What are the advantages of synchronous motor?
  - 7) What is meant by phase spread?
  - 8) What is pitch factor?
- Q.7 a) Explain the zero power factor method for obtaining voltage regulation in an alternator 07
- b) Derive an EMF equation of alternator 08
- Q.8 a) What is synchronous condenser and explain its role in power factor improvement 07
- b) A 3 phase 11kv, 5 MVA, star connected alternator has a synchronous impedance of  $(1+j10)\Omega$  Per phase its excitation is such that line EMF is 14kv, The alternator is connected to Infinite bus bar. Determine its maximum output at given excitation when
- (1) armature resistance is neglected
  - (2) armature resistance is considered
- 08
- Q.9 a) Explain the construction and working of synchronous motor 07
- b) Explain effect of charging field excitation at constant load with the help of phasor diagrams in synchronous motors 08
- Q.10 Write short note on 15
- 1) Armature reaction and its effects
  - 2) Effects of harmonics on pitch factor and distribution factor
  - 3) Method of synchronising the 3phase alternator