

B.E. Electrical (Electronics & Power) Engineering (Model Curriculum) Semester - IV
SE203 - Electrical Machines-II

P. Pages : 2

Time : Three Hours



GUG/S/23/13858

Max. Marks : 80

- Notes :
1. All questions carry equal marks.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Assume suitable data wherever necessary.
 4. Illustrate your answers wherever necessary with the help of neat sketches.
 5. Use of slide rule, Logarithmic tables, Steam tables, Mollier's chart, Drawing instruments, Thermodynamic tables for moist air, Psychrometric charts and Refrigeration charts is permitted.

1. a) Write short notes on: 8
- | | |
|---------------------------|--------------------------|
| i) Short Pitch Coils | ii) Full Pitch coils |
| iii) Concentrated Winding | iv) Distributed Windings |
- b) A 3-phase, 50Hz, 750rpm, Y-connected alternator has flux per pole of 45mwb, sinusoidally distributed. If number of slots per phase are 32 & coil span of 10 slots for single layer winding then calculate the line value of induced emf. Take turns/coil = 8 Also calculate the pitch factor & distribution factor for third harmonic. 8

OR

2. a) What do you mean by distributed winding? What is its necessity? Define distribution factor & hence derive equation for the same. 8
- b) A 4-pole ac machine has a 3-phase winding wound in 60 slots. The coils are short pitched. in such a way that if one coil side lies in slot number 1, the other side of the same coil lies. in slot No. 13. Calculate the winding factor for
- i) Fundamental
 - ii) Third harmonic and
 - iii) Fifth harmonic frequency waveform
3. a) Write short notes on- 8
- i) Constant Magnetic Field
 - ii) Pulsating magnetic field
- b) Explain Revolving Magnetic Field. 8

OR

4. a) Explain concept of rotating magnetic field for 4 pole Machine. 8
- b) Explain following terms- 8
- | | |
|------------------------------|---------------------------|
| i) Magnetic flux | ii) Magnetic flux density |
| iii) Magnetic field strength | iv) Permeability |
5. a) Why starters are necessary for starting induction motor? Name different starting methods for three phase induction motors. 6

- b) A three-phase delta connected cage type induction motor when connected directly to 400V, 50Hz supply takes a starting current of 100A in each stator phase. Calculate. **10**
- The line current for 'direct on line' starting.
 - Line and phase current for star-delta starting, and
 - Line and phase starting current for a 70 percent tapping on auto transformer starting.

OR

6. a) What is meant by slip-energy recovery? How this principle is used to control the speed of three-phase induction motors? **8**
- b) A 220V, single phase induction motor gave the following test results. Blocked-rotor test: 120V, 9.6A, 640W.
No-load test: 220V, 4.6A, 125W.
The stator winding resistance is 1.5ohm, and during the blocked-rotor test, the starting winding is open. Determine the equivalent circuit parameters. Also, find the core, friction and windage losses. **8**
7. a) Explain Construction of single phase induction motor. **8**
- b) Explain Double field revolving theory. **8**

OR

8. a) Explain Equivalent Circuit of Single phase Inductor Motor. **8**
- b) Explain any three split phase induction motor starting method. **8**
9. a) Derive the phasor diagram of a cylindrical rotor alternator. What is the effect of armature reaction and how it is included in the phasor diagram for lagging, unity and leading power factor load? **8**
- b) Explain the hunting of a synchronous motors. What is the purpose of damper winding in synchronous machine. **8**

OR

10. a) What do you mean by synchronizing of alternators? Describe nay one method of synchronizing. **8**
- b) Two identical, three phase alternators operating in parallel share equally a load of 1000kW at 6600V and 0.8 lagging power factor. The field excitation of the first machine is adjusted so that the armature current is 50A at lagging power factor. Determine. **8**
- The armature current of second alternator and
 - The power factor at which each machine operates.
