

B.E. Electrical (Electronics & Power) Engineering (MODEL CURRICULUM) Sem-IV
SE203 : Electrical Machines-II

P. Pages : 2

Time : Three Hours



GUG/W/22/13858

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 non programmable electronic calculator is permitted.
 6. Draw neat and proper diagram/sketches.

1. a) What do you mean by distributed winding? What is its necessity? Define distribution factor & hence derive equation for the same. 8
- b) A 3-phase, 50 Hz, 750 rpm, 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) Write short notes on: 8
- | | |
|---------------------------|--------------------------|
| i) Short Pitch Coils | ii) Full Pitch Coils |
| iii) Concentrated Winding | iv) Distributed Windings |
- 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) Explain following terms 8
- | |
|------------------------------|
| i) Magnetic flux |
| ii) Magnetic flux density |
| iii) Magnetic field strength |
| iv) Permeability |
- b) Explain Revolving Magnetic Field 8

OR

4. a) Explain concept of rotating magnetic field for 4 pole Machine. 8
- b) Write short notes on- 8
- | |
|------------------------------|
| i) Constant Magnetic field |
| ii) Pulsating magnetic field |

5. a) Why starters are necessary for starting induction motor? Name different starting methods for three phase induction motors. **8**
- 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. **8**
- i) The line current for 'direct on line' starting
- ii) Line and phase current for star-delta starting, and
- iii) Line and phase starting current for a 70 percent tapping on auto transformer starting.

OR

6. a) Explain speed control of 3 phase induction motor by frequency control. **5**
- b) Explain dynamic braking in 3 phase induction motor. **5**
- c) Explain star-delta starting of 3 phase induction motor. **6**
7. a) Explain Equivalent Circuit of Single phase Induction Motor. **8**
- b) Explain double field revolving theory and hence show that the single phase induction motors are not self starting. How can it be made self starting? **8**

OR

8. a) Explain Construction of single phase induction 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? **10**
- b) Explain the difference between salient pole and cylindrical pole synchronous machines. **6**

OR

10. a) What do you mean by synchronizing of alternators? Describe any one method of synchronizing. **8**
- b) A 3-phase, 50 Hz, 750 rpm, 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**
