current of the motor at normal voltage is 6 times the full load current and the full load slip is 4%. Neglect the magnetizing current. (7.5)

7. (a) Discuss in detail 'Parallel operation of alternators'. (7.5)

(b) Draw and explain the equivalent circuit and phasor diagram of a synchronous generator. (7.5)

Roll No. ....

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May 2023

B.Tech. (EL) IVth SEMESTER

Electrical Machines-II

(ELPC-402)

Time: 3 Hours] [Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART-A

1. (a) What are the advantages of having stationary armature in a synchronous generator? (1.5)

(b) Why 'Ampere turn' method to find voltage regulation is known as optimistic method? (1.5)

(c) What are V-curves? (1.5)

(d) Name some applications of single phase motors. (1.5)

(e) Why is short pitch winding preferred over full pitch winding? (1.5)

(f) Why wound rotor construction is adopted in induction motors? (1.5)

(g) Why the no load current of an induction motor is much higher than that of an equivalent transformer? (1.5)

(h) Define pitch factor and distribution factor in a synchronous machine. (1.5)

(i) Why induction motor is called rotating transformer? (1.5)

(j) Why the three-phase induction motor draws heavy current at starting? (1.5)

PART-B

2. (a) Discuss 'Synchronous Impedance' method to find voltage regulation. (7.5)

(b) A 3-phase, 16 pole alternator has a star connected winding with 144 slots and 10 conductors per slot. The flux per pole is 0.03 Wb, sinusoidally distributed and the speed is 375 rpm. Find the frequency rpm and the phase and line emf. Assume full pitched coil. (7.5)

3. (a) With the help of double field revolving theory, prove that single phase induction motor is not self-starting. (7.5)

(b) How can we start a single phase induction motor? Explain with the help of capacitor start induction motor. (7.5)

4. (a) Discuss in detail, the torque slip characteristics of an induction motor. Derive the condition for maximum torque. (7.5)

(b) The power input to a 500 V, 50 Hz, 6 pole, 3 phase induction motor running at 975 rpm is 40 kW. The stator losses are 1 kW and the friction and windage losses total 2 kW. Calculate (i) Slip (ii) the rotor copper loss (iii) shaft power, and (iv) efficiency. (7.5)

5. (a) Explain the production of air gap rotating field when a three, phase machine is supplied from a balanced three-phase supply. (7.5)

(b) Discuss in detail speed control of induction motors. (7.5)

6. (a) Discuss in detail starting of three-phase induction motor using three-phase auto transformer. (7.5)

(b) Determine approximately the starting torque of an induction motor in terms of full load torque when started by means of (i) star delta switch (ii) an autotransformer with 70.7% tapping. The short circuit