5TH SEM./ELECTRICAL/ 2023(W) NEW

Th-2   Energy Conversion-II

Full Marks: 80   **Time- 3 Hrs**

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1.   Answer **All** questions   2 x 10
   a.   What is hunting in synchronous Motor?
   b.   State the condition necessary for paralleling alternator.

   c.   What is the function of damper bar in synchronous motor?
   d.   A 4 pole, 3 phase induction motor operates from a supply is 50 Hz, calculate the speed of the rotor in which slip is 0.04.
   e.   Why centrifugal switch is used single phase induction motor?
   f.   What is the V-curves in synchronous motor?
   g.   Define step angle in stepper motor and state its value.
   h.   Write down the advantages of stationary armature in alternator.
   i.   What are the different modes of operation of an induction machine? In which operating mode, the developed torque opposes the rotation of rotor?
   j.   In which rotor high starting torque is produced and why?

2.   Answer **Any Six** Questions   6 x 5
   a.   Describe the dark and bright lamp method with circuit diagram to perform parallel operation of two alternators.
   b.   The power input to the rotor of 440V, 50 Hz, 6 pole, 3-phase, and induction motor is 80 KW. The rotor electromotive force is observed to make 100 complete alterations per minute. Calculate (i) the slip (ii) the rotor speed (iii) rotor copper losses per phase.
   c.   Explain the principle of operation of synchronous motor with diagram. Why it will not run at other than synchronous speed?
   d.   What is the effect of changing excitation on constant load of a synchronous motor?
   e.   A 4-pole alternator has 18 slots/pole, single layer three phase winding. The 1st coil lies in slots 1 and 16. Calculate distribution factor and pitch factor.
   f.   Explain the speed control of induction motor using Rotor resistance control.
   g   Discuss in detail about Delta/Delta and Star/Star connection of 3 phase transformer.

3   A 3-phase, 4-pole, star-connected turbo-alternator has a smooth cylindrical type   10
      rotor. The effective resistance and synchronous reactance per phase are 0.15 Ω and 2.5 Ω. Calculate the voltage
      regulation when delivering 250 A at 6.6 kV and at 0.6 p.f. lagging.
4   Explain about the double field revolving theory in 1-phase induction motor.   10
5   Explain DOL starter with neat sketch. Obtain the expression for starting torque   10
      in terms of full load torque.
6   State and explain maintenance schedule of 3 phase Power transformer.   10
7   Write short notes on   10
                        (a)   Universal motor
                        (b)   Variable reluctance Stepper motor

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