Registration No. :

Total number of printed pages –2

Fifth Semester (Back/Special) Examination – 2013
ELECTRICAL MACHINE - II
BRANCH : EEE, ELECTRICAL
QUESTION CODE : D 286
Full Marks – 70
Time : 3 Hours

Answer Question No. *1* which is compulsory and any **five** from the rest.

The figures in the right-hand margin indicate marks.

1. Answer the following questions :   2×10

    (a) Define the short-circuit ratio of a synchronous machine.

    (b) What are the advantages of short pitch coil in the armature winding in an AC machine ?

    (c) Write two advantages of stepper motor over the conventional motor ?

    (d) What do you understand by voltage regulation of an alternator, why is it (–ve) for leading p.f ?

    (e) What is the speed regulation of a synchronous motor ?

    (f) What is phasing out of a three-phase transformer ?

    (g) Explain why load angle 'delta' is positive for synchronous generator and negative for in case of synchronous motor.

    (h) What is the utilization factor for transformer connected in open delta ?

    (i) How the speed of a universal motor be reversed ?

    (j) In a double revolving field theory of single-phase induction motor, if the slip of the forward motor is 's' then what will be the slip of backward motor ?

2. (a) Explain the method for determining the voltage regulation of three-phase synchronous alternator by potier triangle method.   5

    (b) A 50 MVA, 11 kV, 50 Hz, 6 pole, star (Y) connected alternator has $Zs = 0.005 + j\,0.08$ p.u. If the alternator is delivering rated current at rated voltage with the excitation e.m.f 1.2 p.u. Find the load angle and Power factor.   5

3. (a) Explain the two reaction theory and also draw the phasor diagram of salient pole synchronous alternator.

5

(b) A 6 pole alternator has an armature of 90 slots and 8 conductors per slot and revolves at 1000 rpm .The flux per pole being 50 mWb .Calculate the emf generated as a three-phase star connected machine of winding factor 0.96 and all the conductors are in series ?

5

4. (a) A 3-phase, 8 pole, 50 Hz, 6600 V star connected synchronous motor has an equivalent reactance of 6.5 Ω per phase. When excited to give a generated emf of 4500 V per phase, it takes an input of 2500 kW. Determine the power factor.

5

(b) Explain what is meant by 'V curves' for a synchronous motor operation. 5

5. (a) Explain phasor group Dy 11 and yZ 11 with reference to three-phase transformer showing suitable clock diagram ?

5

(b) It is desired to transform 2400 V at 400 kVA, 3-phase power to 2-phase power at 600 V by scott connected transformers. Determine the voltage and current rating of both primary and secondary of each transformer. (Neglect the transformer no-load currents)

5

6. A 2000 kVA transformer called A is connected in parallel with 3000 kVA transformer called B to supply a 3-phase load of 4000 kVA at 0.8 p.f (lag). Determine the kVA supplied by each transformer assuming equal no-load voltages, percentage of voltage drop in the winding at their rated loads are given below :

10

Transformer A resistance = 2%   reactance = 6 %
Transformer B resistance = 1.6 %   reactance = 4 %

7. (a) Discuss why single-phase Induction motor do not have a starting torque. Draw and explain the equivalent circuit of single phase induction motor. 5

(b) Explain, in brief, the principle of operation of Reluctance motor. 5

8. Write short notes on any **two** of the following :

5×2

(a) Parallel operation of synchronous generators

(b) Open Delta (V) Connection

(c) Stepper motors.