

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/  
MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2018

**SYNCHRONOUS MACHINES AND F.H.P MOTORS**

[Time : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

I Answer *all* questions in one or two sentences. Each question carries 2 marks.

1. State the advantages of short pitched coil.
2. Define voltage regulation.
3. What do you meant by synchronous condenser ?
4. Write any two application of servo motor.
5. List out different types of stepper motors.

(5×2 = 10)

PART — B

(Maximum marks : 30)

II Answer any *five* of the following questions. Each question carries 6 marks.

1. Derive the EMF equation of an alternator.
2. Explain the effect of pf on armature reaction with suitable diagrams.
3. Explain the method to find out voltage regulation by EMF method.
4. What are the conditions for parallel operation of alternator ?
5. Explain the principle of operation of synchronous motor.
6. Explain why synchronous motors are not self starting. What are the methods used for the starting of synchronous motors ?
7. Explain the working of variable reluctance stepper motor.

(5×6 = 30)

## PART — C

(Maximum marks : 60)

(Answer *one* full question from each unit. Each full question carries 15 marks.)

## UNIT — I

- III (a) A three phase 16 pole alternator has a star connected winding with 144 slots and 10 conductor per slot. The flux per pole is 13mWb, sine distributed and the speed is 375 rpm. The coils are chorded by one slot. Find the phase and line values of EMF generated. 8
- (b) Explain the advantages for providing stationary armature for an alternator. 7

OR

- IV (a) Draw the vector diagram of loaded alternator under lagging and leading power factor. 8
- (b) For a three phase winding with 4 slots per pole per phase and with the coil span of 10 slots evaluate the distribution and pitch factors. 7

## UNIT — II

- V (a) Explain the method to find out voltage regulation by ampere turn method. 8
- (b) A 100KVA 3000V 50 Hz three phase star connected alternator has effective armature resistance of 0.2ohm, a field current of 40A produces a short circuit current of 200A and open circuit EMF of 1040 V (between lines). Calculate the percentage regulation at full load 0.8pf leading. 7

OR

- VI (a) Determine the voltage regulation of a 2000V single phase alternator giving a current of 100A at 0.8pf lead from the test results. Full load current 100A is produced on short circuit by a field current of 2.5 A. An EMF of 500V is produced on open circuit by the same excitation. The armature resistance is 0.8ohm. 8
- (b) Explain the procedural steps to determine the voltage regulation by ZPF method. 7

## UNIT — III

- VII (a) Explain the principle of operation of synchronous motor. 8
- (b) Explain double field revolving theory. 7

OR

- VIII (a) Describe classification of single phase induction motors. 8
- (b) Describe the procedure for plotting v curve. 7

## UNIT — IV

- IX (a) Explain the working of hysteresis motor. 8
- (b) Explain the working of printed circuit board motors. 7

OR

- X (a) Explain the construction and working of capacitor start induction run motors. 8
- (b) List out the applications and advantages of stepper motors. 7