

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/  
COMMERCIAL PRACTICE, NOVEMBER - 2024**

**SYNCHRONOUS MACHINES & FHP MOTORS**

[Maximum Marks : 75]

[Time : 3 hours]

**PART-A**

**I.** Answer **all** the following questions in one word or sentence. Each question carries 1 mark.

**(9x1=9 marks)**

		Module Outcome	Cognitive level
1	Write the relation between speed, frequency and number of poles in an alternator.	M1.01	U
2	In an alternator, the ratio of the EMFs of the distributed winding to concentrated winding is termed as.	M1.02	R
3	Name the loss which will reduced by laminating the armature core in an alternator..	M2.02	U
4	List any two indirect methods for finding voltage regulation.	M2.01	R
5	Name any one starting method of synchronous motor.	M3.03	R
6	Mention the function of damper windings in synchronous motor.	M3.03	U
7	The suitable motor for domestic fan is (a) DC shunt motor    (b) DC series motor (c) Single phase induction motor                          (d) Synchronous motor	M4.01	U
8	The function of capacitor in capacitor start induction run motor is for.....	M4.01	R
9	Name a motor which operates in both AC and DC power supply.	M4.02	R

**PART B**

**II.** Answer **any Eight** questions from the following. Each question carries 3 marks.

**(8x3=24 marks)**

		Module Outcome	Cognitive level
1	Draw the phasor diagram of alternator on inductive load.	M1.04	U
2	An alternator has 4 poles, 36 stator slots and coil span is 1 to 8. Calculate the pitch factor.	M1.02	A
3	Define synchronizing current and synchronizing power.	M2.04	R
4	List three methods used for synchronizing the alternators.	M2.04	R
5	Draw the power flow diagram of synchronous motor.	M3.02	U
6	Write any two applications of synchronous motor.	M3.04	U
7	Draw the V curve and inverted V curve of synchronous motor.	M3.02	U
8	Write three advantages of stepper motors.	M4.03	U
9	List three applications of FHP motors.	M4.04	U
10	Write the main characteristics of universal motor.	M4.02	U

### PART C

Answer **all** questions from the following. Each question carries 7 marks.

**(6x7=42marks)**

		Module Outcome	Cognitive level
III	Working principle of an alternator with the help of diagram. <b>OR</b>	M1.01	U
IV	Derive the EMF equation of three phase synchronous generator.	M1.02	U
V	A 20 kVA, 3 phase, star connected 415V alternator has effective armature resistance of 0.35 ohm per phase and leakage reactance of 0.6 ohm per phase. Find the voltage induced in the armature when the alternator is delivering full load current at a load power factor of 0.7 lead. <b>OR</b>	M1.04	A
VI	A 4 pole, 3 phase, 50 Hz star connected has 60 slots, with 6 conductors per slot. Coils are short chorded by two slots. Find the line value and phase value of induced voltage in the alternator if the flux per pole is 0.05 Wb sinusoidally distributed.	M1.02	A
VII	Explain synchronization of three phase alternators by dark lamp method with diagram. <b>OR</b>	M2.04	U
VIII	A 50 kVA, 500 V, 50 Hz, single phase alternator has effective armature resistance of 0.2 ohm. A field current of 10 A produces a short circuit current of 100 A and open circuit EMF of 420 V. Calculate the percentage regulation at full load 0.7 power factor lag.	M2.01	A
IX	Describe open circuit test and short circuit test of synchronous generator with relevant diagrams. <b>OR</b>	M2.01	U
X	Explain various steps to find voltage regulation of an alternator by ZPF method.	M2.01	U
XI	Explain different torques in synchronous motor. <b>OR</b>	M3.03	U
XII	Illustrate the working principle of synchronous motor with diagrams.	M3.01	U
XIII	Describe capacitor start induction run single phase induction motor. <b>OR</b>	M4.01	U
XIV	Explain the construction and working of hysteresis motor.	M4.04	U

\*\*\*\*\*