



# VIDHYADEEP INSTITUTE OF ENGINEERING AND TECHNOLOGY

Vidhyadeep Campus, Anita (Kim), Ta. Olpad, Dist. Surat

**Subject Name: EM-II**

**Subject Code: 3150910**

**Sem: 5<sup>TH</sup> (2021)**

## ***Assignment-1\_ INDUCTION MACHINES***

- 1** What is slip? Explain torque-slip and torque-speed characteristics of an induction motor.
- 2** What is the need of speed control for an induction motor? Explain different speed control methods of induction motor.
- 3** Explain working principle and construction of induction motor. Also differentiate squirrel cage and slip ring induction motor.
- 4** Prove that when 3 phase supply is applied across the stator of 3 phase IM, a rotating magnetic field of constant magnitude is produced.
- 5** What is harmonic torques? Explain crawling and cogging for 3 phase induction motors.
- 6** Derive the equation of electromagnetic torque for a three phase induction motor with usual notations from first principles.
- 7** Draw the phasor diagram (vector diagram) for a three phase induction motor and justify the statement 'Power factor of the motor improves from no load to full load'.
- 8** Discuss the procedure to perform no load and blocked rotor tests on a three phase induction motor.
- 9** Mention the types of starters for a three phase induction motor. Explain DOL starter in detail.
- 10** Explain the procedure to construct the circle diagram of induction motor. Also describe the method to determine losses, efficiency and slip at full load condition using circle diagram.
- 11** Briefly describe the construction and working of linear induction motor.



# *VIDHYADEEP INSTITUTE OF ENGINEERING AND TECHNOLOGY*

**Vidhyadeep Campus, Anita (Kim), Ta. Olpad, Dist. Surat**

---

---

- 12** A 10 pole, 3 phase, 600 V, 50 Hz star connected IM has rotor resistance and standstill reactance of 0.03 and 0.5 ohms per phase respectively. Find (1) Speed at maximum torque (2) the ratio of full load torque to maximum torque, if the full load speed is 570 rpm.
- 13** A 3 phase, 50 Hz, 500 V, I.M. with 8 poles gives an output of 30 kW at 700rpm with 0.8 PF lagging. The mechanical losses are equal to 1 kW. Find (1) slip (2) rotor copper loss (3) input if the stator losses are 1200 W and (4) line current.

**Subject Coordinator**

**H.O.D. (Elect)**



# VIDHYADEEP INSTITUTE OF ENGINEERING AND TECHNOLOGY

Vidhyadeep Campus, Anita (Kim), Ta. Olpad, Dist. Surat

*Subject Name: EM-II*

*Subject Code: 3150910*

*Sem: 5<sup>TH</sup> (2021)*

## ***Assignment-2\_INDUCTION GENERATOR AND 1-PHASE A.C. MOTORS***

- 1 Explain operating principle of Induction Generator.
- 2 Discuss the Working of Induction Generator when connected to isolated load.
- 3 Explain the Double revolving field theory for a single phase induction motor.
- 4 Explain different methods of starting 1-phase induction motor.
- 5 Explain why a single phase I.M does not self start. Discuss its operation based on double revolving field theory.
- 6 Draw the construction and operating characteristics of Shaded pole motor. Also state its application.
- 7 Explain the working of servomotor and its type.
- 8 Explain the working of permanent magnet synchronous motor.
- 9 Explain the working of reluctance motor and state its application.
- 10 Draw the construction of single phase induction motor.

**Subject Coordinator**

**H.O.D. (Elect)**



# VIDHYADEEP INSTITUTE OF ENGINEERING AND TECHNOLOGY

Vidhyadeep Campus, Anita (Kim), Ta. Olpad, Dist. Surat

Subject Name: EM-II

Subject Code: 3150910

Sem: 5<sup>TH</sup> (2021)

## Assignment-3\_ SYNCHRONOUS MACHINES:

- Q.1** A 100 kVA, 3000 V, 50 Hz, 3 phase star connected alternator has effective armature resistance of 0.25 ohm. The field current of 400 A produces short circuit current of 180 A and an open circuit voltage of 1040 V (line value). Find the full load voltage regulation at 0.85 PF lagging and 0.85 PF leading.
- Q.2** What is voltage regulation of an alternator? Explain any one method to find out voltage regulation of an alternator.
- Q.3** Discuss the conditions to be satisfied for proper synchronization of two alternators.
- Q.4** Define pitch factor and distribution factor of an alternator. Also derive the EMF equation of an alternator.
- Q.5** Explain V-curves and its importance for synchronous motors.
- Q.6** Describe the effect of armature reaction in case of a synchronous generator.
- Q.7** Derive the emf equation of an alternator. Just define the pitch factor and distribution factor.
- Q.8** Explain the construction of a salient pole synchronous machine.
- Q.9** List the methods of determination of voltage regulation of an alternator. Describe any one of them in detail.
- Q.10** Write a short note on auto synchronous motor.
- Q.11** Explain with reason why synchronous motor is not self starting. Discuss the methods of starting the synchronous motor.
- Q.12** What is synchronization? Explain two bright one dark lamp method of synchronization.
- Q.13** Differentiate between cylindrical synchronous machine and Salient pole synchronous machine.
- Q.14** Why rotor of cylindrical synchronous machine is not laminated
- Q.15** What is Hunting in synchronous machine
- Q.16** What is the role of commutator In AC commutator motor? Explain the working of Schrage motor.
- Q.17** Explain the construction and working of universal motor and Repulsion motor

Subject Coordinator

H.O.D. (Elect)