



## II B.Tech II Sem Supply End Examination, July 2022

**Electrical Machines - II**

(EEE)

**Time: 3 Hours.****Max. Marks: 70**

Note: 1. Question paper consists: Part-A and Part-B.

2. In Part - A, answer all questions which carries 20 marks.

3. In Part - B, answer any one question from each unit.

Each question carries 10 marks and may have a, b as sub questions.

**PART- A****(10\*2 Marks = 20 Marks)**

- |       |  |    |     |    |
|-------|--|----|-----|----|
| 1. a) | Define Synchronous Speed.  | 2M | C01 | L1 |
| b)    | What do you mean by Crawling?  | 2M | C01 | L1 |
| c)    | Write the maximum torque condition in three phase induction motor.                                     | 2M | C02 | L1 |
| d)    | What are the limitations of Star/Delta Starter?  | 2M | C02 | L1 |
| e)    | Define direct axis reactance ( $X_d$ ) and quadrature axis reactance ( $X_q$ ).                        | 2M | C03 | L1 |
| f)    | What are the differences between MMF and EMF methods?  | 2M | C03 | L2 |
| g)    | What is the effect of varying excitation of an alternator running in parallel with another alternator? | 2M | C04 | L2 |
| h)    | What is an infinite bus?   | 2M | C04 | L1 |
| i)    | Why single phase induction motor has a low power factor?   | 2M | C05 | L2 |
| j)    | Why starting torque of single phase induction motor is zero?   | 2M | C05 | L2 |

**PART- B****(10\*5 Marks = 50 Marks)**

- |   |   |     |     |    |
|---|---|-----|-----|----|
| 2 | Explain how a rotating magnetic field is produced in a 3-phase induction motor and show that it is constant at every instant. | 10M | C01 | L3 |
|---|---|-----|-----|----|

**OR**

- |   |  |     |     |    |
|---|--|-----|-----|----|
| 3 | Discuss in detail about construction and operation of the induction motor. | 10M | C01 | L1 |
|---|--|-----|-----|----|

- |      |   |    |     |    |
|------|---|----|-----|----|
| 4 a) | Briefly explain the speed control of induction motor by pole changing method        | 5M | C02 | L1 |
| b)   | Draw the slip-torque characteristics for a three-phase induction motor and explain. | 5M | C02 | L1 |

**OR**

- 5 A 4-pole, 50 Hz, 3-phase induction motor develops a maximum torque of 110 N-m at 1360 rpm. The resistance of the star connected rotor is  $0.25\Omega$ /phase. Calculate the value of resistance that must be inserted in series with each rotor phase to produce a starting torque equal to half of the maximum torque.

10M C02 L3

- 6 A 30 KVA, 440 V, 50 Hz, 3-phase, star connected synchronous generator gave the following data:

Field current (A):	2	4	6	7	8	10	12	14
O.C.Voltage(V):	155	287	395	440	475	530	570	592
S.C.Current(A)	11	22	34	40	46	57	69	80

OR

- 7 Discuss in brief, how voltage regulation can be computed by ZPF method.

10M C03 L2

- 8 a) Explain the operation of a synchronous generator with a constant load and variable excitation.
- b) What is the necessity of parallel operation of alternators? Give the conditions to be satisfied.

5M C04 L1

5M C04 L2

OR

- 9 What is a synchronous condenser? Explain the operation of a synchronous motor as a synchronous condenser.

10M C04 L1

- 10 a) Explain the working principle of the split phase induction motor in detail.

5M C05 L2

- b) Describe double filed revolving theory

5M C05 L2

OR

- 11 Discuss in detail about construction and operation of shaded pole induction motor.

10M C05 L4