



II B.Tech II Sem Supply End Examination, March 2022

Electrical Machines-II

(EEE)

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

Note: 1. Answer any FIVE questions.

2. Each question carries 14 marks and may have a, b as sub questions.

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| 1 | a) | Show that a rotating magnetic field is produced in the air-gap, when a balanced three-phase ac supply is given to the stator of a 3-phase induction motor. Justify your claim with necessary mathematical equations. | 7M | C01 | BL3 |
| | b) | Explain why an induction motor cannot develop torque when running at synchronous speed. Define the slip speed of an induction motor and deduce how the frequency of rotor currents and magnitude of rotor emf are related to slip. | 7M | C01 | BL4 |
| 2 | a) | Explain the constructional details and principle of operation of 3-phase Induction machine. | 7M | C01 | BL4 |
| | b) | The rotor of a slip ring induction motor is connected to an AC source, where as its stator winding is short circuited. If rotating magnetic field produced by rotor winding' rotates clock wise, Explain the direction in which rotor must revolve. | 7M | C01 | BL3 |
| 3 | a) | With the help of rotor equivalent circuit of an induction motor, show that the power transferred magnetically from stator to rotor is given by $\frac{I_2^2 r_2}{s}$ per phase. | 7M | C02 | BL3 |
| | b) | Draw the equivalent circuit of an Induction Motor indicating all the circuit parameter. Derive the Torque equation of the machine from equivalent circuit. | 7M | C02 | BL6 |
| 4 | a) | Explain the procedure to derive the equivalent circuit parameters of a 3-phase Induction motor from no-load and blocked rotor test. | 7M | C02 | BL4 |
| | b) | Derive the emf equation of synchronous generator from the basic principles. Explain the factor effecting it. | 7M | C03 | BL5 |
| 5 | a) | Explain load characteristics and define the regulation of an alternator. Deduce the relation for regulation from the phasor diagram. | 7M | C03 | BL4 |
| | b) | Briefly explain about the alternator voltage regulation using ZPF method. | 7M | C03 | BL4 |
| 6 | a) | Explain the constructional and principle of operation of synchronous generator. | 7M | C04 | BL4 |
| | b) | Explain the effects of change of excitation and mechanical power input on the alternator performance. Draw the relevant phasor diagrams. | 7M | C04 | BL4 |
| 7 | a) | What are the necessary conditions for paralleling the emergency generator with the existing power system? | 7M | C04 | BL1 |
| | b) | Give the constructional details of single-phase induction motor. | 7M | C05 | BL1 |
| 8 | a) | Explain the concept of double field revolving theory of single-phase induction motor. | 7M | C05 | BL4 |
| | b) | Write short note on Shaded pole motor. | 7M | C05 | BL1 |