Bihar Engineering University, Patna
End Semester Examination - 2023

Course: B.Tech | *Semester: IV* | *Time: 03 Hours*

Code: 110402 | *Subject: Electrical Machine-II* | *Full Marks: 70*

Instructions:-

(i) The marks are indicated in the right-hand margin.
*(ii) There are **NINE** questions in this paper.*
*(iii) Attempt **FIVE** questions in all.*
*(iv) Question No. **1** is compulsory.*

Q.1 ***Write the short answer of the following (Any seven question only):*** **[2 x 7 = 14]**

(a) What do you mean by single layer and double layer winding?
(b) Why is short pitch winding preferred over full-pitch winding?
(c) Define distribution factor.
(d) Write maximum output power equation of cylindrical alternator.
(e) What is double field revolving theory?
(f) Define slip.
(g) Write applications of three phase induction motors.
(h) The rotor of a salient pole alternator has 12 poles. The number of cycles of emf per revolution would be_____.
(i) The angle between the rotating stator flux and rotor poles is called _____ angle.
(j) The maximum power developed in a synchronous motor occurs at a coupling angle of _____.

Q.2 Based on double field revolving theory, explain the operation of single-phase induction motors. Also explain the operation of a capacitor start- capacitor run single phase induction motor. **[14]**

Q.3 (a) List the differences between Rotating and pulsating magnetic field with suitable diagrams. **[7]**

(b) Differentiate concentrated winding and distributed winding with neat and labelled diagram. Discuss why the windings are distributed sinusoidally. **[7]**

Q.4 (a) Explain the effect of excitation on armature current and power factor of a synchronous motor and hence deduce the V and inverted V curves. **[7]**

(b) Explain the two reaction theory of salient pole alternator. **[7]**

Q.5 (a) A 6 pole, 50 Hz, 3 phase Slip ring induction motor, the rotor resistance and the reactance at stand still per phase are 0.3 and 1.5 Ω respectively. The e.m.f. between the slip rings on open circuit is 175 volt. Calculate (i) Slip (ii) rotor e.m.f./phase (iii) rotor frequency and reactance when the motor runs at a speed of 950 r.p.m. **[7]**

(b) Describe the constructional feature of 3 phase slip ring induction motor. **[7]**

Q.6 (a) What are the different types of starters used for starting a 3 phase induction motor? **[7]**

(b) Discuss the various methods adopted for braking of an induction motor. **[7]**

Q.7 (a) What is necessity of parallel operation of alternators? State the conditions necessary for paralleling alternators. **[7]**

(b) What are the different methods of finding the voltage regulation of an alternator? **[7]**

Q.8 (a) Explain the constructional details of a synchronous motor. [7]

(b) Differentiate between the phenomenon Cogging and crawling of an induction motor. [7]

Q.9 Write short notes on ***any two*** of the following: **[7x2=14]**

(a) Doubly-fed induction machine

(b) No-load test of three phase induction machine

(c) Effect of parameter variation on torque-speed characteristic