4E1321

Roll No. _____ Total No. of Pages: 4

4E1321
B. Tech. IV - Sem. (Main / Back) Exam., - 2025
Electrical & Electronics Engineering
4EX4-05 Electrical Machine-II
EE, EX

Time: 3 Hours **Maximum Marks: 70**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

[10×2=20]

PART – A

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1 Define the following in AC machine winding –

(a) Distribution Factor

(b) Coil Span

Q.2 How concentrated winding differ from distributed winding?

Q.3 What is the main difference between a pulsating and a revolving magnetic field?

Q.4 What happens if the phase sequence of a three phase supply is reversed in an Induction machine?

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Q.5 What is the difference between a squirrel cage and a wound rotor Induction machine?

Q.6 What is slip in an Induction motor? How is it defined?

Q.7 What is the effect of increasing supply frequency on the speed of an Induction Motor?

Q.8 Why does a single phase Induction motor not self-start?

Q.9 Why does a synchronous motor need an external starting mechanism?

Q.10 What is the significance of the Power angle in synchronous machine operation?

PART – B

[5×4=

(Analytical/Problem solving questions)

Attempt any five questions

Q.1 Explain the concept of air-gap MMF distribution. Also discuss the differences between full pitch and short pitch winding.

Q.2 Define and explain how a three phase winding arrangement produces a revolving magnetic field?

Q.3 Define the torque-slip characteristics of an Induction motor? Discuss the starting methods of Induction motor briefly.

Q.4 What is self-excitation in an Induction generator? Explain the working principle and concept of Doubly-fed Induction machine.

Q.5 Explain the split phase starting methods and applications for single phase Induction motor.

Q.6 Explain the V-curves of a synchronous machine. Also discuss the conditions required for the synchronization of alternators.

Q.7 Explain the Two-Reaction Theory and how it is used in salient pole machines?

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PART – C

[3×10=30]

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any three questions

Q.1 Explain the construction and working principle of three phase Induction Motor. Also discuss the equivalent circuit of an Induction Motor.

Q.2 Explain the construction and working of a synchronous generator. Also derive EMF equation and equivalent circuit of synchronous generator.

Q.3 Explain the effect of spatial displacement of winding on magnetic field production. Explain when two pulsating magnetic fields are spatially shifted by 90 degree with the help of diagram.

Q.4 (a) Explain the importance of 3D visualization of winding arrangements in AC machine.

(b) Compare concentrated winding and distributed winding.

Q.5 Write short note on –

(a) Condition and procedure for parallel operation of alternators.

(b) Methods of Braking in Induction Motor.

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