

BACHELOR OF TECHNOLOGY (C.B.C.S.) (2020 COURSE)
B.Tech.Sem - IV ELECTRICAL :SUMMER- 2022
SUBJECT : SPECIAL PURPOSE MACHINES

Day : Tuesday
Date : 14-06-2022

S-24548-2022

Time : 10:00 AM-01:00 PM
Max. Marks : 60

N.B.

- 1) All questions are **COMPULSORY**
- 2) Figures to the right indicate **FULL** marks
- 3) Draw neat labelled diagram **WHEREVER** necessary
- 4) Assume suitable data if necessary

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- Q.1** a) Describe the torque speed characteristics of Induction Generator with neat sketch. (05)
b) Discuss the comparison between three phase induction motor and three phase linear induction motor, (05)
- OR**
- Explain the operating principle, characteristics and applications of 1) Universal Motor 2) DYNA Motor (10)
- Q.2** a) Draw a schematic diagram of a two phase ac servo motor and state its principle of working. (06)
b) Distinguish between DC and AC servo motor. (04)
- OR**
- a) Sketch and explain the torque speed characteristics of DC Servomotor. (04)
b) Explain the working principle of an armature controlled DC servomotor with the help of a neat sketch. (06)
- Q.3** a) A stepper motor has a step angle of 2.5° . Determine a) resolution b) number of steps required for the shaft to make 25 revolutions and c) shaft speed if the stepping frequency is 3600 rps. (04)
b) Draw a schematic representation of variable reluctance type stepper motor and explain its principle of working. (06)
- OR**
- a) With the neat diagram explain the working of stepper motor. (06)
b) What are the advantages of hybrid stepper motor as compared to other stepper motors? (04)
- Q.4** a) Discuss the various types of rotors used in Synchronous reluctance motor with neat sketches. (05)
b) Discuss the power converter circuits used in Switched reluctance motor. (05)
- OR**
- a) Derive the torque equation of Switched Reluctance Motor. (05)
b) Justify that the reactance at d-axis (X_d) is more than the reactance at q-axis (X_q) with relevant sketches and equations. (05)
- Q.5** a) Explain the torque speed characteristics of BLDC Motor. (05)
b) Explain the constructional details of BLDC Motor. (05)
- OR**
- a) What are the main advantages of BLDC Motor? What are its drawback? List the application areas of BLDC motor. (05)
b) Compare sensor less and sensor based control of BLDC motor. (05)
- Q.6** a) Draw and explain the phasor diagram of PMSM. (05)
b) What are the features of PMSM? State its advantages and disadvantages. (05)
- OR**
- a) Derive EMF equation of PMSM (05)
b) Compare BLDC motor and PMSM. (05)
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