Q.P.Code:13292

(3 Hours)   [Total Marks: 80]

N. B.: (1) Question No. 1 is compulsory.
   (2) Attempt any three questions from remaining five questions.
   (3) Assume suitable data if necessary.
   (4) Figures to the right indicate full marks.

1. Attempt **any four** questions   **20**

   a) What are the advantages of SVM over the conventional Sine wave PWM? Explain.

   b) Compare various schemes of DC motor speed control.

   c) With the help of neat sketch, explain the working of single-phase half-wave semi converter.

   d) Explain the concept of battery charging systems.

   e) What is V/F control? Explain in detail.

2. a) Draw and Explain the state space model for dc-dc buck converter in detail.

   10

   b) Explain in detail the principle and working of simple boost converter with the help of neat circuit diagram and waveforms.   **10**

3. a) Describe the effect of source inductance in 1-phase and 3-phase rectifiers. Draw relevant circuit diagrams and waveforms.   **10**

   b) Explain in detail the Multiple PWM as used for inverters.   **10**

4. a) A 220V, 1500 rpm, 10A separately excited dc motor has armature resistance of 1 ohm. It is fed from a single phase fully controlled bridge rectifier with an ac source voltage of 230, 50Hz. Assuming continuous load, compute:

   i) Motor speed at firing angle of 45 degrees and torque of 5 NM.

   ii) Torque at firing angle of 55 degrees and at a speed of 1000 rpm.   **10**

   b) Explain dynamic and regenerative braking of DC motors.   **10**

[TURN OVER]

5. a)   With the help of neat waveforms explain the torque speed characteristic of induction motor & give detail description of forward regeneration, forward motoring and reverse plugging.   **10**

b) Explain the working principle of stepper motor. What are different types of stepper motors? Discuss in detail permanent magnet stepper motor.   **10**

6. Write short notes on (**any three**)   **20**

   i)   SMPS & UPS.
   ii) Kramer's drive.
   iii) Induction heating.
   iv) Harmonics reduction in inverters.

****