

Total No. of Questions : 8]

SEAT No. :

P3618

[Total No. of Pages : 2

**[4959] - 1103**  
**B.E. (Electronics)**  
**Advanced Power Electronics**  
**(2012 Course) (End Sem.)**

*Time : 2½ Hours]*

*[Max. Marks : 70*

*Instructions to the candidates:-*

- 1) *Answer Q(1) or Q(2), Q(3) or Q(4), Q(5) or Q(6), Q(7) or Q(8).*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right side indicate full marks.*
- 4) *Assume suitable data if necessary.*

- Q1)** a) Explain Single phase dual converter with relevant waveforms. [6]
- b) A single phase dual converter is operated from a 120 V, 60 Hz supply and load resistance is  $R = 10 \Omega$ . The circulating inductance is  $L_r = 40$  mH, delay angles are  $\alpha_1 = 60^\circ$  and  $\alpha_2 = 120^\circ$ . Calculate the peak circulating current and the peak current of converter 1. [7]
- c) Explain Pulse Width Modulation Control (PWM) techniques for single phase converters with suitable waveforms and equations. [7]

OR

- Q2)** a) Compare circulating and non circulating type of dual converter. [6]
- b) Explain EMI and line power quality problems of thyristor converter. [7]
- c) What is the concept of multi level inverter? Explain any one type of multi level inverter. [7]
- Q3)** a) Compare separately excited and series excited DC motor. [6]
- b) A DC drive system uses a full converter in armature circuit and second full converter in field circuit in the case of separately excited dc motor. Calculate percentage change in the speed of the motor, if armature converter delay angle is changed from  $60^\circ$  to  $50^\circ$ . Input supply voltage is 220 V, 60 Hz, armature resistance  $R_a = 0.27 \Omega$  motor armature current is 15 A, motor voltage constant  $K_b = 1.2$  V/A rad /sec. [6]
- c) Draw transfer function block diagram of DC motor. [4]

OR

**P.T.O.**

- Q4)** a) Explain and draw the curves of torque and power versus speed for separately excited dc motor. [6]  
b) Explain with block diagram speed control of DC drive using microprocessor. [6]  
c) Compare converter fed and chopper fed drive. [4]

- Q5)** a) Explain variable square wave VSI Drives along with block diagram and application. [8]  
b) Explain various control techniques of speed control of induction motor along with suitable torque-speed characteristics (any two in detail) [10]

OR

- Q6)** a) Explain different types of braking of induction motor (Explain any Two). [8]  
b) Explain Vector control technique and its types: Direct and Indirect vector control along with block diagram. [10]

- Q7)** a) Compare variable reluctance motor with permanent magnet stepper motor. [8]  
b) Explain block diagram of volts/hertz control of synchronous motor drive along with the torque slip characteristics and the applications. [8]

OR

- Q8)** a) Explain the working principle of permanent magnet BLDC motor drive with constructional diagram. [8]  
b) Explain the operation of a switched reluctance motor drive. [8]

