

Total No. of Questions : 8]

SEAT No. :

P1971

[Total No. of Pages : 2

[4859]-1049

B.E. (Electronics Engg.) (End Semester)

ADVANCED POWER ELECTRONICS

(2012 Pattern) (Semester - I)

Time : 2 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.*
- 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) Calculate the peak value of circulating current for 3 phase circulating current type dual converter consisting of three phase fully controlled bridges for the given data. The input to the dual converter is 3 phase, 400V, 50Hz; firing angle $\alpha_1 = 60^\circ$, $\alpha_2 = 120^\circ$ and the value of current limiting inductance is 15 mH. **[4]**
- b) What is the need of Power factor conditioning in converters? Explain the operation of single phase diode rectifier with boost chopper for line current wave shaping. **[8]**
- c) With the help of neat circuit diagram and waveforms explain the operation of single phase bridge Diode Clamped Multilevel inverter. State its features, advantages and disadvantages. **[8]**

OR

- Q2)** a) What is dual converter? Explain in detail the operation of single phase dual converter with circulating current. Draw all the necessary waveforms. Derive an expression for circulating current. **[8]**
- b) Explain the operation of Double sided PWM converter system using single phase H-bridge converter. **[6]**
- c) With the help of circuit diagram and waveforms explain the operation of Single phase to Single phase bridge type step down cycloconverter to get output frequency $\frac{1}{2}$ of the input frequency. **[6]**

P.T.O.

- Q3)** a) What are DC motor performance parameters? Explain in brief. [4]
b) What is the need of reversible drives? Explain with circuit diagrams the operation of four quadrant chopper drive with suitable load. [6]
c) What is braking? Explain Regenerative braking of DC machine. Mention its advantages and disadvantages. [6]

OR

- Q4)** a) Draw and explain the power circuit of single phase semi-converter feeding a separately excited DC motor. Explain with typical waveforms, the operation in continuous and discontinuous armature current modes. [8]
b) With the help of a neat block diagram, explain the operation of Microcontroller based DC drive. State its advantages. [8]
- Q5)** a) Explain the significance of V/f control for 3 phase Induction motor. Explain the requirement of a 3 phase induction motor drive. [8]
b) What is the need of vector control in Induction Motors? Briefly explain Vector control of induction motors. [8]

OR

- Q6)** a) With the help of suitable circuit diagram and waveforms explain the working of Variable frequency PWM VSI Drives. [8]
b) Explain electromagnetic braking of 3 phase Induction motors. [4]
c) Explain any one protection circuit for 3 phase Induction motor. [4]
- Q7)** a) With the help of a neat circuit diagram and waveforms explain the operation of 3 phase brushless dc motor drive. State the applications of 3 phase brushless dc motor drive. [10]
b) With the help of block schematic explain the typical Switched Reluctance motor drive. State advantages and disadvantages of Switched Reluctance motor drive. [8]

OR

- Q8)** Write Short notes on : [18]
i) Cylindrical rotor motor Drive
ii) Synchronous Reluctance motor drive
iii) Salient pole motor Drive

