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BIEE-030

DIPLOMA IN ELECTRICAL ENGINEERING (DELVI) / ADVANCED LEVEL CERTIFICATE COURSE IN ELECTRICAL ENGINEERING (ACELVI)

00834

Term-End Examination

June, 2014

BIEE-030 : INDUSTRIAL DRIVES AND CONTROLS

Time : 2 hours *Maximum Marks : 70*

Note : *Attempt any **five** questions. All questions carry equal marks. Question no. **1** is **compulsory** (objective type). Draw neat and clean diagrams, if any required.*

1. Attempt all objective type questions : *7×2=14*

(a) Armature voltage of a DC motor can be controlled by means of

(i) Cyclo converter

(ii) Inverters

(iii) AC-DC converter

(iv) Bridge rectifier with fixed input

(b) The speed of DC shunt motor above normal speed can be controlled by

(i) Armature voltage control method

(ii) Field current control method

(iii) Both methods

(iv) None of these

(c) For controlling the speed of DC motor of 150 HP rating, the following type of converters are normally used.

(i) Single phase full converters

(ii) Single phase dual converters

(iii) Three phase full converters

(iv) Three phase dual converters

(d) A DC chopper circuit controls the average voltage across the DC motor by

(i) Controlling the input voltage

(ii) Controlling the field current

(iii) Controlling the line current

(iv) Continuously switching ON and OFF the motor for fixed durations of t_{ON} and t_{OFF} respectively

(e) A motor armature supplied through phase-controlled SCR's receives a smoother voltage shape at

(i) high motor speed

(ii) low motor speed

(iii) rated normal motor speed

(iv) None of these

(f) For controlling the speed of a three-phase induction motor, the method generally used is the

(i) fixed voltage fixed frequency method

(ii) variable voltage variable frequency method

(iii) fixed voltage variable frequency method

(iv) variable voltage fixed frequency method

(g) Variable speed drives using stator voltage control are normally

(i) open loop system

(ii) closed loop system

(iii) both are correct

(iv) both are incorrect

2. (a) Explain how a thyristor bridge can be used for speed control DC shunt motor.

(b) List out the applications of phase control converters. *7+7=14*

3. (a) Explain the working principle of a single phase full wave half controlled bridge rectifier using two SCR's and two diodes.

(b) Draw and explain the connection diagram of three phase full wave half controlled rectifier bridge. *7+7=14*

4. (a) What is a DC chopper ? Give various types of chopper configurations with appropriate figures.

(b) Explain the Regenerative and Rheostatic braking mode of chopper drives. *7+7=14*

5. (a) Discuss the speed control of single phase separately excited DC motor.

(b) Draw the waveform of voltage and current for semi-converter series motor drive. *7+7=14*

6. (a) Compare CSI and VSI fed drives.

(b) Discuss briefly the different methods for controlling the speed of wound rotor induction motors. *7+7=14*

7. (a) Discuss briefly the various methods of speed control of 3-phase cage rotor and induction motor.

(b) Draw the circuit of stator voltage control of delta connected induction motor using closed loop method. *7+7=14*

8. Write short notes on any ***four*** of the following : $4 \times 3\frac{1}{2} = 14$

(a) Advantages and disadvantages of Thyristorised Drives

(b) Two quadrant operation for DC motor

(c) Speed regulation by armature voltage control

(d) Speed regulation by armature current control

(e) Electric braking of motors

(f) Block diagram of closed loop operation of induction motor