17667

21819

3 Hours / 100 Marks Seat No. | | | | | | | | |

Instructions – (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. a) **Attempt any THREE of the following:** **12**

(i) Write the requirements of adjustable speed drive.

(ii) State the requirements of motors for cranes and hoists.

(iii) With the help of block diagram explain the use of PLL for speed control of d.c motors.

(iv) Draw the circuit diagram of single phase dual converter and draw its voltage and current wave forms.

b) **Attempt any ONE of the following:** **6**

(i) Describe four quadrant operation of induction motor with speed- torque characteristics.

(ii) Compare semiconverter drive and full converter drive.

Marks

2. Attempt any FOUR of the following: **16**

a) With the help of block diagram explain the elements of electric drives.

b) List eight industrial applications of drives.

c) Draw and explain DC chopper using power MOSFET.

d) List advantages of induction motor drives over d.c motor drives.

e) Draw the block diagram of PWM control method of induction motor. Write any two advantages of it.

f) State the functions of microprocessors in drives.

3. Attempt any FOUR of the following: **16**

a) Draw a neat diagram of class C chopper and explain its operation.

b) Explain multiphase chopper with a neat diagram.

c) Draw the power circuit of three phase full converter drive and explain its operation.

d) Compare PWM control and variable frequency control strategies of a chopper.

e) Give the comparision between AC drives and DC drives.

4. a) Attempt any THREE of the following: **12**

(i) Draw circuit diagram and explain the operation of single phase half wave converter drive.

(ii) State the advantages of converter fed induction motor drives.

(iii) Draw the block diagram of micro controller based stepper motor control.

(iv) State the advantages of micro processor based control for drives.

Marks

b) **Attempt any ONE of the following:** **6**

(i) Explain four quadrant operation of hoist load.

(ii) Write the sequence of stages and drivers required in each stage for sugar mills.

5. Attempt any FOUR of the following: **16**

a) Explain single phase semiconverter drive for speed control of separately excited d.c motor.

b) Write the equation between speed, frequency and no of poles of induction motor and also define slip of induction motor.

c) Draw the block diagram of constant V/F control method using square wave inverter and explain its working.

d) Explain in brief drive requirements and types of motors used for machine tool applications.

e) What do you mean by regenerative braking of d.c motor?

f) Draw the block diagram of micro processor based D.C motor control.

6. Attempt any FOUR of the following: **16**

a) Give the ratings and specifications of stepper motor.

b) Compare discrete analog and microprocessor speed control method.

c) How speed control of induction motor is achieved using rotor-resistance control method? Explain.

d) Write different stages involved in textile mills and its speed rating at each stage.

e) Explain closed loop control of synchronous motor.
