Total No. of Questions : 10]

SEAT No. :

P3791

[Total No. of Pages : 3

[5561]-192
B.E. (Electrical)
POWER ELECTRONICS CONTROLLED DRIVES
(2012 Course) (Semester - II) (403148)

Time : 2 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, Q9 or Q10.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicates full marks.***
4) ***Assume suitable data if necessary.***
5) ***Use calculator is allowed.***

Q1) a) State essential components of electrical drive and describe the function of each component in brief. **[5]**

b) Draw circuit diagram of 1ϕ, fully controlled converter fed separately excited D.C. motor and explain working for motoring quadrant. **[5]**

OR

Q2) a) Explain load equalization in an electric drive. How it is achieved? **[5]**

b) Explain advantages of electric braking over conventional braking methods. **[5]**

Q3) a) Explain stator voltage control of an induction motor. **[5]**

b) A 230 volt, 1000 rpm, 30 A DC separately excited motor has Ra= 0.7Ω, La = 50 mH, Motor is controlled in regenerative braking by chopper operating at 800 Hz from a dc source of 230 volts. Assume continuous conduction. Calculate the motor speed for duty ratio of 0.6 and rated motor torque. **[5]**

OR

Q4) a) Explain Dynamic Braking of D.C. Shunt motor. **[5]**

b) Explain regenerative braking of induction motor. **[5]**

P.T.O.

Q5) a) Explain closed loop speed control of C.S.I. Drives. **[8]**

b) Explain V/F control using C.S.I. for induction motor drive. **[8]**

OR

Q6) a) Explain flux oriented vector control method for IM with a block diagram. **[8]**

b) Compare CSI and VSI control for IM with their related merits and demerits. **[8]**

Q7) a) Explain steps in vector control of PMSM Drive. **[8]**

b) Explain Split supply converter topology for half wave operation of PMBLDC drive. **[8]**

OR

Q8) a) Write a short note on selection criteria of motor. Why a motor of smaller rating can be selected for a short time duty? **[8]**

b) A constant speed drive has the following duty cycle: **[8]**

i) Load rising linearly from 200 to 500 KW : 4 min

ii) Uniform load of 400KW : 2 min

iii) Regenerative power returned to the supply

Reducing linearly from 400KW to 0:3 min

iv) Remains idle : 4 min

Determine the power rating of the motor assuming loss to be proportional to $(\text{power})^2$.

Q9) a) Explain solar power operated pump drive with the help of block diagram. **[6]**

b) Write a short notes on any two of the following.

i) Traction drives **[6]**

ii) Rolling mills Drives **[6]**

iii) Sugar mills Drives **[6]**

OR

Q10)a) Draw Heating and cooling diagram for periodic intermittent duty of motor and explain in brief. **[6]**

b) Write a short notes on any two of the following

i) Electric Vehicles **[6]**

ii) Solar pumps Drives **[6]**

iii) Machine Tools **[6]**

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