Total No. of Questions : 8]

SEAT No. :

PC-2402

[Total No. of Pages : 2

[6354]-519

B.E. (Electrical Engineering)

ADVANCED ELECTRICAL DRIVES AND CONTROL

(2019 Pattern) (Semester - VIII) (403149)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates :

1) ***Solve Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Assume suitable additional data, if necessary.***
5) ***Use of non-prograinmable calculator is allowed.***

Q1) a) Compare VSI and CSI fed induction motor drive. **[4]**

b) Explain Plugging braking of Induction motor. What precautions are to be taken during plugging operation of Induction motor? **[6]**

c) Explain regenerative braking and multi quadrant operation of induction motor drives. **[8]**

OR

Q2) a) What is electrical braking? Explain difference between plugging and regenerative braking of induction motor. **[4]**

b) A 3-Phase, 400V, 50Hz, 4 pole 1370rpm star connected squirrel cage induction motor has the following parameters: Rs =2Ω, Rr = 3Ω, Xs = Xr = 3.5Ω, Xm = 80Ω. Motor is controlled by VSI at constant V/f ratio. Inverter allows frequency variation from 10Hz to 50Hz. For regenerative braking operation of VSI fed Induction motor determine:**[6]**

i) Speed for frequency of 30Hz and 80% of full load torque.

ii) Frequency for a speed of 1000 rpm and full load torque.

c) Explain the principle of vector control of Induction motor. **[8]**

P.T.O.

Q3) a) Explain with necessary diagram vector control of BLDC motor. **[9]**

b) Explain closed loop control of BLDC drive. Also judge the suitability of this motor for EV application. **[9]**

OR

Q4) a) Describe the construction and working of BLDC Motor. Draw speed-torque characteristics. **[9]**

b) Describe with necessary diagram vector control of BLDC motor. State the advantages of vector control. **[9]**

Q5) a) Draw construction of synchronous reluctance motor and explain its operation. **[8]**

b) Draw neat diagram and explain vector control of PM synchronous motor. **[8]**

OR

Q6) a) Explain different topologies of rotor construction used in PMSM. Also state application of each. **[8]**

b) Explain application of synchronous reluctance motor in EV. **[8]**

Q7) a) Explain requirement and choice of drives for steel rolling mills. Why four quadrant operations are needed in rolling mill drives? **[10]**

b) How drives are selected for Traction system. **[8]**

OR

Q8) a) Write short note on any two : **[10]**

i) Classes of motor duty.

ii) Requirements of drive for Solar and battery powered application.

iii) Requirements of drive for Machine tools.

b) With schematic diagram explain drives required in sugar industries. Will modern power converters be useful in sugar industry? Explain. **[8]**

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