

Total No. of Questions : 8]

SEAT No. :

P6585

[6181]-136

[Total No. of Pages : 2

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 Q.1 or Q.2, Q.3 or Q.4, 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-programmable calculator is allowed.*

Q1) a) Explain closed loop speed control of 3-phase Induction motor. [4]

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

c) Draw and explain block diagram of Vector control of induction motor.[8]

OR

Q2) a) Compare merits and demerits of VSI and CSI fed induction motor drive.[4]

b) A 3-Phase, 400V, 50Hz, 4 pole 1370rpm star connected squirrel cage induction motor has the following parameters: $R_s=2\Omega$, $R_r=3\Omega$, $X_s=X_r=3.5\Omega$, $X_m=80\Omega$. 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]

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Q3) a) Describe working of BLDC motor for motoring and regenerative braking with neat block diagram with. [9]

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

OR

Q4) a) Explain variable DC link converter topology for BLDC motor for motoring and regenerative braking. [9]

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

Q5) a) Draw neat diagram and explain vector control of PM synchronous motor. [8]

b) Draw speed torque characteristics of PMSM. Explain application of synchronous reluctance motor in EV. [8]

OR

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

b) Draw construction of synchronous reluctance motor and explain its operation. [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 Solar and battery powered application. [8]

OR

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

i) Classes of motor duty.

ii) Requirements of drive for Traction.

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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