Total No. of Questions : 8]

SEAT No. :

P-1407

[Total No. of Pages : 3

[6004]-514A

B.E. (Electrical)

ADVANCED ELECTRIC DRIVES & CONTROL

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

Time : 2½ 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.7or Q.8***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of calculator is allowed.***
5) ***Assume suitable data if necessary.***

Q1) a) With necessary mathematical expressions explain ac dynamic braking of three phase induction motor using two lead connection. Also draw necessary torque speed characteristics. **[9]**

b) A 400V wye connected 3 phase, 6 pole, 50 Hz induction motor has following parameters referred to the stator Rs = Rr' = 1 Ohm, Xs = Xr' = 2 Ohm is under go plugging operation from its full load speed of 950 rpm. The stator to rotor turns ratio is 2.3. Calculate the initial braking current and torque as a ratio of their full load values. What resistance must be inserted in rotor circuit to reduce the maximum braking to 1.5 times full load current? **[9]**

OR

Q2) a) Discuss VSI fed induction Motor Drive. Also give different circuit topologies of VSI fed Drives. **[9]**

b) A3φ, 415V, 50Hz, 4 pole, 1460 RPM, star connected induction motor has the following parameters. R_1= 0.65Ω; R_2 = 0.35Ω; X_1= 0.95Ω, X_2 = 1.43Ω, X_m = 28Ω. Motor speed is controlled by varying stator

P.T.O.

Voltage and frequency keeping the V/f ratio constant at the rated condition. Determine the maximum Torque and speed at which it occurs for stator frequencies. **[9]**

i) 50Hz

ii) 35Hz

iii) l0Hz.

Q3) a) Describe the construction and operation of BLDC Motor. **[8]**

b) With neat diagram explain close loop control of BLDC motor. Also describe characteristics of BLDC Motor. **[9]**

OR

Q4) a) Describe with necessary diagram sensored vector control of BLDC motor. What advantages of vector control? **[9]**

b) Explain control scheme of BLDC motor used in EV applications. **[8]**

Q5) a) Explain different topologies of rotor constructions used in PMSM. Also state the applications of each. **[9]**

b) Explain direct vector control of PMSM motor with necessary diagrams. **[8]**

OR

Q6) a) Describe the construction of synchronous reluctance motor. Also judge the suitability of this motor for EV applications. **[9]**

b) Compare BLDC motor with PMSM motor. **[8]**

Q7) a) How motors are classified on the basis of duty and enclosure type. How these will help selecting motors? **[9]**

b) Explain various requirements and choice of drive for EV applications. Also explain basic operations of drive. **[9]**

OR

Q8) a) Explain requirements of motor drive requirements for traction applications. Explain with neat sketch any one scheme. **[9]**

b) With schematic diagram explain drives required in sugar industries. Will modern power converters be useful in sugar industry? Explain. **[9]**

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