Total No. of Questions : 6]

SEAT No. :

P259

[Total No. of Pages : 2

Oct. - 16/B.E./ Insem. - 142
B.E. (E & TC)
INDUSTRIAL DRIVE & CONTROL
(2012 Pattern)

Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***All questions carry equal marks.***
5) ***Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

Q1) a) What are phase controlled converters? Explain with circuit diagram & waveforms working of 3ϕ semiconverter drive for separately excited DC motor. Comment on p.f. **[6]**

b) What are choppers? Compare chopper drive with converter drive. **[4]**

OR

Q2) a) A 15 HP, 220V, 2000 rpm separately excited DC motor controls a load requiring torque T_L = 45 N – m at a speed of 1200 rpm. Field circuit resistance R_f = 147 Ω armature circuit resistance R_a = 0.25 Ω & voltage constant of motor Kv = 0.7032 V/A- rad/ sec. The field voltage is 220V. The viscous friction & no-load losses are negligible. Armature current can be assumed to be continuous & ripple free. **[6]**

Determine: i) Back Emf. ii) Required armature voltage Ea.

b) What is series motor? Explain with circuit diagram & waveforms. **[4]**

Q3) a) What is the need of Induction Motors in Industry? Explain with block diagram, speed control technique of Induction Motor by using $\frac{V}{f}$ method. Plot its T_q, speed & slip characteristics. **[6]**

b) What are protection circuits? Explain in brief. **[4]**

P.T.O.

OR

Q4) a) What are Inverters? Explain with block diagram, working & speed control technique of 3ϕ PWM based Induction Motor (drive). Comment on its characteristics. **[6]**

b) What is the need of soft start in motors? Explain acceleration & deceleration. **[4]**

Q5) a) What are Synchronous Motors? Explain with diagram & speed characteristics. State its advantages. **[6]**

b) What is Switched Reluctance Motor? Compare with cylindrical rotor Motor drive. **[4]**

OR

Q6) a) What are different types of braking techniques used for Induction Motors? Explain any one type. **[6]**

b) What is the need of salient pole Motor drive in industries? Explain in brief. **[4]**