

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 $T_L = 45 \text{ N - m}$ at a speed of 1200 rpm. Field circuit resistance $R_f = 147 \Omega$ armature circuit resistance $R_a = 0.25 \Omega$ & voltage constant of motor $K_v = 0.7032 \text{ V/A- rad/ sec}$. 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 E_a .

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 3 ϕ 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]

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