

Total No. of Questions :12]

SEAT No. :

P832

[4659]-91

[Total No. of Pages : 3

B.E. (E&TC)

C- INDUSTRIAL DRIVES & CONTROL

(Semester-I) (2008 Course)(Elective-I)

Time : 3 Hours]

[Max. Marks : 100

Instructions to the candidates:

- 1) *Answer three questions from section I and three questions from section II.*
- 2) *Answers to the two sections should be written in separate books.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*
- 5) *All questions carry equal marks.*
- 6) *Your answers will be valued as a whole.*
- 7) *Use of logarithmic tables slide rule, Mollier charts, electronic pocket Calculator and steam tables is allowed.*
- 8) *Assume suitable data, if necessary.*

SECTION-I

- Q1)** a) For the 3 phase full controlled converter operating from 415V, 50Hz with inductive load. Derive average output voltage. **[8]**
- b) A 3 ϕ Full controlled converter is connected to the armature of a DC Motor. The motor runs at 1000 rpm at no - load, if connected to 220V DC source , $R_a = 1\Omega$ find: **[10]**
- i) Line to line voltage of the converter so that maximum output voltage of converter is equal to rated voltage of the motor.
 - ii) The speed of motor for $\alpha = 45^\circ$, & $I_a = 20A$.

OR

- Q2)** a) What are reversible drives? Explain with circuit diagram & waveforms, working of 3 phase dual converter with circulating current mode operation with heavy loads. **[8]**
- b) What is chopper? Explain with circuit diagram and waveforms working of 2 Quadrant step -down chopper. **[6]**
- c) Explain the effect of "L_s" source inductance on performance on full controlled converter. **[4]**

P.T.O.

- Q3)** a) What is the need of 3 phase inverters in industries ? Explain with circuit diagram & w/F's, working of 3 ϕ VSI operating in 120° mode of conduction with R- load. State its advantages & dis- advantages. [10]
- b) Explain Harmonic reduction technique.Used in Inverters. Comment on p.f. [6]

OR

- Q4)** a) What are resonant converters? Explain with circuit diagram & waveforms working of ZVS. [10]
- b) What is single resonant & multiresonant converter. State its advantages & disadvantages. [6]

- Q5)** a) What is the principle of DC motor? Explain with circuit diagram, working of 1 ϕ Separately excited DC motor operating with semi converter with highly inductive load. [10]
- b) What are DC motor performance characteristics? Explain. [6]

OR

- Q6)** Write short notes on any three: [16]
- Cycloconverter.
 - Multilevel converters.
 - Protection circuits for DC motors.
 - Speed control technique of series motor.
 - Regenerating braking techniques.

SECTION -II

- Q7)** a) What is slip - power recovery? Explain with circuit diagram,working of Scherbius system for slip -Power recovery. [8]
- b) What is acceleration & Deceleration ? Explain. [4]
- c) What is soft start? Explain in brief. [4]

OR

- Q8)** a) What is static krammer Drive? Explain with diagram [8]
b) Explain how will you improve the slip power. State its subsynchronous & super synchronous modes. [8]

- Q9)** a) Explain speed control technique of 3 ϕ Induction motor by using $\frac{V}{f}$ technique. Comment on T_q , N characteristics. [8]
b) What are brushless motors? Explain with block diagram working of 3 ϕ brushless DC motor. [8]

OR

- Q10)**a) What is Micro- stepping? Explain with circuit diagram working of microprocessor based stepper motor control state its advantages. [10]
b) What is synchronous motor? Explain in brief. [6]

- Q11)**a) What is power quality? Mention various types of power line disturbances & suggest preventive & nullifying measures for these disturbances. [12]
b) What is the need of Energy audit? Explain. [6]

OR

- Q12)** Write short notes on any three: [18]
a) Traction drives.
b) Fuzzy logic based Induction motor drive
c) LCI
d) ZCS
e) Universal motors.

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