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Name.....

Reg. No.....

EIGHTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, MAY/JUNE 2007

PTEE 2K 801/EE 2K 802—INDUSTRIAL DRIVES

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

1. (a) State and briefly describe essential parts of electrical drives.
   (b) Briefly explain the function of a phase-locked loop speed control.
   (c) List the advantages offered by d.c. chopper drives over line-commutated converter controlled d.c. drives.
   (d) Write short notes on the battery operated electric drives.
   (e) Discuss briefly the stator voltage control scheme of three-phase induction motors.
   (f) Explain various methods of harmonic reduction in induction motor drives.
   (g) Explain briefly the operation of self-controlled synchronous motor drives.
   (h) In variable frequency control of a synchronous motor why (V/f) ratio is maintained constant upto base speed and V constant above the base speed.

(8 × 5 = 40 marks)

2. (a) Describe the methods of finding the equivalent moment of inertia of motor load system and equivalent torque components for (i) loads with rotational motion and (ii) loads with translational motion.

Or

   (b) Why current sensing is required in electrical drives ? What are the common methods of current sensing ? Also describe the function of each.

(15 marks)

3. (a) Draw the circuit diagram and explain the operation of a three-phase semiconverter drive. Also, sketch and explain the following output voltage and output current waveforms at (i) $\alpha = 60°$ and $\alpha = 120°$.

Or

   (b) Draw the circuit diagram and explain the operation of chopper fed d.c. series motor. Also, derive the expressions for I_{max} and I_{min} assuming a continuous armature current.

(15 marks)

4. (a) Explain the operation of induction motor for two different cases when fed by current source inverters :
   (i) Operation at and below rated frequency.
   (ii) Operation above rated frequency.

Or

Turn over

) State and describe the various schemes for induction motor speed control by voltage source inverters.

(15 marks)

) Describe with suitable diagrams, the operation of a brushless d.c. motor drive.

Or

) Draw and explain the block diagram of an microprocessor based synchronous motor drive.

(15 marks)

[4 × 15 = 60 marks]