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B TECH
(SEM-VI) THEORY EXAMINATION 2017-18
INTRODUCTION TO ELECTRIC DRIVES

Time: 3 Hours   *Total Marks: 100*

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1.   **Attempt *all* questions in brief.**   **2 x 10 = 20**

   a.   Write the differences between Transistor and Thyristor.
   b.   Explain the basic principle of Thyristor.
   c.   Listed the various performance factors of line commutated converters.
   d.   What do you mean by dual converter? Explain.
   e.   Enlist the advantages & applications of cyclo-converter.
   f.   Explain the term: Chopper.
   g.   Define DC motor speed control.
   h.   Enlist the different methods for braking of a dc motor
   i.   Discuss about the significance of rotor resistance control.
   j.   Write the differences between AC drives and DC drives.

SECTION B

2.   **Attempt any *three* of the following:**   **10 x 3 = 30**

   a.   (i) Explain the gate protection of SCR against over voltage and currents.
        (ii) Draw and explain the V-I characteristics of a thyristor.
   b.   Draw and explain the circuit for single phase half wave controlled converter with RLE load. Also explain its output waveforms.
   c.   Explain the principle of chopper operation. Also Explain the working of step-up chopper.
   d.   Explain the operation of separately excited dc motor driven using a semi-converter.
   e.   (i)Explain the construction and working of three phase induction motor.
        (ii) Discuss about anyone method for speed control of induction motor.

SECTION C

3.   **Attempt any *one* part of the following:**   **10 x 1 = 10**

   (a)   With a neat diagram explain the working of the gate trigger circuit thyristor.
   (b)   (i) Write a note on resistance capacitance firing circuit.
        (ii) The voltage and current rating in a particular circuit are 3KV and 750A respectively. SCRs with a rating of 800V and 175A are available. Minimum derating factor is 15%. Determine the number of series and parallel units required.

4. **Attempt any *one* part of the following:** 10 x 1 = 10

(a) Explain the operation of fully controlled bridge circuit having inductive load and find the expression for output voltage.

(b) What do you mean by the three phase inverter? Explain its working with its output waveforms.

5. **Attempt any *one* part of the following:** 10 x 1 = 10

(a) Describe the waveform for single phase to single phase circuit step-down cyclo converter for discontinuous load current.

(b) What do you mean by Jones copper? Explain the design considerations of Jones copper.

6. **Attempt any *one* part of the following:** 10 x 1 = 10

(a) (i) Describe the regenerative braking of a chopper-fed separately excited dc motor. Illustrate answer with circuit diagram and relevant waveforms.
(ii) Explain in brief anyone method of braking of a dc motor.

(b) Explain the speed control of DC series motor using single phase full converter.

7. **Attempt any *one* part of the following:** 10 x 1 = 10

(a) (i) Draw a suitable diagram & explain working of slip power recovery system using commutator-less Kramer drive.
(ii) Enumerate the variable frequency control of an induction motor.

(b) A 3-phase squirrel cage induction motor running at 1440 rpm at 50Hz develops torque of 2000N-m. If motor frequency is now increased to 80 Hz using constant power mode. Calculate the new value of torque developed by motor at constant slip.