Printed Pages: 02 **Sub Code:KEE075**

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B.TECH
(SEM VII) THEORY EXAMINATION 2022-23
ELECTRIC DRIVES

Time: 3 Hours ***Total Marks: 100***

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

SECTION A

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

(a) Classified various mechanical loads on the basis of their speed-torque characteristics.
(b) What do you mean by constant power operation.
(c) Explain the concept of steady state stability?
(d) What is meant by heating time constant of motor?
(e) Write down various methods of reducing energy losses during starting.
(f) What are the advantages and disadvantages of electrical braking?
(g) Mention various methods of power electronics control of ac motors.
(h) Why the thyristor control is preferred over Ward Leonard system of speed control?
(i) What do you mean by cycloconverter.
(j) Variable frequency control yields high torque to current ratio during starting. Why?

SECTION B

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

(a) Write a brief note on motors employed in electric drives.
(b) Explain the loading of an electric motor and its duty cycle with a simple diagram.
(c) Draw and explain the speed torque characteristics for dynamic breaking operation of DC series motor. Why torque becomes zero at finite speed?
(d) Explain in detail the operation of DC separately excited motor fed by 3-ϕ fully controlled rectifier considering the continuous conduction mode.
(e) Explain how the Static Scherbius drive is used in slip power recovery scheme.

SECTION C

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

(a) Elucidate the multi-quadrant operation of Electric drive system.
(b) State the advantages of drive system. Give some applications with suitable drive system.

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

(a) Explain the regenerative braking of separately excited DC motor.
(b) Derive, the expression to calculate the energy loss during starting of Induction motor and also state the various methods used to reduce the energy loss during starting.

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

(a) Comment on the stability of the operating points A, B, C, D in fig (1).

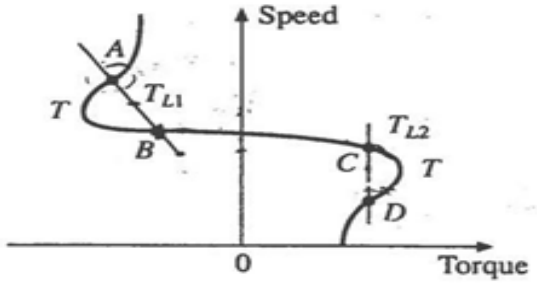

Fig 1

(b) Illustrate the Dynamics of motor load system. Also give comparison between DC and AC Drive.

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

(a) Draw the block diagram of an electric drive. Explain the function of Power modulator in detail.

(b) A 250V, 900 rpm and 200A separately excited dc motor has an armature resistance of 0.02Ω. The motor is fed from a chopper operating in dynamic braking with braking resistance of 0.2Ω (i) calculate duty ratio of chopper for a motor speed of 600 rpm & braking torque twice the rated value (ii) what will be motor speed for a duty ratio of 0.6 and motor torque equal to twice its rated torque.

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

(a) Describe the construction and working of brushless dc motor.

(b) Describe the construction and working of switched reluctance motor.