00754

DIPLOMA IN ELECTRICAL ENGINEERING

Term-End Examination

June, 2011

BIEE-030 : INDUSTRIAL DRIVES AND CONTROLS

Time : 2 hours   *Maximum Marks : 70*

Note :   (1) Attempt **any five** Questions.

(2) Question no. **1** is **compulsory**. (objective types)

(3) Draw neat & clean Diagram if any Required.

1.   Give the suitable answer of the following questions.   **7x2=14**

(a)   The minimum gate current which can turn on SCR is called.

(i)   Trigger current

(ii)   Holding current

(iii) Junction current

(iv) Break over current

(b)   In a controlled rectifier a freewheeling Diode is necessary if the load is

(i)   Inductive

(ii)   Resistive

(iii) Capacitive

(iv) any of the above

(c) The no. of thyristors in a single phase fully controlled bridge rectifier

(i) 16   (ii) 8   (iii) 4   (iv) 2

(d) A single phase full converter can operate in

(i) 4 quadrants   (ii) 3 quadrants

(iii) 2 quadrants   (iv) 1 quadrants

(e) If 4 quadrants operation is required we need.

(i) Dual converter   (ii) Full converter

(iii) Semi converter   (iv) any of the above

(f) A cyclo converter converts the-

(i) AC to DC   (ii) DC to AC

(iii) DC to DC   (iv) AC to AC

(g) Chopper converts

(i) Constant voltage DC into AC then into variable DC.

(ii) Constant voltage DC into variable DC directly.

(iii) Converts AC of one frequency into AC of another frequency.

(iv) None of them.

2. (a) Draw and explain the working principle of single phase semi converter dc.motor drive and give the advantages of variable speed drives.   7

(b) Explain the speed and torque characteristics for DC series and shunt motor with the help of derivation. 7

3. (a) Explain the working principle of three phase full converter. Derive with the help of the ckt. Diagram. 7

(b) Draw and explain the Block Diagram of speed control of DC-motor using feed back loop. 7

4. (a) Compare converter fed and chopper fed DC drive and explain motoring mode of chopper drive. 7

(b) A one Quadrant chopper is used for rheostatic breaking of a separately excited DC Motor. $R_a = 0.1 \, \Omega$ breaking Resistance is 7.5 Ω, voltage constant 1.4V/A-rad-/sec, armature current is 120 Amp. and field current is 1.6Amp. The Duty cycle of chopper is 0.35. Find 7

(i) average voltage across chopper

(ii) power dispiated in breaking resistance.

(iii) motor speed

5. (a) What is thyristor ? Discuss it's operation   **7**
        and characteristics.

    (b) Name the methods for speed control of 3   **7**
        phase induction motor and explain any one
        method.

6. (a) Explain the commonly used methods for the   **7**
        determination of power rating of the motor.

    (b) Explain with necessary diagram the single   **7**
        phase controlled rectifier.

7. Write the short notes on *any Two*.   **7+7=14**

    (a) Duty cycle of drives

    (b) Basic torque equation

    (c) General configuration of a motor drive.

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