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DIPLOMA IN ELECTRICAL ENGINEERING (DELVI)/ADVANCED LEVEL CERTIFICATE COURSE IN ELECTRICAL ENGINEERING (ACELVI)

Term-End Examination

December, 2013

BIEE-030 : INDUSTRIAL DRIVES AND CONTROLS

Time : 2 hours   *Maximum Marks : 70*

Note : (i) Attempt **any five** questions.
(ii) Question No. **1** is **compulsory**. *(objective types)*
(iii) *Draw neat and clean diagram, if any required.*

1. (a) The minimum gate current which can turn off SCR is called :   **7x2=14**

     (i) Latching current

     (ii) Holding current

     (iii) Junction current

     (iv) Trigger current

    (b) SCR is a :

     (i) Unilateral   (ii) Bilateral

     (iii) Unijunction   (iv) Two Junction

    (c) Chopper has $V_o = \alpha V_s$

     (i) Step up   (ii) Step down

     (iii) Both   (iv) None

(d) Inverter converts :

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

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

(e) For single phase fully controlled drive connected to dc motor the expression as :

    (i) $V + I_a R_a = K\phi N = \dfrac{2V_m}{\pi}\cos\alpha$

    (ii) $V - I_a R_a = K\phi N = \dfrac{V_m}{2\pi}\cos\alpha$

    (iii) $V + I_a R_a = K\phi N = \dfrac{V_m}{\pi}\cos\alpha$

    (iv)   None

(f) Cycloconverter converts :

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

    (iii)   AC to DC   (iv)   None

(g) Triac is a :

    (i)   Unidirectional

    (ii)   Bidirectional

    (iii)   Both

    (iv)   None

2. (a) Draw and explain the working of 3 phase semi-converter drive and give advantage of variable speed drives.   7

    (b) Derive relation between firing angle and speed for dc series motor fed with single phase fully controlled rectifier.   7

3. (a) Explain single phase half wave controlled rectifier connected to a separately excited dc motor, derive relation for that. 7

   (b) Draw and explain the speed control of a 3 phase fully controlled rectifier for a dc series motor. 7

4. (a) Explain chopper fed dc drive and two quadrant and four quadrant operation of it. 7

   (b) Derive relation between voltage output and input voltage for step up and step down chopper. 7

5. (a) Derive $\alpha V_s = V_t - I_a R_a$. Where symbol has usual meaning. 7

   (b) Explain general configuration of a motor drive. 7

6. (a) Explain different method of induction motor drive. 7

   (b) Explain cyclo converter base dc drive. 7

7. (a) Explain torque - speed characteristics of 3 phase induction motor in detail. 7

   (b) Draw waveform of step up cyclo converter and fed to AC motor. 7

8. (a) Explain seperately excited DC motor with single phase fully controlled converter. **7**

   (b) Explain PWM control and comparison of VSI and CSI operation. **7**

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