No. of Printed Pages : **3**

BIEE-035

DIPLOMA - ELECTRICAL ENGINEERING (DELVI)

00591

Term-End Examination

June, 2013

BIEE-035 : CONTROL SYSTEMS

Time : 2 hours *Maximum Marks : 70*

*Note : There are total **eight** questions. All questions carry **equal** marks. Question No. **1** is **compulsory**. **Four** questions are to be attempted out of question No 2 to 8.*

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1. Write **'True'/'False'** and justify. **2x7=14**

   (a) Negative Feedback Control System is inherently stable.

   (b) Position Control System belongs to Process Control Category.

   (c) In a I^{st} order system the o/p reaches 63.2% of its final value in 0.2 time constants.

   (d) For a sluggish (slow moving) system the value of $\zeta < 1$.

   (e) For a stable system there should be one change of sign in the first column of routh array.

   (f) A two - phase a.c. servo motor has a drag - cup rotor essentially.

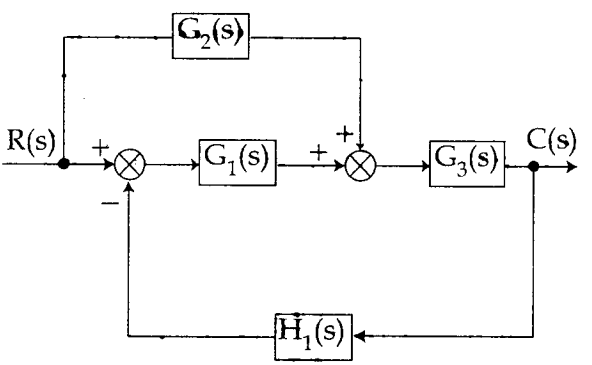
   (g) The term 'Robot' is derived from the Greek word 'Robota' meaning a *slave*.

2. Derive and draw the unit step response of a 2nd order underdamped system. Explain the various parameters of the response like rise time, delay time etc. 14

3. (a) Compare open loop and closed loop control system. 7

(b) Draw and explain the working of Automatic Control System. 7

4. (a) Reduce the following block diagram and find the transfer function : 7



(b) A series RL circuit is connected to a dc-source of E volts. Derive an expression for the steady state value of current flowing in the circuit. 7

5. (a) Define stability. What do you understand by absolute and relative stability ? 7

(b) The characteristic eqn. of a closed loop control system is 7

$s^5 + 1.5\ s^4 + 2s^3 + 4s^2 + 5s + 10 = 0$.

Comment on stability using Routh's criterion.

6. (a) Draw and explain the working of electronic PI - controller. Derive its transfer function also. 10

(b) Derivative control is never used alone. Comment and justify. 4

7. (a) Explain the construction and working of a synchro error detector. 7

(b) Explain the construction and working of a d.c. servo motor. 7

8. Write short notes on **any four** of the following : 14

(a) A.C. servomotor

(b) Phase Margin

(c) Effect of adding a zero to a transfer function.

(d) Reset Windup

(e) Robot Classification

(f) Types of End - effectors of a robot.