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BIEE-021

B.Tech. – VIEP – ELECTRICAL ENGINEERING (BTELVI)

Term-End Examination

00273

June, 2018

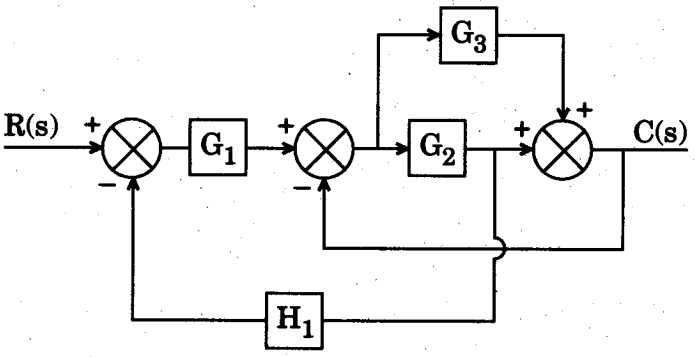
BIEE-021 : CONTROL SYSTEMS

Time : 3 hours *Maximum Marks : 70*

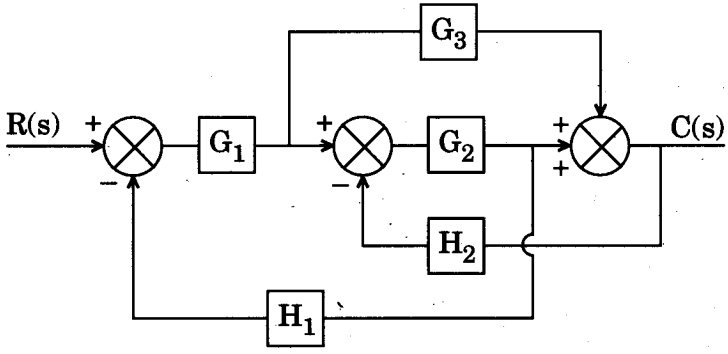
Note : *Attempt any **five** questions. All questions carry equal marks. Use of scientific calculator is permitted.*

1. (a) Explain how control systems are classified. Distinguish between feed-back control system and feed-forward control system. 7

(b) Determine the transfer function C(s)/R(s) from the block diagram shown in the following figure : 7



2. Determine the transfer function relating C and R for the block diagram given in the figure below, use the Mason's Gain formula. *14*



3. (a) A closed loop control system has the characteristic equation given by

$$s^3 + 4{\cdot}5s^2 + 3{\cdot}5s + 1{\cdot}5 = 0.$$

Investigate the Routh–Hurwitz criterion. *6*

(b) Define the following terms : *4×2=8*

(i) Rise time

(ii) Peak time

(iii) Settling time

(iv) Maximum overshoot

4. (a) What is a polar plot ? Explain the polar plot for type 0 and type 1 system. *7*

(b) What is compensation ? Discuss various types of compensators. *7*

5. Sketch the Bode plot for the open loop transfer function for the unity feedback system given below and discuss about its stability. *14*

$$G(s) = \frac{50}{(s+1)(s+2)}$$

6. (a) What are the advantages of state space approach over transfer function as well as graphical approach for the analysis of control system ? *7*

(b) Explain the concept of controllability and observability in detail. *7*

7. Write short notes on any ***two*** of the following : *2×7=14*

(a) PID Controllers

(b) DC Servo-Motors

(c) Concept of Absolute Stability