

**B.Tech. SEM -IV E & TC 2014 Course (CBCS) : WINTER - 2018**

**SUBJECT: CONTROL SYSTEM ENGINEERING**

Day : Thursday  
Date : 15/11/2018

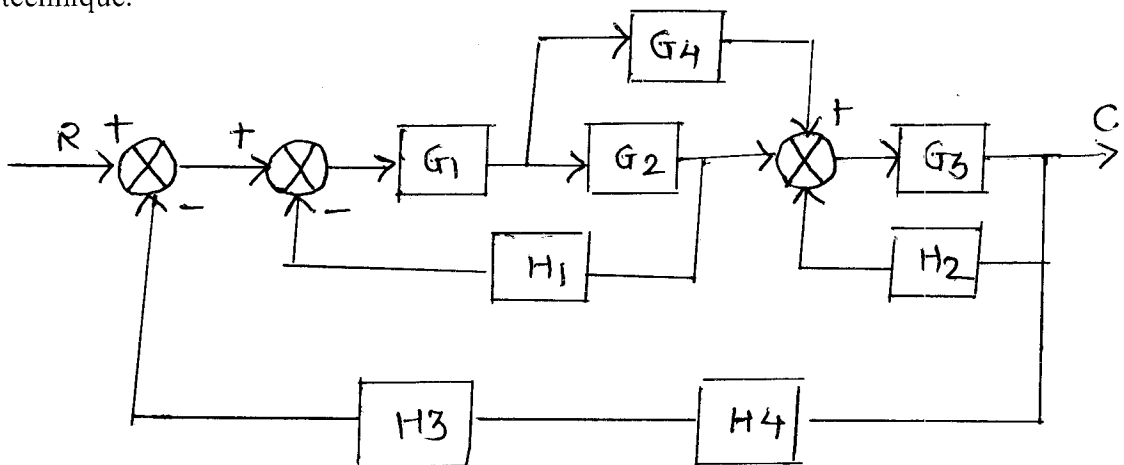
**W-2018-2372**

Time: 02.30 PM TO 05.30 PM  
Max. Marks: 60

**N. B. :**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Draw neat and labeled diagram **WHEREVER** necessary.
- 4) Assume suitable data, if necessary.

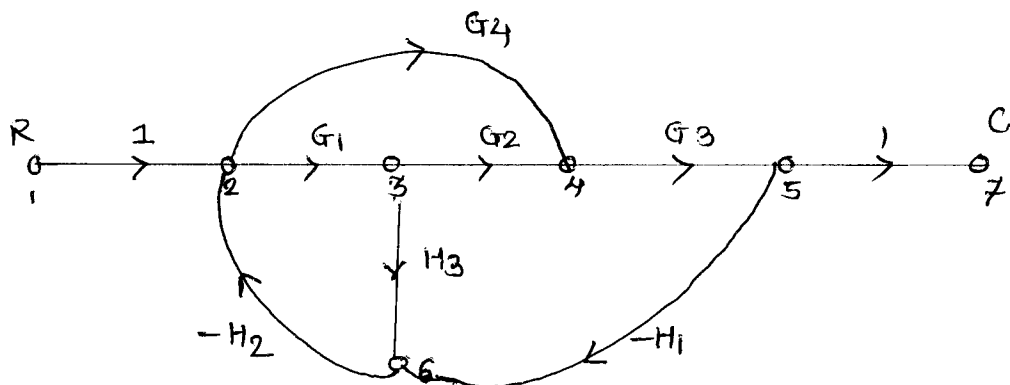
**Q. 1 a)** Find  $C(s) / R(s)$  of the system shown below using Block Diagram Reduction technique. (06)



**b)** What is the difference between Feedback control system and Feed-forward control system? (04)

**OR**

**a)** What is the Mason's gain formula? Determine T.F. of the following S.F.G. (06) using Mason's gain formula.



**b)** How does closed loop control system is advantageous over open loop control system. Give a suitable example. (04)

**P. T. O.**

- Q2.** a) What is the working principle of LVDT? Explain. (06)  
 b) What are the level measuring instruments? (04)

**OR**

- a) What are the types of Transducers? Explain any one in detail (05)  
 b) Explain working principle of Strain Gauge. (05)

- Q3.** a) What is the Time domain Specifications? Explain. (05)  
 b) For Unity F/B system having open loop T.F.  
 $G(s) = k(s+2) / s^2 (s^2+7s+12)$   
 Find out Error Constants & Type no. of the system. (05)

**OR**

The open loop T.F. of the system with unity F/B gain is given as (10)  
 $G(s) = 20 / s^2 + 5s + 6$   
 Determine the Damping Ratio, Max Overshoot, Rise Time, Peak Time.  
 Derive the used Formula.

- Q4.** a) A system is having closed loop T.F. as  $T(S) = k / s^3 + 5s^2 + 5s - 2$  (05)  
 Discuss about the stability.  
 b) What is the Routh – Hurwitz Criteria (05)

**OR**

- a) Which are the necessary conditions needs to be checked to test the stability of the system. (03)  
 b) Sketch the Root Locus for the system with open loop T.F. (07)  
 $G(s) = k / s(s^2+4s+8)$

- Q5.** a) What is Nyquist Stability Criteria? (05)  
 b) Draw Frequency Response of following system  $G(s) = 1 / 1+2S$  (05)

**OR**

Sketch the Bode plot for unity F/B system with the open loop T.F. (10)  
 $G(s) = 0.5 / s (s^2+s+1)$  Find Gain Margin & Phase Margin.

- Q6.** a) Which are the steps to design Lead Compensators? (05)  
 b) What is ON/OFF controller? Explain it with suitable example. (05)

**OR**

- a) What is meant by PLC? Explain Architecture of PLC. (05)  
 b) What are the types of Compensators? Explain any one in detail. (05)

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