

Roll No. ....

**OLE-3238**  
**B. Tech. 5th Semester (EE)**  
**Examination – April, 2021**  
**CONTROL SYSTEM**  
**Paper : PCC-EE-305-G**

*Time : Three Hours ]*

*[ Maximum Marks : 75*

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*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

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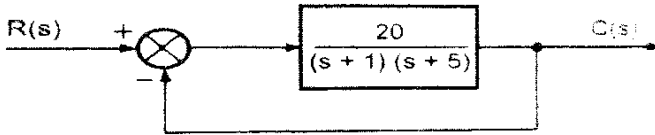
**Note :** Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is *compulsory*. All questions carry equal marks.

1. (a) Differentiate between open loop and close loop control system.
- (b) Explain brief about Gain and Phase Margin in Bode plot of control system.
- (c) What do you mean by analog controller in control system ?
- (d) Explain concept of state variable in state space analysis.

15

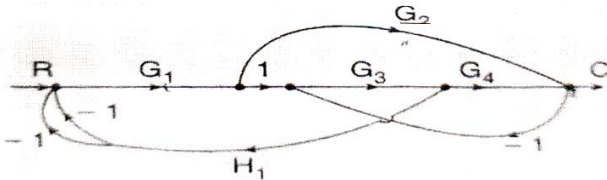
## UNIT – I

2. The block diagram of unity feedback control system is given in figure below : 15

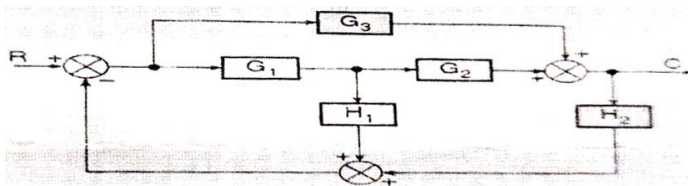


Determine the characteristic equation of the system  $\omega_n$ ,  $\xi$ ,  $\omega_d$ ,  $t_p$ ,  $M_p$ , the time at which the first overshoot occur the period of oscillation and the number of cycles completed before reaching the steady state.

3. (a) Draw the signal flow graph and determine the overall transfer function the signal flow graph is given below. 7.5



- (b) The block diagram of control system is shown below determine the overall transfer function. 7.5



## UNIT – II

4. Sketch the Bode plot for the open loop transfer function of unity feedback system given below and access stability. 15

$$G(s) = 50 s / (s + 1) (s + 2)$$

5. Using Nyquist Criteria investigate the closed-loop stability of the system whose open loop transfer function is given below : 15

$$G(s)H(s) = K(s + 1) / (s + 0.5) (s - 2), K = 1.25$$

Also determine the limiting value of k for stability.

## UNIT – III

6. Write short note on : 15
- (a) Lag Compensation
  - (b) Lead Compensation
7. Explain PID Controller with its effect on steady state error. 15

## UNIT – IV

8. Write short note on : 15
- (a) Controllability
  - (b) Eigenvalues

9. Write short note on :

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(a) Observeability

(b) State space model

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