



- Notes :
1. All questions carry equal marks.
  2. Due credit will be given to neatness and adequate dimensions.
  3. Assume suitable data wherever necessary.
  4. Diagrams and Chemical equation should be given wherever necessary.
  5. Illustrate your answers wherever necessary with the help of neat sketches.
  6. Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10.

1. a) Explain generalized measurement system with block diagram. 8
- b) What are the different methods in measurements? Describe in detail. 8

**OR**

2. a) Draw and explain the response of the 1<sup>st</sup> order system to the step input. Explain steady state error and transient error. 8
- b) Discuss following dynamic characteristics of the instruments. 8
  - 1) Overshoot
  - 2) Dead time and dead zone
  - 3) Dynamic error and
  - 4) Settling time

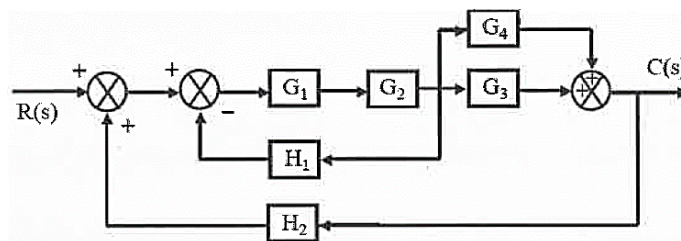
3. a) Define steady state error. Derive an expression for the steady state error. 8
- b) A system has  $G(s) = \frac{20}{s(1+4s)(1+s)}$  8  
Find:  
  - 1) Steady state error if input  $r(t) = 2 + 4t + (t^2 / 2)$
  - 2) Static errors coefficients

**OR**

4. a) The open loop transfer function of a unity feedback control system is given by  $G(s) = \frac{25}{s(s+5)}$  8  
Obtain maximum overshoot, peak time, rise time and setting time.
- b) Discuss briefly PID Controller. 8
5. a) Explain with neat sketch Centrifugal force tachometer. 8
- b) Explain construction and working of LVDT with its advantages. 8

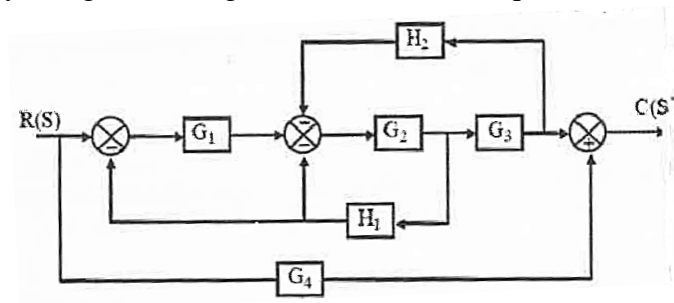
**OR**

6. a) Enlist the various transducers used in speed measurement and explain photoelectric transducer. 8
- b) Following data refers to the test on an engine with rope brake dynamometer 8  
 Mass attached to rope = 75 kg.  
 Spring balance reading = 1 N  
 Flywheel radius = 0.2 meter  
 Rope diameter = 2 cm.  
 Speed = 480 RPM. Obtain the power of the engine.
7. a) Differentiate between open loop and closed loop system. 8
- b) Find out Transfer function 8  
 $C(s) / R(s)$

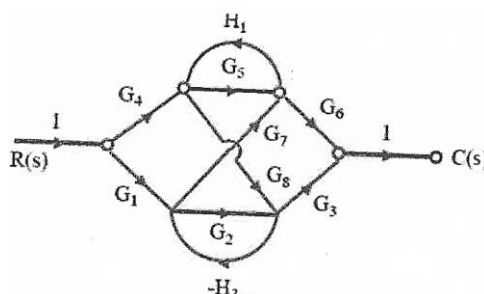


**OR**

8. a) Obtain  $C(s)/R(s)$  by using block diagram reduction technique. 8



- b) Find out Transfer function using Mason gain formula. 8



9. A unity feedback system has the open loop transfer function  $G(s) = \frac{k}{s(s+1)(s+3)}$  plot the Root locus 16

**OR**

- 10 For unity feedback system,  $G(s) = \frac{10}{s(s+1)(s+5)}$  sketch the Bode plot. Find PM and GM of the system and comment upon the stability of system. 16

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