



SF-8357

B. E. III (Sem. VI) (Mech.) Examination
May / June - 2011
Dynamics of Machinery

Time : 3 Hours]

[Total Marks : 100

Instructions :

(1)

नीचे दर्शाविए निशानीवाणी विगतो उत्तरवही पर अवश्य कर्षवी.
Fillup strictly the details of signs on your answer book.

Name of the Examination :
B. E. - 3 (SEM. 6) (MECH.)

Name of the Subject :
DYNAMICS OF MACHINERY

Subject Code No. : 8 3 5 7 Section No. (1, 2,.....) : NIL

Seat No. :

Student's Signature

- (2) Attempt all questions.
- (3) Figures to the right indicates full marks.
- (4) Use of graph paper is allowed.
- (5) Use of Laplace transform tables is not-allowed.

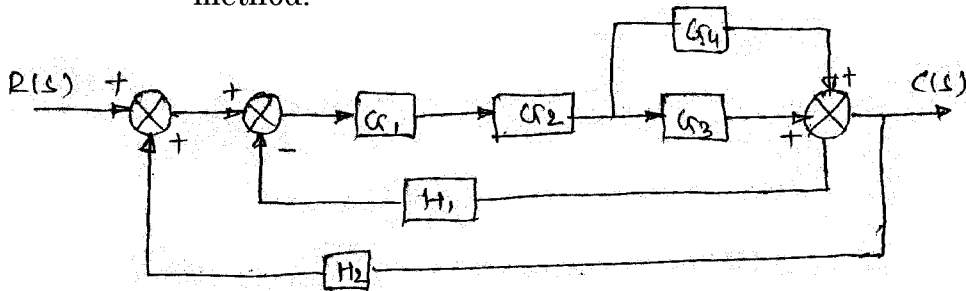
1 (a) Answer the following questions : 10

- (i) Explain control system.
- (ii) What is stability ?
- (iii) Explain open loop transfer function.
- (iv) Properties of Transfer function.
- (v) The output of a linear system for a unit step input is given by $t2e^{-t}$. Find the transfer function of the system.

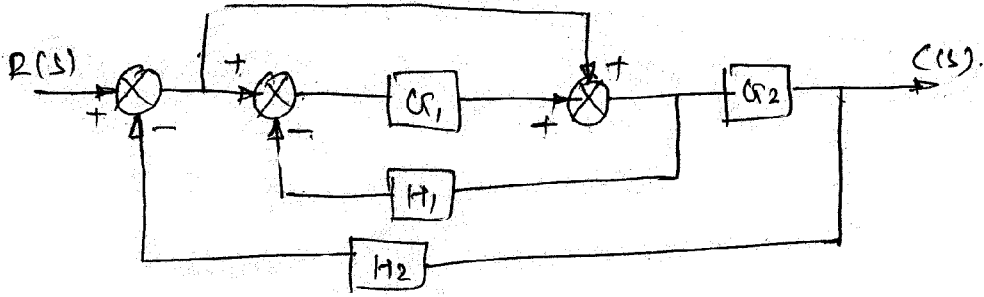
(b) Analysis of first order system for unit step response. 10

2 (a) Attempt any two : 15

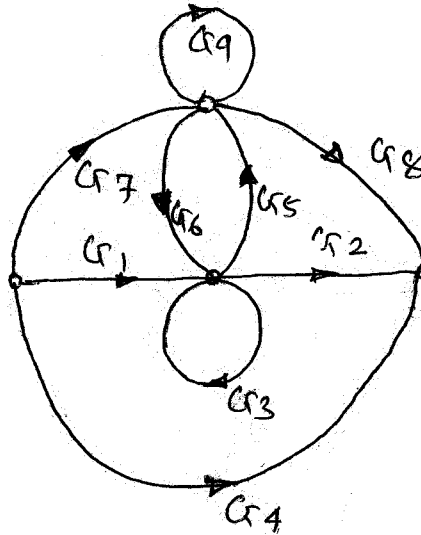
- (i) Solve the problem using block diagram reduction method.



(ii) Solve the problem using signal flow graph :



(iii) Find C/R for the following system using Mason's gain formula.



3 (a) Find the range of K for which the system, whose characteristic equation is given below is stable 5
 $F(S) = S^3 + (K+0.5)S^2 + 4KS + 50 = 0$

(b) Draw the root locus for the system 10

$$G(S) \cdot H(S) = \frac{K}{S(S+3)(S+6)}$$

Obtain the value of K when $\xi = 0.6$

Determine the value of K for marginal stability and critical damping.

OR

- (b) Sketch the root locus for transfer function :

$$G(S).H(S) = \frac{K}{(S+2)^3}$$

Find the value of K which gives a damping ratio of 0.5.
For K = 8, find the gain margin and phase margin of system.

- 4 Write short notes : (any **four**) **20**
- (a) Pneumatic Relay
 - (b) Liquid Level Control
 - (c) Control system in thermal power plant
 - (d) Control system in Automobiles
 - (e) Concept of fuzzy logic
- 5 (a) Derive block diagram and transfer function for speed control of DC motor by Armature Control. **8**
- (b) Classify hydraulic pumps based on construction. **7**
Explain any two with neat sketches.

OR

- (b) Write short notes on : **7**
- (i) Hydraulic Ram
 - (ii) Hydraulic Crane
- 6 (a) Explain the construction and working of pneumatic amplifier with neat sketch. **8**
Derive block diagram and transfer function for the system.
- (b) (i) State advantages and disadvantages of pneumatic system over hydraulic system. **4**
- (ii) Write desirable characteristic of hydraulic fluid. **3**

OR

- (b) Classify pneumatic valves. Explain 4 way valve and flapped nozzle valve with neat sketches. **7**