Seat No: _____ **Enrollment No: _____**

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

B.Tech. Summer 2018 - 19 Examination

Semester:8 **Date:03/05/2019**
Subject Code: 03109453 **Time:10:30am to 01:00pm**
Subject Name: Control Engineering **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Objective Type Questions - (All are compulsory) (Each of one mark) **(15)**

1.For the first order system $G(s) = \frac{3}{s+5}$ Value of D.C gain (K) of the system is _____

2. The only function of NOT Gate is _____

3.The most common hydraulic fluid is _____

4. Find the pneumatic system component
(A)FRL unit (B) Pump (C) Tank (D) Accumulator

5. _____ system uses pressurized air or other gases?

6. Despite the presence of negative feedback, control systems still have problems of instability because the
(A)Components used have non-linearity.
(B) Dynamic equations of the subsystems are not known exactly.
(C) Mathematical analysis involves approximations.
(D) System has large negative phase angle at high frequencies.

7.If the Unit step response of a network is $\left(1 - e^{-\alpha t}\right)$ then its unit impulse response will be _____

8. _____signal deals with the excitation or stimulus applied to the system from an external source for the generation of an output?

9. In Signal flow graph , nodes are represented by small _____

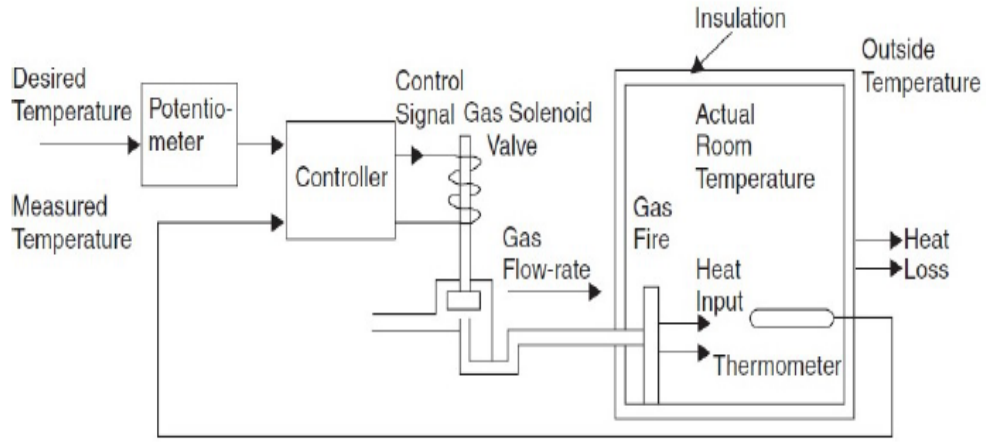
10. Value of parabolic input in Laplace domain is _____

11. Which condition is used to verify the existence of a particular point on the root locus?
(A) Amplitude (B) Frequency (C) Angle (D) Magnitude
12. Which unit is adopted for magnitude measurement in Bode plots?
(A) Degree (B) Decimal (C) Decibel (D) Deviation
13. Which controller has potential to overcome the drawback of offset in Proportional controllers?
(A) P-I (B) P-D (C) Both A and B (D) None of above
14. A good control system should be sensitive to _____

15. What does the numbers in 4/2 valve means _____

Q.2 Answer the following questions. (Attempt any three) **(15)**

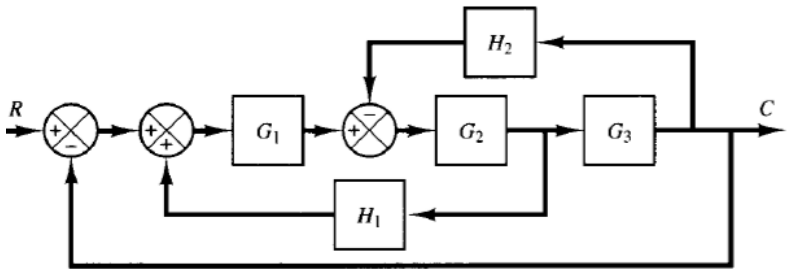
A) Draw the block diagram for the below mention room temperature control system.



B) Define Delay time, Rise time & settling time and Write the equation for settling time according to 2% and 5% criteria.

C) What is Frequency response analysis with its need?

D) Solve the following block diagram and find the transfer function



Q.3 A) What is the need of FRL unit in Pneumatic system? Differentiate between electrical, Hydraulic and Pneumatic system. **(07)**

B) Find time domain specifications for $\frac{C(s)}{R(s)} = \frac{1}{s^2+s+1}$ like (i) Natural frequency (ii) Damping factor (iii) Rise time (iv) Delay time. **(08)**

OR

B) Enlist any four rules of Block Diagram Reduction Method. **(08)**

Q.4 A) Determine the stability to $s^6 + 2s^5 + 8s^4 + 12s^3 + 20s^2 + 16s + 16$ using Routh's Criteria. **(07)**

OR

A) Enlist different principles used in Hydraulic control system and Explain in detail Pascal's Law. **(07)**

B) Draw the symbol and truth table for any four logic Gates. **(08)**