Name:

Enrolment No:

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, Dec 2023

Programme Name: B Tech (Aerospace Engineering) **Semester : VII**
Course Name : Introduction to Automatic Flight Control **Time : 03 hrs**
Course Code : ASEG 4015P **Max. Marks: 100**
Nos. of page(s) : 02
Schematic diagrams are must in each answers

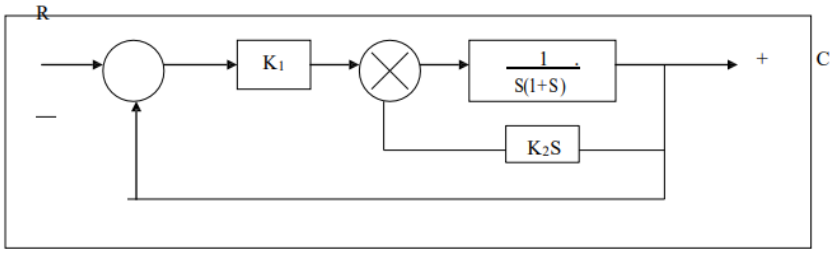
SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	How SFG is suitable algorithm in solving the complex control problems.	**4**	**CO1**
Q 2	Differentiate Fourier and Laplace transforms with e.g.	**4**	**CO2**
Q 3	List out the time response parameters used for dynamics study	**4**	**CO3**
Q 4	Discuss surface-to-air missile guidance systems	**4**	**CO 4**
Q 5	What is the meaning of Guidance, Navigation and Control for any Aerospace Vehicles?	**4**	**CO 4**

SECTION B
(4Qx10M= 40 Marks)

Q 6	Describe the methods of aerospace vehicle control system operations	**10**	**CO4**
Q 7	Measurements conducted on sever me mechanism show the system response to be $c(t) = 1+0.2e^{-60t} - 1.2e^{-10t}$, When subjected to a unit step i/p. Obtain the expression for closed loop T.F the damping ratio and undamped natural frequency of oscillation .	**10**	**CO 4**
Q 8	Derive the time response of first order system with unity step input.	**10**	**CO 3**
Q 9	The closed loop T.F. of a unity feedback control system is given by $\frac{C(S)}{R(S)} = \frac{5}{S^2+4S+5}$. Determine (1) Damping ratio (2) Natural undamped response frequency (3) Percent peak over shoot Mp (4) Expression for error response.	**10**	**CO 3**

SECTION-C
(2Qx20M=40 Marks)

Q 10	Derive the second order system, discuss poles and zeroes, how the roots affects the stability of the operation. Derive the response for the system under the input of unity step. Discuss the time response parameters, derive each parameters for the same inputs. Schematic diagram with suitable explanation is must.	**20**	**CO2**
Q 11	A feedback system employing o/p damping is as shown in fig. Find the value of K_1 & K_2 so that closed loop system resembles a 2^{nd} order system with damping ratio= 0.5 & frequency of damped oscillation 9.5 rad / Sec. With the above value of K_1 & K_2 find the % overshoot when i/p is step i/p What is the % overshoot when i/p is step i/p, the settling time for 2% tolerance? 	**20**	**CO 4**