School of Aeronautics (Neemrana) | School of Aeronautics

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DELHI ADMINISTRATION, UNDER SOCIETIES REGISTRATION ACT XXI OF 1860.

Question Paper For Internal Assessment Examination (Theory) - Credit 4 / 33 /

Instructions for Students/FacultyMid Term I (Total 80 Marks, 2 HRS. Syllabus from Unit-1)

- Part A: Total number of questions to be given are ten (5 from CO1 and 5 from CO2), each carrying 2 marks and are compulsory to attend. There is no choice. They are short answer type questions (**Not More Than 25 Words For both Question & Answer)**, no objective type or fill in the blanks. Total 20 marks.
- Part B: Total number of questions to be given are six (3 from CO1 and 3 from CO2), out of which student must answer four (2 from CO1 and 2 from CO2). They are long answer type (**Not More Than 50 Words for Question)**, each carrying 5 marks. Total 20 marks.
- Part C: Total number of questions to be given are six (3 from CO1 and 3 from CO2), out of which student must answer four (2 from CO1 and 2 from CO2). They are numerical answer type / fully elaborative type (**Not More Than 70 Words for Question)** *, each carrying 10 marks. Total 40 marks.

Mid Term II (Total 120 Marks, 2.5 HRS., Syllabus from Unit-2)

- Part A: Total number of questions to be given are ten (5 from CO3 and 5 from CO4), each carrying 4 marks and are compulsory to attend. There is no choice. They are short answer type questions (**Not More Than 25 Words For both Question & Answer)**, no objective type or fill in the blanks. Total 40 marks.
- Part B: Total number of questions to be given are six (3 from CO3 and 3 from CO4), out of which student has to answer four (2 from CO3 and 2 from CO4). They are long answer type (**Not More Than 50 Words for Question)**, each carrying 7 marks. Total 28 marks.
- Part C: Total number of questions to be given are six (3 from CO3 and 3 from CO4), out of which student has to answer four (2 from CO3 and 2 from CO4). They are numerical answer type / fully elaborative type (**Not More Than 70 Words For Question)** *, each carrying 13 marks. Total 52 marks.

Mid Term III (Total 120 Marks, 2.5 HRS., Syllabus from Unit-3)

- Part A: Total number of questions to be given are ten (5 from CO5 and 5 from CO6), each carrying 4 marks and are compulsory to attend. There is no choice. They are short answer type questions (**Not More Than 25 Words For both Question & Answer)**, no objective type or fill in the blanks. Total 40 marks.
- Part B: Total number of questions to be given are six (3 from CO5 and 3 from CO6), out of which student must answer four (2 from CO5 and 2 from CO6). They are long answer type (**Not More Than 50 Words for Question)**, each carrying 7 marks. Total 28 marks.
- Part C: Total number of questions to be given are six (3 from CO5 and 3 from CO6), out of which student must answer four (2 from CO5 and 2 from CO6). They are numerical answer type / fully elaborative type (**Not More Than 70 Words for Question)** *, each carrying 13 marks. Total 52 marks.

* LIST OF ELABORATIVE THEORY QUESTION SUBJECTS: NO SUBJECT UNDER CREDIT FOUR

Instructions For Faculties:

There should be total 6 Course Outcomes (COs) for each subject.

- Mid Term Question Papers are to be submitted as per Course Outcomes (COs) which should be divided equally in Part A, Part B and Part C according to Mid Term Examination and Credit Point.
- In Mid Term-1, the questions are to be given from CO1 and CO2. In Mid Term-2, the questions are to be given from CO3 and CO4. Similarly, in Mid Term-3, the questions are to be given from CO5 and CO6.

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- **FACULTY MEMBERS, PLEASE ENSURE EXCEPT ABOVE LISTED SUBJECTS, NO THEORITICAL ELABORATIVE QUESTION SHOULD BE GIVEN IN PART 'C' OF QUESTION PAPER**

INSTRUCTION FOR STUDENTS

- **STUDENT IS ALLOWED TO ENTER LATE NOT MORE THAN 15 MIN AFTER STARTING OF EXAM, AND MAY LEAVE THE EXAM HALL ON EXPIRY OF ATLEAST OF 1 Hr FROM THE STARTING TIME OF EXAMINATION.**

QUESTION PAPER AND STUDENTS DETAILS

Type of Exam	Mid Term 1	**Date of Submission**	28/04/2021
Name of Faculty	Tarun Thukral	**Date of Examination**	30/06/2021
Course	B.Tech (Mechatronics Engineering)	**Semester**	SEMESTER : 4
Batch	Fifth (5)	**Subject**	4 MH4 - 07 Control System (Cr 4)

COURSE OUTCOMES FOR REFERENCE TO FRAME QUESTION PAPER
(Faculties are required to mention relevant Course Outcome number against the respective question in QP)

Course Outcome	1 Student will learn about the basic concepts of control system, its mathematical modelling and reduction techniques. 2 Student will learn about the time response of first and second order system, its steady state analysis and PID controllers. 3 Student will learn about the frequency domain analysis of different control systems. 4 Student will learn about the different criterion of stability mechanisms of control systems. 5 Student will learn about the compensation techniques of lead, lag and lead-lag network. 6 Student will learn about the different control system design problems with the help of matlab.
Email I'd	tarunthukral@soaneemrana.org	**Phone No.**	750-096-6580
Student Name		**Student Reg No.**	

Part A

All the questions are compulsory to attend.

1. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.	1

Question : 1	Define Open loop system with example.	
3	BASIC CONCEPTS AND SYSTEM REPRESENTATION	Automatic Control System by S Hasan Saeed	

Question : 2	Define closed loop system with example.	
4	BASIC CONCEPTS AND SYSTEM REPRESENTATION	Automatic Control System by S Hasan Saeed	

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Question : 3	Define transfer function.		
8	BASIC CONCEPTS AND SYSTEM REPRESENTATION	Automatic Control System by S Hasan Saeed	
Question : 4	Define node, forward path, loop and self loop.		
9	BASIC CONCEPTS AND SYSTEM REPRESENTATION	Automatic Control System by S Hasan Saeed	
Question : 5	Define linear time-invariant control system.		
1	Introduction	Automatic Control System by S Hasan Saeed	
2. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.		2	
Question : 6	Define step function.		
11	TIME RESPONSE ANALYSIS	Automatic Control System by S Hasan Saeed	
Question : 7	Define rise and peak time		
10	TIME RESPONSE ANALYSIS	Automatic Control System by S Hasan Saeed	
Question : 8	Define Dynamic error.		
15	TIME RESPONSE ANALYSIS	Automatic Control System by S Hasan Saeed	
Question : 9	Define controller. Write its types.		
16	TIME RESPONSE ANALYSIS	Automatic Control System by S Hasan Saeed	
Question : 10	Define Static position & velocity error constant.		
14	TIME RESPONSE ANALYSIS	Automatic Control System by S Hasan Saeed	

Part B

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FOR MIDTERM 1 - Part B: Total number of questions to be given are six (3 from CO1 and 3 from CO2), out of which student must answer four (2 from CO1 and 2 from CO2).

FOR MIDTERM 2 - Part B: Total number of questions to be given are six (3 from CO3 and 3 from CO4), out of which student must answer four (2 from CO3 and 2 from CO4).

FOR MIDTERM 3 - Part B: Total number of questions to be given are six (3 from CO5 and 3 from CO6), out of which student has to answer four (2 from CO5 and 2 from CO6).

3. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.			1
Question : 1	Compare open and closed loop control system.		
3 & 4	BASIC CONCEPTS AND SYSTEM REPRESENTATION	Automatic Control System by S Hasan Saeed	
Question : 2	Do mathematical modelling of Electrical system.		
7	BASIC CONCEPTS AND SYSTEM REPRESENTATION	Automatic Control System by S Hasan Saeed	
Question : 3	Do mathematical modelling of translational system.		
5	BASIC CONCEPTS AND SYSTEM REPRESENTATION	Automatic Control System by S Hasan Saeed	
4. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.			2
Question : 4	Derive the time response of second order system with unit step input.		
13	TIME RESPONSE ANALYSIS	Automatic Control System by S Hasan Saeed	
Question : 5	Derive static error coefficients.		
14	TIME RESPONSE ANALYSIS	Automatic Control System by S Hasan Saeed	
Question : 6	Explain PID controller characteristics.		
17	TIME RESPONSE ANALYSIS	Automatic Control System by S Hasan Saeed	
Question : 7 (Old Pattern)			

Part C

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FOR MIDTERM 1 - Part C: Total number of questions to be given are six (3 from CO1 and 3 from CO2), out of which student must answer four (2 from CO1 and 2 from CO2).

FOR MIDTERM 2 - Part C: Total number of questions to be given are six (3 from CO3 and 3 from CO4), out of which student must answer four (2 from CO3 and 2 from CO4).

FOR MIDTERM 3 - Part C: Total number of questions to be given are six (3 from CO5 and 3 from CO6), out of which student has to answer four (2 from CO5 and 2 from CO6).

5. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.		1
Question : 1	Draw the SFG and determine C/R for the bock diagram shown in diagram sheet.	
9	BASIC CONCEPTS AND SYSTEM REPRESENTATION	Automatic Control System by S Hasan Saeed	
Question : 2	For the given SFG in diagram sheet, find the C/R.	
9	BASIC CONCEPTS AND SYSTEM REPRESENTATION	Automatic Control System by S Hasan Saeed	
Question : 3	Find the C/R using Block reduction techniques.	
8	BASIC CONCEPTS AND SYSTEM REPRESENTATION	Automatic Control System by S Hasan Saeed	

6. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.		2
Question : 4	The forward path transfer function of a unity feedback control system is given by G(s) in numerical sheet. Determine Kp, Kv and Ka. Also determine the type of the system	
14	TIME RESPONSE ANALYSIS	Automatic Control System by S Hasan Saeed	
Question : 5	A second order system has a transfer function given by G(s) in numerical sheet. If the system initially at rest is subjected to a unit step input at t = 0, the second peak in the response will occur at what time?	
13	TIME RESPONSE ANALYSIS	Automatic Control System by S Hasan Saeed	
Question : 6	The open loop transfer function of a servo system is given in the attached sheet. Determine the damping ratio, undamped natural frequency of oscillation. What is the percentage overshoot of the response to a unit step input.	
11	TIME RESPONSE ANALYSIS	Automatic Control System by S Hasan Saeed	

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Upload Scanned Document In Case of Numerical or Diagram For Any of The Above Questions. *(Mention question number with relevant fig / numerical / equations. Max 150 KB)*	https://form.123formbuilder.com/upload_dld.php?fileid=805b569c7faf5e6b9c27586017ca12b4
I have scrutinized the question paper. There is no spelling mistake or any type of irrelevant question.	

The message has been sent from 115.242.250.134 (India) at 2021-06-22 11:43:09 on Firefox 89.0
Entry ID: 33

School of Aeronautics(Neemrana)

Faculties preparing Question Paper for various examinations, need to draw or insert diagrams as per requirement of questions in the below format and upload the same in upload documents column of the question paper.

QuestionPaper&StudentDetails

Mid Term *	1	Date of SubmissionofQP	6/21/2021
Name of Faculty *	TARUN THUKRAL	Date ofExamination*	6/28/2021
Subject *	Control System	Course*	Aeronautical
Batch	5	Semester *	4
Email Id of Faculty:*	tarunthukral@soaneemrana.org	PhoneNumberofFaculty*	7500966580
StudentName		Student RegNo.	

Part No. __C_, Question Number __1__ .
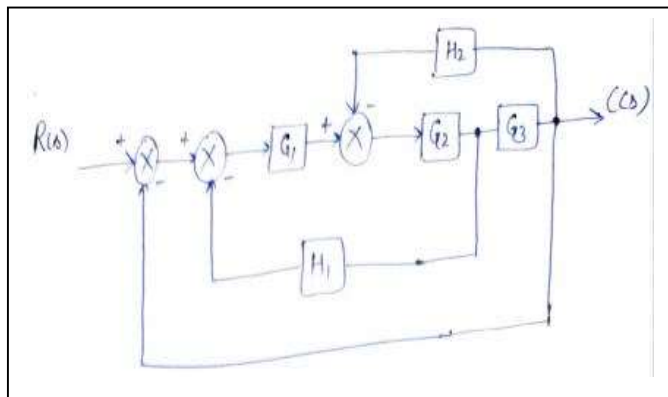
Part No. _C__, Question Number _2___ .
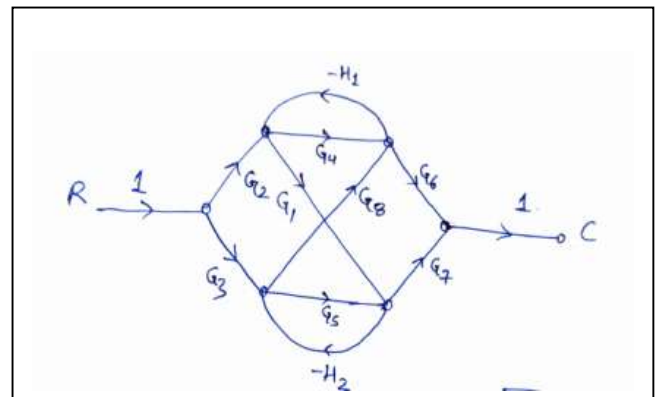
Part No. _C__, Question Number _3___ .
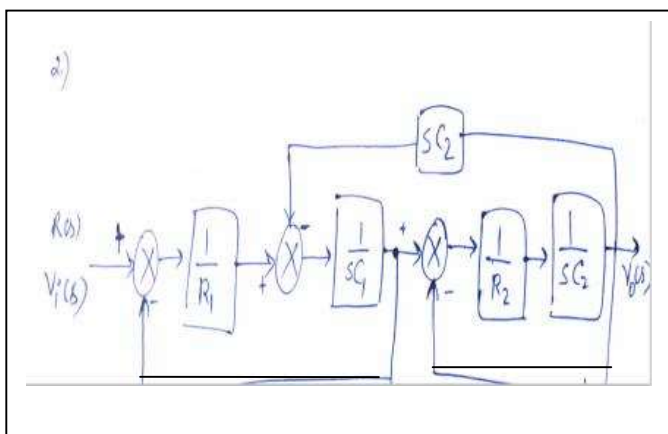
Part No. _C__, Question Number __4__ .

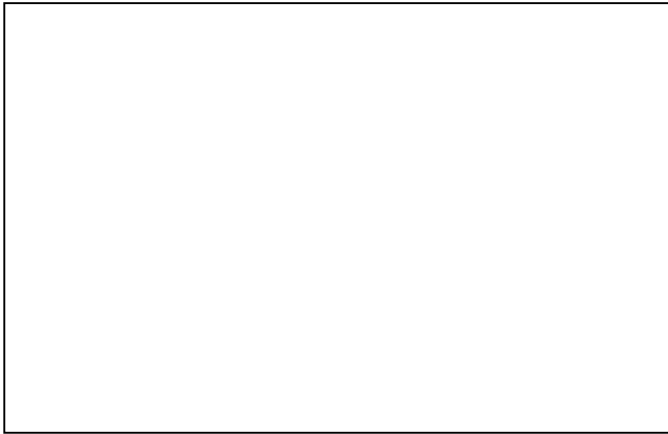$$\frac{5(s^2 + 2s + 100)}{s^2(s + 5)(s^2 + 3s + 10)}$$

$$\frac{25}{s^2 + 8s + 25}$$

$$\frac{10}{(s + 2)(s + 5)}$$