Hall Ticket Number :										

R-20

Code: 20A251T

III B.Tech. I Semester Supplementary Examinations June 2023

Linear Control Systems

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

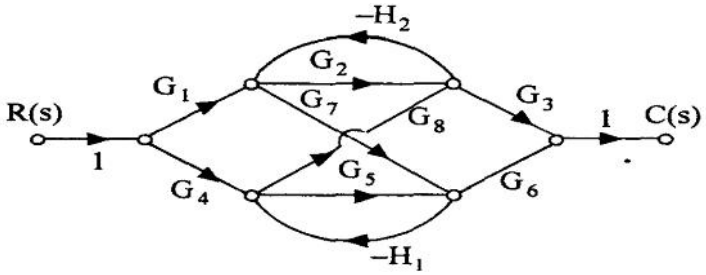
PART-A

(Compulsory question)

		CO	BL
1. Answer ***all*** the following short answer questions (5 X 2 = 10M)			
a)	What are the necessary components of the feedback control system?	1	1
b)	Discuss about standard input signals.	2	1
c)	Define Phase margin and Gain margin.	3	2
d)	How would you design a lag compensator using Bode plot?	4	2
e)	What are the advantages of state space approach over transfer function approach?	5	1

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

			Marks	CO	BL
		UNIT–I			
2.		Determine the overall gain C/R for the block diagram shown below using Signal flow graph 	12M	1	2
		OR			
3.	a)	Explain open loop and closed loop control systems with suitable examples.	6M	1	1
	b)	Derive the Transfer function of a Armature controlled DC Servo motor.	6M	1	2
		UNIT–II			
4.	a)	Derive the edback control system has ope controlled r fur A unity fe $G(s) = \frac{K}{s(s+50)}$. Design a PI controller $G^c(s) = \frac{s+\alpha}{-s}$ to meet the specifications M_p=20% and t_s=2 sec.	6M	2	2
	b)	Compute the Rise Time, Peak Time, Maximum Overshoot and Settling time in the unit-Step Response curve for the system having open Loop Transfer Function $G(s) = \frac{10}{s(s+2)(s+4)}$	6M	2	2
		OR			

5.	a)	A closed loop servo is represented by the differential equation $d^2c/dt^2+8dc/dt=4e$, where c is the displacement of the output shaft, r is the displacement of the input shaft and e= r – c Compute the undamped natural frequency, damping ratio and % Mp for a unit step.	6M	2	2
	b)	Write a short note on various standard test input signals.	6M	2	2

UNIT–III

6.		Sketch the root locus plot of a unity feedback system with open-loop transfer function $G(s) = \frac{K}{s(s+4)(s+6)}$ Find the range of K for which the system has damped oscillatory response.	12M	3	2

OR

7.	a)	Determine the RH stability of given characteristic equation. $s^4 + 8s^3 + 18s^2 + 16s + 5 = 0$	6M	3	2
	b)	Sketch the Nyquist plot for the following open loop transfer function. $G(s) = \frac{2}{s(s+1)(s+2)}$	6M	3	2

UNIT–IV

8.		Sketch the Bode plot of a unity feedback system with open-loop transfer function $G(s) = \frac{K}{s(s+4)(s+6)}$ Find the range of K for which the system has damped oscillatory response.	12M	4	2

OR

9.	a)	Explain tuning rules for PID controllers.	6M	4	2
	b)	Write the procedure for lead compensator using root locus technique.	6M	4	2

UNIT–V

10.		Obtain the Transfer Function Y(s)/U(s) for the System Defined by $\dot{X} = AX + BU$ Y=CX where $A = \begin{bmatrix} -1 & 0 & 1 \\ 1 & -2 & 0 \\ 0 & 0 & -3 \end{bmatrix}, B = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}, C = [1 \quad 1 \quad 0]$	12M	5	2

OR

11.	a)	Is the System is Completely Controllable and Observable or not $\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \\ \dot{x}_3 \end{bmatrix} = \begin{bmatrix} 1 & -2 & -2 \\ 0 & -1 & 1 \\ 1 & 0 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} + \begin{bmatrix} 2 \\ 0 \\ 1 \end{bmatrix} u$ $y = [1 \quad 1 \quad 0] \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$	6M	5	2
	b)	What is state transition matrix and write down the properties.	6M	5	2

*** End ***

Hall Ticket Number :										

R-20

Code: 20A253T

III B.Tech. I Semester Supplementary Examinations June 2023

Electric Power Transmission and Switch Gear

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

1. Answer ***all*** the following short answer questions (5 X 2 = 10M) CO BL

a) What do you mean by transposition of transmission lines? 1 2
b) Draw the phasor diagram of nominal-T model of transmission line? 2 3
c) What is the application of stringing chart? 3 2
d) Give the classification of cables? 4 2
e) Define RRRV? 5 1

PART-B

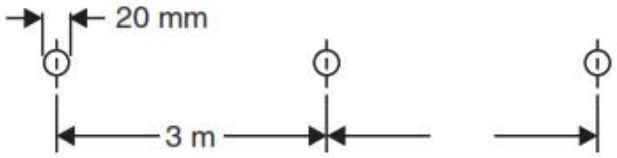
Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

Marks CO BL

UNIT–I

2. a) Derive the inductance of a single-phase transmission line? 6M 1 2

b) Determine the capacitance and charging current per unit length of the line when the arrangement of the conductors is as shown in Fig. The operating voltage is 132 kV.

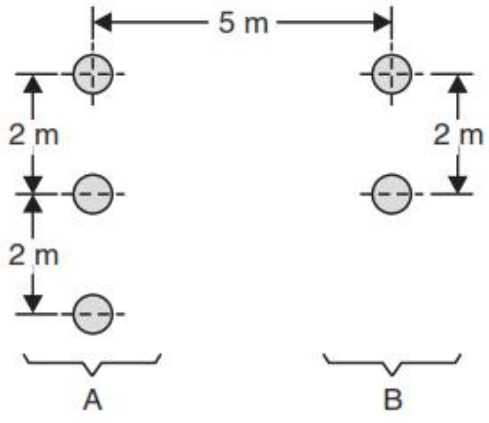


6M 1 3

OR

3. a) Explain the effect of earth on the capacitance of single-phase transmission line? 4M 1 2

b) Determine the inductance of a 1-phase transmission line having the following arrangement of conductors. One circuit consists of three wires of 2 mm dia each and the other circuit two wires of 4 mm dia each.



8M 1 4

UNIT–II

4.	a)	Derive ABCD parameters of nominal-π model?	6M	2	3
	b)	A 3-phase 50 Hz transmission line has conductors of section 90 mm^2 and effective diameter of 1 cm and are placed at the vertices of an equilateral triangle of side 1metre. The line is 20 km long and delivers a load of 10 MW at 33 KV and p.f. 0.8. Neglect capacitance and assume temperature of 20°C. Determine the efficiency and regulation of the line.	6M	2	4

OR

5.		Determine the efficiency and regulation of a 3-phase, 100 km, 50 Hz transmission line delivering 20 MW at a p.f. of 0.8 lagging and 66 kV to a balanced load. The conductors are of copper, each having resistance 0.1 ohm per km, 1.5 cm outside dia, spaced equilaterally 2 metres between centres. Neglect leakance and use (i) nominal-T, and (ii) nominal πmethod.	12M	2	4

UNIT–III

6.	a)	An overhead line has the following data: Span length 160 metres, conductor dia 0.95 cm, weight per unit length of the conductor 0.65 kg/metre. Ultimate stress 4250 kg/cm^2, wind pressure 40 kg/m^2 of projected area. Factor of safety 5. Calculate the sag.	6M	3	4
	b)	Explain the methods of equalizing the potential among the string of insulators?	6M	3	2

OR

7.	a)	A string of eight suspension insulators is to be fitted with a grading ring. If the pin to earth capacitances are all equal to C, find the values of line to pin capacitances that would give a uniform voltage distribution over the string?	6M	3	3
	b)	An overhead line at a river crossing is supported from two towers of heights 30 metres and 90 metres above water level with a span of 300 metres. The weight of the conductor is 1 kg/metre and the working tension is 2000 kg. Determine the clearance between the conductor and the water level mid-way between the towers	6M	3	4

UNIT–IV

8.	a)	Explain the about the materials used for cables?	6M	4	2
	b)	Derive the equation for electrostatic stress in a single core cable?	6M	4	2

OR

9.	a)	Explain about Inter sheath grading of cables?	6M	4	2
	b)	The capacitance of a 3-core lead sheathed cable measured between any two of the conductors with sheath earthed is 0.19 μF per km. Determine the equivalent star connected capacity and the kVA required to keep 16 kms of the cable charged when connected to 20 kV, 50 Hz supply.	6M	4	3

UNIT–V

10.	a)	Discuss about current chopping in a circuit breaker?	6M	5	2
	b)	Explain Energy balance theory?	6M	5	2

OR

11.		Explain the operation of SF6 circuit breaker and write the advantages and disadvantages?	12M	5	2

*** End ***

Hall Ticket Number :										

R-20

Code: 20AE5AT

III B.Tech. I Semester Supplementary Examinations June 2023

Human Resource Management

(Common to CE, EEE & ECE)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

1. Answer ***all*** the following short answer questions (5 X 2 = 10M)	CO	BL
a) Define HRM.	1	1
b) Define Job Design.	1	1
c) Define Placement.	1	1
d) List out the need for training employees.	1	1
e) Define Compensation.	1	1

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

		Marks	CO	BL
	UNIT–I			
2.	Discuss in detail, the managerial and operative functions of HRM.	12M	1	2
	OR			
3.	Describe the nature, significance and scope of HRM.	12M	1	2
	UNIT–II			
4.	Write a detailed note on the various factors effecting human resource planning and the various hindrances to effective HRP.	12M	2	2
	OR			
5.	Describe in detail, the significance and process involved in job analysis.	12M	2	2
	UNIT–III			
6.	Discuss in detail, the various factors governing recruitment.	12M	3	2
	OR			
7.	Discuss in detail, the various steps in the selection process.	12M	3	2
	UNIT–IV			
8.	Describe in detail, the various stages in career development.	12M	4	2
	OR			
9.	Discuss in detail, the various methods of off the job training citing examples as applicable.	12M	4	2
	UNIT–V			
10.	Discuss in detail, the various methods of performance appraisal.	12M	5	2
	OR			
11.	Discuss in detail the process of grievance redressal in organizations.	12M	5	2

*** End ***

Hall Ticket Number :										

R-20

Code: 20A252T

III B.Tech. I Semester Supplementary Examinations June 2023

Power Electronics

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	BL
1.	Answer all the following short answer questions (5 X 2 = 10M)		
a)	Define holding current of SCR.	1	1
b)	Specify the purpose of dv/dt circuit.	2	2
c)	Define transformer utilization factor.	3	1
d)	List the application of chopper	4	3
e)	Why thyristors are not preferred for inverters?	5	4

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

		Marks	CO	BL
	UNIT–I			
2.	Explain the operation of MOSFET with the help of neat structural diagram and suitable waveforms	12M	1	2
	OR			
3.	With help of a neat diagram and V-I characteristics, explain the different modes of operation for SCR	12M	1	2
	UNIT–II			
4.	Design a snubber circuit for protection against dv/dt	12M	2	4
	OR			
5.	Analyze the Improving of dv/dt rating with Cathode and short di/dt improvement by high gate current with illustration.	12M	2	4
	UNIT–III			
6.	Describe the working of single phase and three phase dual converter.	12M	3	2
	OR			

7.		Explain the effect of source inductance in the operation of single phase fully controlled converter by indicating clearly the conduction of various thyristors during one cycle.	12M	3	4

UNIT–IV

8.		Draw the circuit diagram of voltage commutated chopper and explain its working principle with necessary waveforms.	12M	4	2

OR

9.	a)	Explain the control strategies used to control the output of chopper	6M	4	3
	b)	Describe the working principle of boost converter with necessary circuit and waveforms	6M	4	3

UNIT–V

10.		Explain the single phase current source inverter with neat circuit and waveforms.	12M	5	2

OR

11.		With suitable phase and line voltage waveforms of 3φ VSI, explain its operation in 120 degree operating mode.	12M	5	4

*** End ***