Hall Ticket Number :										

R-20

Code: 20A253T

III B.Tech. I Semester Regular & Supplementary Examinations December 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**

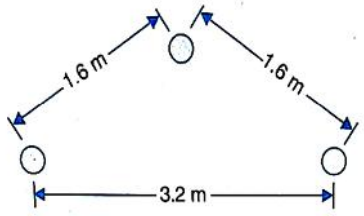
PART-A

(Compulsory question)

		CO	BL
1.	Answer ***all*** the following short answer questions (5 X 2 = 10M)		
	a) Why we need Transposition in Transmission lines?	1	2
	b) Define Proximity effect	2	2
	c) Give any two factors that affect sag in an overhead line	3	2
	d) Give the expression for the insulation resistance of a single core cable	4	2
	e) What are the applications of HRC fuses?	5	2

PART-B

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

			Marks	CO	BL
		UNIT-I			
2.	a)	What are bundled conductors? Discuss the advantages of bundled conductors when used for overhead lines.	5M	1	2
	b)	Determine the inductance of a 3-phase line operating at 50Hz and conductors arranged as follows. The Conductor diameter is 0.8 cm. 	7M	1	3
		OR			
3.	a)	Derive an expression for the capacitance per km of a single phase line taking into account the effect of ground.	6M	1	2
	b)	A 220kV, 50Hz, 200km long three phase line has its conductors on the corners of a triangle with sides 6m, 6m and 12m. The conductor radius is 1.81cm. Find the capacitance per phase per km.	6M	1	3
		UNIT-II			
4.	a)	Derive ABCD Parameters of a Short Transmission line with a phasor diagram.	6M	2	2
	b)	A 400 V 3-phase 4-wire system supplies the following loads: Phase R-20 kvA at p.f. 0.8 lagging, phase Y-20 kvA at 0.8 lead p.f. and phase B-20 kvA at unity p.f. The resistance of each conductor is 0.2 ohm and of the neutral 0.4 ohm. Calculate the current in the neutral wire and the load voltages.	6M	2	3
		OR			
5.	a)	Explain clearly the "Ferranti effect “with a phasor diagram	6M	2	2

	b)	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-π method.	6M	2	3

UNIT-III

6.	a)	Explain in detail about the factors that affect corona loss.	6M	3	2
	b)	Determine the critical disruptive voltage and corona loss for a 3-phase line operating at 110kV which has conductor of 1.25cm dia arranged in a3.05 metre delta. Assume air density factor of 1.07 and the dielectric strength of air to be 21kV/cm.	6M	3	3

OR

7.	a)	Derive the expressions for sag and tension in a power conductor strung between two supports at equal heights taking in to account the wind and ice loadings also.	6M	3	2
	b)	A string of six insulator units has mutual capacitance 10 times the capacitance to ground. Determine the voltage across each unit as a fraction of the operating voltage. Also determine the string efficiency.	6M	3	3

UNIT-IV

8.	a)	What is void formation in a cable? How does this affect the performance of a cable? What steps are taken to prevent the formation of these voids?	6M	4	2
	b)	A 3-core, 3-phase metal-sheathed cable gave the following results on test for capacitance: (i) Capacitance between two conductors bunched with the sheath and the third conductor 0.4 µF per km. (ii) Capacitance between bunched conductors and sheath 0.625 µF per km .Find the capacitance (a) between any two conductors (b) between any two bunched conductors and the third conductor if the sheath is insulated.	6M	4	3

OR

9.	a)	Describe with a neat sketch, the construction of 3-core belted type cable. Discuss the limitations of such a cable.	6M	4	2
	b)	A single core lead covered cable has to be designed for capacity of 66 kV to ground. The radius of conductor is 0.5 cm and three insulating material A, B and C have relative permittivities of 4, 2.5 and 4 with maximum permissible stresses of 50, 30 and 40 kV/mm respectively. Determine the minimum internal diameter of the lead sheath.	6M	4	3

UNIT-V

10.	a)	Define and explain the following terms: (i) fusing current (ii) cut off current (iii)operating time (iv) breaking capacity.	6M	5	2
	b)	A circuit breaker is rated 2500A, 1500 mva, 33Kv,3 sec ,3-phase oil circuit breaker Determine (i) the rated normal current (ii) breaking current (iii) making current (iv) short time rating current.	6M	5	3

OR

11.	a)	Discuss the constructional details and operation of a minimum oil circuit breaker? What are its merits and demerits?	6M	5	2
	b)	In a 132kV system, the reactance and capacitance up to the location of circuit breaker is 5Ω and 0.003µF respectively. Calculate value of critical resistance for suppressing transient oscillations.	6M	5	3

*** End ***

Hall Ticket Number :										

R-20

Code: 20AE5AT

III B.Tech. I Semester Regular & Supplementary Examinations December 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)

			CO	BL
1.	Answer ***all*** the following short answer questions	(5 X 2 = 10M)		
	a) Define Human Resource Management		1	1
	b) What is Job Analysis?		2	1
	c) Write a short note on Recruitment.		3	1
	d) What are the Benefits of Employee Training		4	1
	e) What is Industrial Relations?		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.		What is meant by HRM? Explain scope and functions of HRM.	12M	1	2
		OR			
3.		Explain Competitive challenges influencing HRM	12M	1	2
		UNIT–II			
4.		Briefly explain the concept of Human Resource Planning? Describe Human Resource Planning Process.	12M	2	2
		OR			
5.	a)	Discuss Human Resource Information System.	6M	2	2
	b)	Explain methods of collecting job data	6M	2	2
		UNIT–III			
6.		What is the process of Recruitment? Explain?	12M	3	2
		OR			
7.		Explain Nature of Selection and Selection Process.	12M	3	2
		UNIT–IV			
8.		Explain the stages of Career Development.	12M	4	2
		OR			
9.		Differentiate between Training and Development. Explain the process of identifying training needs.	12M	4	3
		UNIT–V			
10.		Explain Wage policy in India	12M	5	2
		OR			
11.		Critically evaluate any five performance appraisal methods.	12M	5	2

*** End ***

Hall Ticket Number :										

R-20

Code: 20A45ET

III B.Tech. I Semester Regular & Supplementary Examinations December 2023

Introduction to Communication 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)

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

a) Draw the block diagram of communication system. CO1 L1

b) How do you Generate VSB Modulated waves? CO2 L1

c) Define figure of merit. CO3 L1

d) Determine the Transmission Bandwidth in PCM. CO4 L1

e) State different modulation schemes. CO5 L1

PART-B

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

		Marks	CO	BL
	UNIT-I			
2. a)	With the help of block diagram explain the elements of communication system.	6M	CO1	L2
b)	Derive expression for the total power carried by an AM wave.	6M	CO1	L3
	OR			
3. a)	Explain the process of detection of AM waves by using Envelope detector.	6M	CO1	L2
b)	Classify and Discuss various types of modulation.	6M	CO1	L2
	UNIT-II			
4. a)	How the phase synchronism problem encountered in synchronous detector can be solved in Costas loop? Explain with a neat diagram.	6M	CO2	L2
b)	What are different methods of generation of SSB waves? Explain any one.	6M	CO2	L2
	OR			
5. a)	What are the advantages DSBSC over AM with full carrier? How do you produce DSBSC wave with a balance modulator? Describe in detail. Give the time and frequency domain description of DSBSC waves.	6M	CO2	L3

	b)	Write short notes on Vestigial sideband modulation.	6M	CO2	L1

UNIT-III

6.		With the help of a block diagram, illustrate the method of generating narrowband FM signal.	12M	CO3	L3

OR

7.	a)	Derive the expression for bandwidth of FM.	6M	CO3	L3
	b)	Compare the FM and AM.	6M	CO3	L2

UNIT-IV

8.	a)	Explain the DPCM system with neat diagram?	6M	CO4	L2
	b)	Write the differences between PCM, DPCM, and DM?	6M	CO4	L1

OR

9.	a)	With a neat block diagram explain PCM transmitter and receiver?	6M	CO4	L2
	b)	Derive the quantization noise in PCM?	6M	CO4	L3

UNIT-V

10.	a)	Explain the generation and detection of BPSK.	6M	CO5	L2
	b)	Discuss and Compare the various types of digital modulation techniques.	6M	CO5	L2

OR

11.	a)	Explain the process of Generation of FSK.	6M	CO5	L2
	b)	Describe the generation and detection of DPSK.	6M	CO5	L3

*** End ***

Hall Ticket Number :										

R-20

Code: 20A251T

III B.Tech. I Semester Regular & Supplementary Examinations December 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**

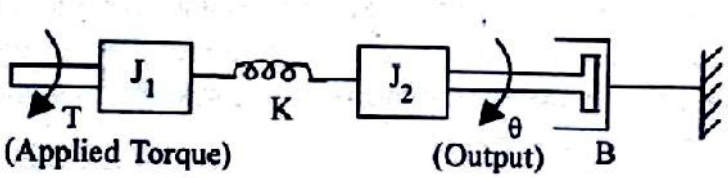
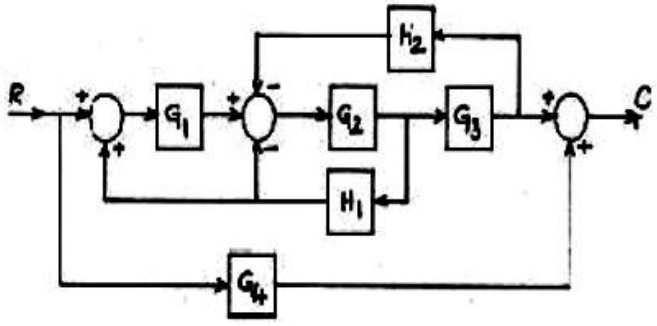
PART-A

(Compulsory question)

		CO	BL
1.	Answer ***all*** the following short answer questions (5 X 2 = 10M)		
a)	What is the necessary condition for stability?	CO1	BL1
b)	Explain how the lead compensation is done using Bode plots.	CO2	BL2
c)	How the closed loop frequency response is determined from the open loop frequency response?	CO2	BL3
d)	What is the effect of PI controller on the system performance?	CO3	BL2
e)	Give the important characteristics of open loop control system.	CO4	BL3

PART-B

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

		Marks	CO	BL
	UNIT-I			
2. a)	Find the transfer function for the following system as shown in the figure. 	8M	CO3	BL2
b)	Define transfer function and discuss its limitations.	4M	CO1	BL1
	OR			
3. a)	For the given block diagram shown in Fig, find the transfer function 	8M	CO4	BL3
b)	Explain any one feedback characteristics of a closed loop systems.	4M	CO2	BL1

UNIT-II

4. a) Define position, velocity and acceleration error constants. Express steady-state error in terms of error constants for type-1 and type-2 systems. 7M CO3 BL2

   b) What are standard test signals used in control systems explain in brief? 5M CO2 BL1

OR

5. Develop the time domain specifications of a second order system 12M CO2 BL1

UNIT-III

6. A unity feedback control system has an open loop transfer function $G(s) = K/s(s^2+4s+3)$. Sketch the root locus 12M CO3 BL2

OR

7. Sketch the polar plot for the open loop transfer function of a unity feedback System is given by

$$G(s) = \frac{1}{S(1+S)(1+2S)}.$$

Determine Gain Margin & Phase Margin. 12M CO5 BL3

UNIT-IV

8. Write the procedure for design of Lead Compensator using Electrical Network. 12M CO2 BL2

OR

9. Sketch the Bode plot for the system having the following transfer function

$$G(s) = \frac{15(S+5)}{S(S^2+16S+100)}$$

12M CO5 BL3

UNIT-V

10. a) Explain the concept of observability. 5M CO2 BL1

    b) Evaluate controllability and observability of the following state model:

$$A = \begin{bmatrix} -2 & 1 \\ 1 & -2 \end{bmatrix}, B = \begin{bmatrix} 1 \\ 0 \end{bmatrix}, C = \begin{bmatrix} 1 & -1 \end{bmatrix}$$

7M CO3 BL2

OR

11. a) A continuous time system has a transfer function of $T(s) = (s^2+3s+3) / (s^3+2s^2+3s+1)$.

    Construct a state model of the system 7M CO3 BL2

    b) Explain properties of state transition matrix. 5M CO3 BL2

*** End ***

Hall Ticket Number :										

R-20

Code: 20A252T

III B.Tech. I Semester Regular & Supplementary Examinations December 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 Latching current		1	1
	b) Is it possible to exceed rms current rating of an SCR?		2	2
	c) What is the PIV of a thyristor in a single phase mid point rectifier?		3	2
	d) Define duty cycle of an SCR in a chopper circuit.		4	1
	e) What is the power factor of a single phase fully controlled ac voltage controller serving a resistive load at a firing angle of 45 degrees?		5	3

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

			Marks	CO	BL
		UNIT-I			
2.	a)	Explain static characteristics of SCR	6M	1	1
	b)	Describe two-transistor analogy of a SCR	6M	1	2
		OR			
3.	a)	Explain the operation of a power IGBT	6M	1	1
	b)	Describe gate triggering of a SCR	6M	1	2
		UNIT-II			
4.	a)	Describe various voltage ratings of a Thyristor	6M	2	1
	b)	Illustrate the design of Snubber circuit for the dv/dt protection of SCR	6M	2	3
		OR			
5.	a)	Explain di/dt protection and dv/dt protection	6M	2	1
	b)	Demonstrate Over current protection by fast acting current limiting fuse	6M	2	3
		UNIT-III			
6.		Describe the effect of source inductance on the operation of a three phase full converter with RL load.	12M	3	3

OR

7.		Draw the circuit diagram and wave forms for single phase fully controlled bridge rectifier with R load and RL loads in continuous current mode for various firing angles. Derive the generalized expression for average output voltages in both scenarios.	12M	3	3

UNIT-IV

8.		Draw and explain the operation of Buck converter with relevant waveforms. Derive the expression for average output voltage.	12M	4	3

OR

9.		Explain the operation of four quadrant chopper.	12M	4	2

UNIT-V

10.	a)	Draw and explain the operation of single phase parallel inverter.	6M	5	2
	b)	Demonstrate Sinusoidal Pulse Width Modulation	6M	5	3

OR

11.	a)	Explain Voltage control techniques of single phase inverters	6M	5	2
	b)	What is the function of cyclo-converter? Explain the working of single phase mid-point cyclo-converter for step up operation.	6M	5	2

*** End ***

Hall Ticket Number :										

R-20

Code: 20A25DT

III B.Tech. I Semester Regular & Supplementary Examinations December 2023

Renewable Energy 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 mark.**
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)	Compare the conventional and non-conventional energy sources	1	1
b)	Compose the environmental impact of solar power.	2	3
c)	How are winds classified?	3	2
d)	Illustrate the limitations of tidal power generation	4	3
e)	What is biomass? In what form biomass can be used?	5	3

PART-B

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

		Marks	CO	BL
	UNIT–I			
2. a)	Demonstrate the importance of renewable sources of energy.	5M	1	3
b)	Discuss the impact of renewable energy generation on environment	7M	1	2
	OR			
3. a)	Express extraterrestrial and terrestrial solar radiation.	6M	1	2
b)	Examine the working of a pyrheliometer	6M	1	3
	UNIT–II			
4. a)	What is flat plate collector? Explain	6M	2	2
b)	Explain the heat transport system used in liquid collectors.	6M	2	2
	OR			
5. a)	How can classification of solar energy storage system be done? Explain them briefly	6M	2	2
b)	Describe the construction of solar cell and solar PV panel.	6M	2	1
	UNIT–III			
6. a)	Explain in detail about the various components present in the wind power plant with neat sketch.	6M	3	2

	b)	With neat sketch explain about the Wind turbine functional control elements	6M	3	1

OR

7.	a)	What are the environmental impacts of wind power? Explain each case in detail.	6M	3	2
	b)	What are the advantages of wind power systems?	6M	3	1

UNIT–IV

8.	a)	Explain the 'single-basin' and 'two-basin' systems of tidal power harnessing. Further, discuss their advantages and limitations.	7M	4	2
	b)	What are the factors affecting the feasibility of a tidal power plant?	5M	4	1

OR

9.	a)	Explain different wave energy conversion machines	6M	4	2
	b)	Explain with a neat sketch the operation of OTEC plants.	6M	4	2

UNIT–V

10.		Discuss the following methods of biogas generation i. Gasification ii. Anaerobic Digestion	12M	5	2

OR

11.	a)	With a neat sketch explain the operation dry steam geothermal power plant.	6M	5	2
	b)	Explain the analysis of the energy content and its extraction for a hot dry rock type Geothermal resource	6M	5	4

*** End ***

Hall Ticket Number :										

R-20

Code: 20A25AT

III B.Tech. I Semester Regular & Supplementary Examinations December 2023

Distribution of Electrical Power

(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)

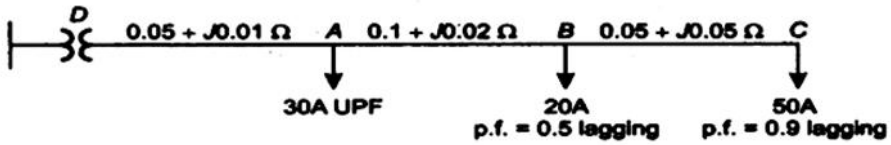
		CO	BL
1.	Answer ***all*** the following short answer questions (5 X 2 = 10M)		
a)	How does a distribution feeder different from a transmission feeder?	1	L3
b)	Compare AC and DC distribution systems.	2	L2
c)	List the Equipment's of Substation and define the Bus Bar.	3	L2
d)	Enumerate the causes of low power factor in distribution systems.	4	L2
e)	What is the role of Data Acquisition system in distribution automation?	5	L2

PART-B

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

		Marks	CO	BL
	UNIT–I			
2. a)	What is meant by Load Factor and Loss Factor? Obtain the relation between Load Factor and Loss Factor	6M	1	L1
b)	The annual input to a sub-transmission system is 87,000MWh. On the peak – load day of the year, the peak is 25MW and the energy input that day is 300MWh. Find the load factor for the year and for the peak load day.	6M	1	L3
	OR			
3. a)	Write a brief note on load modelling.	6M	1	L2
b)	Explain the following factors in detail. (i) Coincidence factor (ii) Contribution factor	6M	1	L1
	UNIT–II			
4. a)	Discuss the design and operational aspects that affects the Primary Feeder voltage level.	6M	2	L2
b)	With the help of a schematic explain the operation of loop type secondary distribution system.	6M	2	L2
	OR			

5.	a)	Discuss the requirement and design consideration of Distribution System.	6M	2	L3
	b)	Find the output power of a 3-phase 400V LV side of distribution transformer D shown in Fig.	6M	2	L4



UNIT–III

6.	a)	Draw the schematic of a substation showing incoming, outgoing feeders showing various protective and controlling equipment.	6M	3	L3
	b)	List the driving factors to consider for optimal substation location. Explain.	6M	3	L2

OR

7.	a)	Explain the procedure of computing the rating of distribution substation with 4 feeder configurations.	6M	3	L3
	b)	With the help of neat schematic explain the advantages and drawbacks of the following bus bar switching schemes. (i) Single bus bar scheme (ii) Ring main scheme	6M	3	L3

UNIT–IV

8.	a)	With the help of neat diagrams explain the capacitive compensation.	6M	4	L3
	b)	Write a short notes on economic justification of capacitors in distribution network.	6M	4	L4

OR

9.	a)	Write a short note on various types of voltage regulators in distribution network.	6M	4	L1
	b)	With neat block diagram explain the operation of synchronous phase modifier.	6M	4	L2

UNIT–V

10.	a)	What is distribution automation? What are the main objectives of DA?	6M	5	L2
	b)	Explain the basic structure of DA.	6M	5	L2

OR

11.		Explain the communication requirements of DA. What are the benefits of DA?	12M	5	L3

*** End ***