Hall Ticket Number :										

R-17

Code: 7G284

IV B.Tech. II Semester Regular & Supplmentary Examinations June 2022

Fundamentals of HVDC & FACTS Devices

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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			Marks	CO	Blooms Level
		UNIT–I			
1.		With the help of a neat schematic diagram, explain in detail the functions of various components of HVDC converter station.	14M	1	2
		OR			
2.		Explain the various types of HVDC links.	14M	1	4
		UNIT–II			
3.	a)	Why are harmonics generated in HVDC converter and what are the problems associated with the harmonics	7M	2	1
	b)	Explain the various sources of reactive power.	7M	2	4
		OR			
4.	a)	Explain the hierarchical control structure of a DC link.	7M	2	2
	b)	With neat block diagram, explain the concept of constant extinction control of HVDC converters.	7M	2	2
		UNIT–III			
5.	a)	Explain the sequential method of DC power flow. Draw the necessary flow chart	7M	3	2
	b)	Obtain the mathematical model of a DC converter including converter controller?	7M	3	3
		OR			
6.	a)	Explain in detail how power flow in meshed systems can be controlled with the help of FACTS devices.	7M	3	2
	b)	Explain the various types of FACTS controllers.	7M	3	2
		UNIT–IV			
7.	a)	Explain the objectives of shunt compensation.	7M	4	3
	b)	What are the objectives of series compensation	7M	4	1
		OR			
8.	a)	Explain the effect of shunt compensation of the end of a radial line on voltage stability	7M	4	2
	b)	With neat wave forms, explain the operating characteristics of the SSSC.	7M	4	2
		UNIT–V			
9.	a)	Explain the operation of UPFC with relevant diagrams.	7M	4	2
	b)	Draw the schematic diagram of the Unified power flow controller and write its operating principle?	7M	4	2
		OR			
10.		Explain independent real and reactive power control of UPFC.	14M	4	2

END

Hall Ticket Number :										

R-17

Code: 7G286

IV B.Tech. II Semester Regular & Supplmentary Examinations June 2022

Reliability Engineering & Applications to Power Systems

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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UNIT–I

1. a) Develop an expression for expected value of a random event that follows binomial distribution
   b) There are three boxes A, B, C in which there are bulbs. There are 1000 bulbs in box A with 6% probability of defective ones, 1500 in box B with 7% and 2100 in box C with 4% defective ones respectively. Find the probability that the picked bulb is good.

OR

2. a) Discuss various probability rules for combination of events.
   b) Evaluate the probability of system surviving if at least three out of the five units must be success for a time period of 1500 hours , if the failure rate of each unit is 0.2 (failures per year) .

UNIT–II

3. a) Develop symbolic unreliability expressions for parallel connected system with fully redundant configuration
   b) Analyze the reliability of series connected networks

OR

4. A system consists of two components when they are connected in series, the reliability of the combination is 0.54 and while they are in parallel, reliability is 0.96. Find the individual reliabilities of the components.

UNIT–III

5. Explain the concept of Markov Chains.

6. Consider the one component repairable model with state transitions: from state 1 to state 2 is 0.2 and from state 2 to state 1 is 0.6. Develop the state transition diagram and hence obtain the state transition probabilities up to three intervals considering that the system is initially in state

UNIT–IV

7. A Power System contains four generating units, where units 1, 2 and 3 have a capacity of 20MW and unit four has a capacity of 40 MW. The failure rate and the repair rate of each unit is 0 .4 per year and 9.6 per year respectively. Develop the combined capacity outage probability table

8. A generating unit consists of 2×25 & 1×50 MW units with a failure rate of 0.01 failures per day and repair rate 0.49 per day. Obtain the Cumulative Probability and Cumulative frequency of all the possible states

UNIT–V

9. Explain about the Common Mode Failures for 4-state model with its complete state space diagram of catastrophic components.

10. Derive the general expressions for basic probability indices for series configurations for ‘n’ components in series.

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Hall Ticket Number :										

R-17

Code: 7G283

IV B.Tech. II Semester Regular & Supplementary Examinations June 2022

Renewable Energy Sources

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	Outline the role and potential of new and renewable sources in the current energy scenario	7M	1	3
	b)	Write a short note on advantages and limitations of conventional energy resources	7M	1	2
		OR			
2.	a)	How are conventional energy sources classified?	7M	1	3
	b)	Infer briefly the role of environmental impact of solar power	7M	1	3
		UNIT–II			
3.		Explain in detail with neat sketch the construction and operation of flat plate collector. Also state its advantages and disadvantages	14M	2	3
		OR			
4.	a)	Explicate the various sensible and latent heat energy storage devices	7M	2	3
	b)	Illustrate with a neat diagram the operating principle of solar distillation	7M	2	3
		UNIT–III			
5.	a)	Explicate the various site selection consideration parameters for WECS	7M	3	3
	b)	Demonstrate with a neat block diagram the working of the various parts of WECS	7M	3	3
		OR			
6.	a)	Elucidate in the detail the classification of WECS	7M	3	3
	b)	Discuss the applications of WECS	7M	3	3
		UNIT–IV			
7.		Describe in detail the various types of tidal power plants. List its advantages and disadvantages	14M	3	3
		OR			
8.	a)	Present a short outline on mini-hydel power plants	7M	3	3
	b)	Expound about the advantages and disadvantages of OTEC	7M	3	2
		UNIT–V			
9.		Elucidate in detail the principle of operation of various types of Bio-gas digesters	14M	3	3
		OR			
10.		Describe elaborately the methods of harnessing Geothermal energy and the potential of Geothermal Energy in India	14M	3	4

****END****

Hall Ticket Number :										

R-17

Code: 7G288

IV B.Tech. II Semester Regular & Supplementary Examinations June 2022

Energy Auditing and Demand Side Management

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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			Marks	CO	Blooms Level
		UNIT–I			
1.		Explain about pie-chart, Sankey diagrams and Load profiles in detail.	14M	CO1	L2
		OR			
2.		Discuss in detail about various energy conservation schemes.	14M	CO1	L2
		UNIT–II			
3.		Explain briefly in relation to electrical energy consumption and conservation in India and in the world.	14M	CO1	L2
		OR			
4.		Discuss about roles and responsibilities of energy managers in industries.	14M	CO1	L3
		UNIT–III			
5.		Discuss construction details and characteristics of energy efficient motors.	14M	CO2	L3
		OR			
6.		Explain the technologies adopted in energy efficient lighting systems.	14M	CO2	L2
		UNIT–IV			
7.		Explain briefly about the following energy instruments: Watt meter, Pyrometer, Lux meter and Tong testers.	14M	CO3	L2
		OR			
8.		Explain in detail about time value of money and rate of return.	14M	CO3	L2
		UNIT–V			
9.	a)	Explain the benefits of DSM in detail.	7M	CO4	L2
	b)	Write in brief about Multi-Utility power exchange model of DSM.	7M	CO4	L1
		OR			
10.		Discuss management and organization of energy conservation awareness program.	14M	CO4	L3

****END****