Hall Ticket Number :										

R-20

Code: 20A27LT

IV B.Tech. I Semester Regular Examinations November 2023

Energy Storage 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 roles of EES?	1	1
	b)	Name the anode, cathode and electrolyte used in Nickel cadmium battery?	2	1
	c)	What are the classifications of EES systems?	2	1
	d)	What is double layer capacitors?	2	1
	e)	List the various applications of Energy storage systems in consumer side?	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.		Explain in detail the need for continuous and flexible supply?	12M	2	2
		OR			
3.	a)	Explain the characteristics of electricity?	6M	2	2
	b)	Interpret about transmission by cable?	6M	1	2
		UNIT–II			
4.		Analyze the basic structure, chemical reaction and characteristics of nickel and cadmium battery?	12M	2	4
		OR			
5.		Briefly explain the components of a battery Energy storage systems?	12M	2	2
		UNIT–III			
6.		Explain the chemical energy storage systems?	12M	2	2
		OR			
7.		Analyze the electro chemical storage systems?	12M	2	4
		UNIT–IV			
8.		Explain in detail super conducting magnetic energy storage systems?	12M	2	4
		OR			
9.	a)	What are the standards for EES?	6M	2	2
	b)	Explain Electrical storage systems in detail?	6M	2	2
		UNIT–V			
10.		Explain the management and control hierarchy of storage systems?	12M	3	3
		OR			
11.	a)	Analyze the application of ESS to smart grid?	6M	3	4
	b)	Apply the integration of ESS with renewable energy generation?	6M	3	4

*** End ***

Hall Ticket Number :										

R-20

Code: 20A27FT

IV B.Tech. I Semester Regular Examinations November 2023

Hybrid Electric Vehicles

(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) List the various components of EV System.		CO1	L2
	b) What is Transmission Efficiency?		CO2	L2
	c) Classify the batteries for electric vehicles.		CO3	L2
	d) What is Plug-In Hybrid Electric Vehicle?		CO4	L2
	e) Compare hybrid electric heavy-duty and fuel cell heavy duty vehicles.		CO5	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)	With the help of a neat block diagram explain different subsystems of electric drive train.	6M	CO1	L2
	b)	Illustrate the various types of hybrid electric vehicles	6M	CO1	L2
		OR			
3.	a)	Discuss the impact of modern drive trains on energy supplies.	6M	CO1	L2
	b)	Illustrate the mathematical models to describe the vehicle performance.	6M	CO1	L3
		UNIT–II			
4.	a)	Which are the resistive forces that retard the motion of a four-wheel vehicle? Show with a diagram.	6M	CO2	L2
	b)	Discuss briefly the electrical and mechanical constraints to be considered while sizing an electrical machine for an EV.	6M	CO2	L2
		OR			
5.	a)	Derive the expression for Tractive Effort in Electric Vehicle?	6M	CO2	L4
	b)	Discuss the issue that is related to the design of Electric Vehicle?	6M	CO2	L6

UNIT–III

6.	a)	Illustrate the modeling of batteries.	6M	CO2	L2
	b)	Discuss the following: specific energy (ii) specific power (iii) Ragone plot	6M	CO2	L2
		OR			
7.	a)	Describe the terms State-of-Charge and Depth-of-Discharge as applied to batteries.	6M	CO3	L2
	b)	Discuss the sizing procedures of energy storage systems for electric hybrid vehicle.	6M	CO3	L2

UNIT–IV

8.	a)	Illustrate the challenges and key technology of Hybrid Electric Vehicles	6M	CO4	L2
	b)	Describe the advantages and disadvantages of Hybrid Electric Vehicles	6M	CO4	L2
		OR			
9.	a)	Discuss the design and control principles of Plug-In Hybrid Electric Vehicles	6M	CO4	L2
	b)	Illustrate the architectures of Hybrid Electric Vehicles	6M	CO4	L2

UNIT–V

10.	a)	Describe the different power flow control modes of a typical parallel hybrid system with the help of block diagrams.	6M	CO5	L2
	b)	Illustrate the mechanism of hybrid electric heavy-duty vehicles	6M	CO5	L2
		OR			
11.		Discuss the various steps involved in the electric vehicle case study	12M	CO5	L2

*** End ***

Hall Ticket Number :										

R-20

Code: 20A27BT

IV B.Tech. I Semester Regular Examinations November 2023

HVDC & FACTS

(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 is the purpose of using smoothing reactor in HVDC system?	CO1	L2
b)	What are the drawbacks of Individual phase control scheme?	CO2	L2
c)	List the benefits of FACTS controllers.	CO3	L2
d)	Elaborate the objectives of shunt compensation.	CO4	L1
e)	List out the technical benefits of UPFC.	CO5	L3

PART-B

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

			Marks	CO	BL
		UNIT–I			
2.		Compare the dc transmission system with ac transmission system with respect to economics, technical performance and reliability.	12M	1	2
		OR			
3.	a)	With neat circuit diagram and waveforms explain the operation of 3-Phase, 6 Pulse bridge circuit with no overlapping.	6M	1	3
	b)	Explain two and three valve conduction mode of 6 pulse bridge circuit.	6M	1	3
		UNIT–II			
4.	a)	Explain current and extinction angle control.	6M	2	2
	b)	Explain system control hierarchy for HVDC transmission system.	6M	2	2
		OR			
5.		Discuss various types of filters used in HVDC transmission to suppress harmonics.	12M	2	2
		UNIT–III			
6.		Explain the power flow considerations in meshed systems.	12M	3	2
		OR			
7.		List and explain basic types of FACTS controllers.	12M	3	2
		UNIT–IV			
8.	a)	Discuss the implementation of the controllable VAR generation.	6M	4	3
	b)	Explain the operation of STATCOM.	6M	4	2
		OR			
9.		Explain operation and control of the SSSC with a neat schematic diagram.	12M	4	2
		UNIT–V			
10.		Explain the operation of UPFC with neat sketch.	12M	5	2
		OR			
11.		Explain how the UPFC can control real and reactive power flow in the transmission line.	12M	5	3

*** End ***

Hall Ticket Number :										

R-20

Code: 20A27NT

IV B.Tech. I Semester Regular Examinations November 2023

IoT Applications in Electrical Engineering

(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 IoT and its uses.	1	1
b)	What are the devices used in IoT?	2	1
c)	How IoT is interlinked with international chain?	3	1
d)	How data can be represented in IoT?	4	1
e)	What device measures energy consumption?	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)	Briefly explain the challenges of IoT	6M	1	1
b)	Explain IoT global context in detail and improvisations in IoT	6M	1	2
	OR			
3. a)	Explain Deployment and Operational procedures of IoT	6M	1	2
b)	Briefly explain IoT reference Model and architecture.	6M	1	2
	UNIT–II			
4. a)	Explain Devices and gateways of IoT	6M	2	2
b)	Explain the process of Data management in IoT	6M	2	1
	OR			
5. a)	Explain in detail about Everything as a Service (XaaS)	6M	2	2
b)	Describe the Knowledge Management of IoT	6M	2	2
	UNIT–III			
6. a)	What is global information monopolies? Explain.	6M	3	2
b)	Why IoT global value chains are important in international trade?	6M	3	2
	OR			

7.	a)	Describe the Design principles?	6M	3	1
	b)	What are the needed capabilities of IoT? Explain.	6M	3	2

UNIT–IV

8.	a)	What are technological design constraints of IoT?	6M	4	2
	b)	What are the hardware constraintsof IoT?	6M	4	2

OR

9.	a)	Explain Data representation and visualization of IoT	6M	4	2
	b)	Briefly explain Interaction and remote control process of IoT.	6M	4	2

UNIT–V

10.	a)	How does an AMI meter work?	6M	5	2
	b)	What is the concept of supervisory control and data acquisition Scada?	6M	5	2

OR

11.	a)	What is a smart grid and its function?	6M	5	2
	b)	Explain remote control operation of energy consuming devices.	6M	5	2

*** End ***

Hall Ticket Number :										

Code: 20A27IT

R-20

IV B.Tech. I Semester Regular Examinations November 2023

Power Quality

(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 Power Quality.	1	L1
	b)	Define voltage sag.	2	L1
	c)	Differentiate voltage and current distortion.	3	L1
	d)	What is meant by power quality benchmarking?	4	L1
	e)	Define voltage flicker.	5	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)	Explain the standards in power quality.	6M	1	L2
	b)	Explain with neat sketches the CBEMA and ITI curves.	6M	1	L2
		OR			
3.	a)	Elaborate on the responsibilities of the suppliers and users of electric power.	8M	1	L2
	b)	Interpret the issues in power quality.	4M	1	L2
		UNIT–II			
4.		Illustrate with neat sketches the Impulsive and oscillatory transients	12M	2	L3
		OR			
5.		Analyze the Long duration voltage variations.	12M	2	L3
		UNIT–III			
6.	a)	Differentiate harmonics and transients.	4M	3	L2
	b)	Explain the procedure behind evaluation of harmonic distortion.	8M	3	L2
		OR			
7.	a)	State the principles to control harmonics.	4M	3	L2
	b)	Explain any one device used to control harmonics.	8M	3	L2
		UNIT–IV			
8.		Analyze the measurement of power quality data using the assessment methods and standards.	12M	4	L3
		OR			
9.		Explain the various types of power quality measurement equipment.	12M	4	L2
		UNIT–V			
10.		Explain the power quality impact from different distributed generation types.	12M	5	L2
		OR			
11.		Describe how light and heavy load condition is compensated in power lines.	12M	5	L2

*** End ***

Hall Ticket Number :										

Code: 20A27HT

R-20

IV B.Tech. I Semester Regular Examinations November 2023

Utilization of Electrical Energy

(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 load equalization in electric drives	CO1	L1
b)	Write any two advantages of electrical heating.	CO2	L1
c)	What is Inverse square law in illumination?	CO3	L1
d)	List the advantages of electrical drive used on traction.	CO4	L4
e)	Write the disadvantages of HEV	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)	Discuss the different types of electric drives in detail.	6M	CO1	L2
	b)	Demonstrate the temperature rise in motor with necessary equations?	6M	CO1	L2
		OR			
3.	a)	Explain the starting and running characteristics of electric drives	6M	CO1	L1
	b)	Analyze the terms (i) Continuous loads (ii) Intermittent loads	6M	CO1	L4
		UNIT–II			
4.	a)	With neat sketch explain about dielectric heating.	6M	CO2	L3
	b)	Explain electric arc welding with fundamentals.	6M	CO2	L1
		OR			
5.	a)	Explain different types of resistance heating methods.	6M	CO2	L1
	b)	Discuss the differences between AC and DC welding.	6M	CO2	L6
		UNIT–III			
6.	a)	Explain working principle and operation of Mercury Vapor Lamp with diagram	6M	CO3	L1
	b)	Discuss the various factors to be taken into account for designing street lighting.	6M	CO3	L6
		OR			
7.	a)	Describe with a neat sketch the principle of electric discharge lamp.	6M	CO3	L4
	b)	State the advantages and disadvantages of discharge lamps over the filament lamp	6M	CO3	L2
		UNIT–IV			
8.	a)	Explain the electric traction and state the advantages of electric traction over other non-electrical systems.	6M	CO4	L1
	b)	Discuss the trapezoidal and quadrilateral speed time curves.	6M	CO4	L6
		OR			
9.		Explain Rheostatic and Regenerative braking with neat sketch	12M	CO4	L1
		UNIT–V			
10.		Discuss the various types of Electrical Machines adopted for EVs	12M	CO5	L6
		OR			
11.	a)	Explain the principle, working of electric vehicles	6M	CO5	L1
	b)	Compare conventional vehicle with hybrid electric vehicle.	6M	CO5	L2

*** End ***

Hall Ticket Number :										

R-20

Code: 20A27DT

IV B.Tech. I Semester Regular Examinations November 2023

Energy Auditing and Demand Side Management

(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 energy index.		1	1
	b) What is the need for energy audit?		1	1
	c) Write the concept of Demand Side Management.		2	1
	d) Define power factor.		4	1
	e) What is cash flow model?		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)	Explain about the importance of energy management.	6M	1	2
	b)	Explain about global warming.	6M	1	2
		OR			
3.	a)	Discuss about Sankey diagrams.	6M	1	2
	b)	Discuss about Energy Conservation Building Code.	6M	1	2
		UNIT–II			
4.	a)	List out the duties of energy auditors.	6M	2	1
	b)	Explain the procedure for report writing for energy audit.	6M	3	2
		OR			
5.		Discuss about the following energy instruments: (i) wattmeters (ii) luxmeters	12M	3	2
		UNIT–III			
6.		Explain peak clipping and valley filling.	12M	2	2
		OR			
7.	a)	Explain about the Load management.	6M	2	2
	b)	Discuss the usage of energy efficient equipment.	6M	2	2
		UNIT–IV			
8.		Explain the factors affecting the motor efficiency.	12M	4	2
		OR			
9.		Discuss the lighting energy control and lighting energy audit.	12M	4	2
		UNIT–V			
10.		Explain internal rate of return method.	12M	5	2
		OR			
11.		Explain future value method.	12M	5	2

*** End ***