Code: 19A27ET

IV B.Tech. I Semester Regular Examinations Nov/Dec 2022

Hybrid Electric Vehicles

(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	BL

UNIT–I

| 1. | With the help of a neat block diagram explain different subsystems of electric drive train. | 14M | 1 | 1 |

OR

| 2. | Explain different transmission configurations of electric vehicles. | 14M | 1 | 1 |

UNIT–II

| 3. | Discuss about Ideal Gear Box steady state model? | 14M | 2 | 2 |

OR

| 4. | Briefly explain the problems related to tractive effort. | 14M | 2 | 1 |

UNIT–III

| 5. a) | Explain about Electric Vehicle battery capacity? | 7M | 3 | 1 |
| b) | What are the different methods that are used to test the Electric Vehicle battery? | 7M | 3 | 1 |

OR

| 6. | What are the different types of fast charging strategies for Electric Vehicle battery? | 14M | 3 | 1 |

UNIT–IV

| 7. a) | What are the challenges and key technologies of hybrid electric vehicle? | 7M | 4 | 1 |
| b) | Write the advantages and disadvantages of hybrid electric vehicle. | 7M | 4 | 1 |

OR

| 8. | Explain different architectures of hybrid electric vehicle. | 14M | 4 | 1 |

UNIT–V

| 9. a) | Explain different types of battery charger topologies? | 7M | 5 | 1 |
| b) | What are the challenges faced by charging infrastructure of electric vehicles. | 7M | 5 | 1 |

OR

| 10. | Explain the impact of plug in electric vehicles on distribution network? | 14M | 5 | 1 |

END

Code: 19A27CT

IV B.Tech. I Semester Regular Examinations Nov/Dec 2022
Principles of Power Quality
(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	BL
		UNIT–I			
1.	a)	Define power quality.	4M	CO1	L1
	b)	Draw and explain the CBEMA and ITI Curves.	10M	CO1	L1
		OR			
2.		Explain about the various power quality standards in electrical power system.	14M	CO1	L1
		UNIT–II			
3.	a)	Write the principles of regulating the voltage.	2M	CO2	L1
	b)	Explain the following electrical power quality issues with examples. (i)Voltage sags (ii)Voltage interruptions (iii) Voltage Swell	12M	CO2	L1
		OR			
4.	a)	Explain about short duration and long duration voltage variations?	7M	CO2	L1
	b)	Explain how the estimation of voltage sag is done?	7M	CO2	L2
		UNIT–III			
5.	a)	Explain about the harmonic sources from Commercial loads?	7M	CO3	L1
	b)	Explain the effects of harmonics on power system equipments and load	7M	CO3	L1
		OR			
6.		List out the devices for controlling harmonic distortion? Explain any two in detail.	14M	CO3	L1
		UNIT–IV			
7.	a)	Discuss about the Power Quality Monitoring Standards?	7M	CO4	L1
	b)	Discuss how the assessment of Power Quality measurement data is done?	7M	CO4	L1
		OR			
8.		Explain how power quality measurement equipment is classified and also explain in detail.	14M	CO4	L1
		UNIT–V			
9.	a)	Discuss about the impact of Distributed Generator on the low voltage network.	7M	CO5	L1
	b)	Write a note on voltage flicker and fluctuations.	7M	CO5	L1
		OR			
10.	a)	Explain in detail about the mitigation of voltage dip during motor start.	7M	CO5	L1
	b)	Discuss about the protection issues for distributed generation?	7M	CO5	L1

END

Code: 19A272T

IV B.Tech. I Semester Regular Examinations Nov/Dec 2022
Power Semiconductor Drives
(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	BL

UNIT–I

1. a) Briefly explain the advantages of electric drive. — 7M　1　2

   b) Draw and discuss the torque-speed characteristics of 1- fully controlled separately excited dc motor with neat diagram and output voltage expressions. — 7M　1　2

OR

2. a) What is Drive? Compare the differences between electric drives over mechanical drives. — 7M　1　2

   b) Draw and describe the torque-speed characteristics of 3- fully controlled Dc series motor with neat diagram and output voltage expressions. — 7M　1　2

UNIT–II

3. a) Describe plugging for separately excited dc motor with neat circuit diagrams and also draw torque-speed characteristics — 7M　2　2

   b) A 220V, 970 rpm, 100A dc separately excited motor as an armature resistance of 0.05 . It is braked by plugging from an initial speed of 1000rpm. Calculate (i) Resistance to be placed in the armature circuit to limit braking current to twice the full load value. (ii) Braking torque when the speed as fallen to zero — 7M　2　3

OR

4. a) With neat circuit diagram and waveforms, discuss dynamic braking of separately excited motor. — 7M　2　2

   b) Describe the operation of dual converter in the following two modes i) Without circulating current mode ii) With circulating current mode — 7M　2　2

UNIT–III

5. a) Discuss with suitable diagram one quadrant chopper controlled dc series motor drive — 7M　3　2

   b) Describe two quadrant chopper controlled separately excited dc motor drive — 7M　3　2

OR

6. a) Illustrate four quadrant operation of chopper fed dc series motor drive with neat diagram. 7M 3 2

   b) Draw and discuss the closed loop operation of chopper fed DC motor 7M 3 2

UNIT–IV

7. a) Draw and describe the control of an induction motor with variable stator voltage and also draw the speed torque characteristics 7M 4 2

   b) A 400V, 3- , 50 Hz, 6 pole squirrel Cage induction motor has the following parameters referred to stator.
   $Rs=R^1r=0.2$, $Xs=X^1r=0.5$, and $Xm=16$, and $S=0.06$, when two stator windings were suddenly interchanged, calculate (i) Primary current (ii) Breaking torque immediately after the application of plugging (iii) Rotor speed 7M 4 3

OR

8. a) Discuss the basic principle of operation of an induction motor. 7M 4 2

   b) Describe the variable frequency control of an induction motor by voltage source inverter 7M 4 2

UNIT–V

9. a) Illustrate the operation of rotor- resistance control. 7M 5 2

   b) A 3-phase, 400V, 6 pole, 50hz, delta connected slip ring induction motor has rotor resistance of 0.2 and leakage reactance of 1 per phase referred to stator. When driving a fan load it runs at full load at 4% slip. What resistance must be inserted in the rotor circuit to obtain a speed of 850 rpm. Neglect impedance and magnetising branch. Stator to rotor turns ratio is 2.2. 7M 5 3

OR

10. a) Draw and discuss the characteristics of load commutated CSI fed synchronous motor with expressions. 7M 5 2

    b) Illustrate the operation of self-controlled synchronous motor. 7M 5 2

END

R-19

Code: 19A27BT

IV B.Tech. I Semester Regular Examinations Nov/Dec 2022
Smart Grid
(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	BL

UNIT–I

1.	a)	List and explain the five key aspects of smart grid development.	7M	1	1
	b)	Describe working definitions of smart grid and associated concepts	7M	1	2

OR

2.	a)	Draw and explain the smart grid architecture.	7M	1	1
	b)	What are the benefits of smart grids?	7M	1	2

UNIT–II

3.	Explain different types of latest wired and wireless technologies.	14M	2	4

OR

4.	Explain Phasor Measurement Units in smart grids?	14M	2	3

UNIT–III

5.	a)	Compare different load flow techniques.	7M	3	4
	b)	Write an algorithm for Newton-Raphson load flow method.	7M	3	2

OR

6.	Discuss energy management in smart grids.	14M	3	4

UNIT–IV

7.	Briefly discuss about various modelling and analysis tools associated with customer information systems.	14M	4	1

OR

8.	a)	What is the importance of state estimation? Explain weighted least square technique of state estimation.	7M	4	2
	b)	Briefly explain the outage management procedure in smart grids.	7M	4	1

UNIT–V

9.	Explain the wind energy as renewable energy sources with the necessary modelling equations.	14M	5	2

OR

10.	Briefly discuss about various penetration and variability issues associated with sustainable energy technologies.	14M	5	2

END

Code: 19A17HT

IV B.Tech. I Semester Regular Examinations Nov/Dec 2022

Water Resources and Conservation
(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	BL
	UNIT–I			
1.	Describe the various components of hydrologic cycle with the help of a neat sketch.	14M	1	3
	OR			
2.	Describe about the interrelation of water resources with other natural resources and the environment.	14M	1	3
	UNIT–II			
3.	Bring out the difference between evaporation, transpiration and evapotranspiration.	14M	2	2
	OR			
4.	Explain the importance of reservoir and its operations during critical time.	14M	2	2
	UNIT–III			
5.	Explain the concept of irrigation scheduling and list out the advantages of it.	14M	3	4
	OR			
6.	Discuss about the four principles of Integrated Water Resources Management.	14M	3	4
	UNIT–IV			
7.	How to implement the concept of *Think Globally Act Locally* on water resources.	14M	3	4
	OR			
8.	Briefly explain about national water policy.	14M	3	4
	UNIT–V			
9.	How to conserve water by municipal water supplies.	14M	4	2
	OR			
10.	Write in detail how to control pollution from bathrooms, kitchens, laundry and outdoors.	14M	4	2

****END****

Code: 19A271T

IV B.Tech. I Semester Regular Examinations Nov/Dec 2022
Distribution of Electrical Power
(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)
****

| | | | Marks | CO | BL |

UNIT–I

1. a) Explain the following term: (i) Maximum demand. (ii) Coincident demand. (iii) Contribution factor — 6M 1 2

   b) Assume that the annual peak load of a primary feeder is 2500kW, at which the power is 70 kW per three phases. Assuming an annual loss factor of 0.15. Determine: (i) The average annual power loss (ii) The total annual energy loss due to the copper losses of the feeder — 8M 1 5

OR

2. a) Discuss the design consideration of loop type primary feeders. — 6M 1 2

   b) List the factors affecting the primary feeder voltage levels and primary feeder loading — 8M 1 2

UNIT–II

3. a) Explain the voltage drop of uniformly loaded distributor fed at both ends with equal voltages. — 6M 2 2

   b) Consider a three phase, 3 wire, 240 V secondary system with balanced loads at A, B and C as shown in figure below. Determine the voltage drop in one phase of laterals

$Z_1 = (0.03 + j0.01)$ Ω/phase
$Z_2 = (0.1 + j0.03)$ Ω/phase
$Z_3 = (0.05 + j0.05)$ Ω/phase

— 8M 2 5
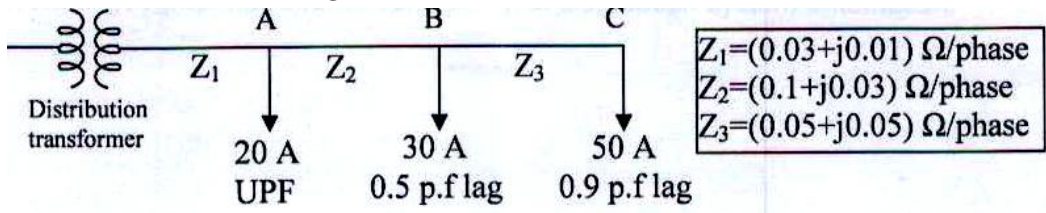
OR

4. a) Derive the equations for voltage drop and power loss in a radial feeder with uniformly distributed load — 6M 2 2

   b) A 2-wire DC distributor AB, 600 m long as loaded as under

Distance from (mts):	150	300	350	450
Loads(amps)	100	150	250	300

   The feeding point A is maintained at 440 V and that of B at 430V. If each conductor has a resistance of 0.02 per 100 m, Find: (i) The current supplied from A to B. (ii) The power dispatched in the distributor — 8M 2 5

UNIT–III

5. a) How do you analyze a substation service area with 'n' primary feeders   7M   3   2

   b) Draw the Substation layout by showing the location of all substation equipment   7M   3   2

OR

6. a) Explain how to decide the rating of a distribution a substation.   7M   3   2

   b) Explain
(i) Air insulated substation (ii) Indoor and outdoor substation   7M   3   2

UNIT–IV

7. a) Explain the role of shunt and series capacitors in power factor correction.   6M   4   2

   b) A synchronous motor improves the power factor of a load of 300 kW from 0.8 lagging to 0.9 lagging. Simultaneously the Motor carries a load of 150 kW. Determine: (i) The leading kVAR taken by the motor. (ii) kVA rating of the motor. (iii) Power factor at which the motor operate.   8M   4   5

OR

8. a) Write short notes of methods of voltage control?   7M   4   2

   b) A 3-phase, 5 kW inductions motor has a power factor of 0.85 lagging. A bank of capacitor is connected in delta across the supply terminal and power factor raised to 0.95 lagging. Determine the kVAR rating of the capacitor in each phase.   7M   4   5

UNIT–V

9. a) Explain the typical distribution system planning process.   7M   5   2

   b) Explain the classification of Load forecasting   7M   5   2

OR

10. a) Explain the different types of Distribution System Planning Models   10M   5   2

   b) Explain the short notes about substation expansion,   4M   5   2

END