Hall Ticket Number :										

R-20

Code: 20A261T

III B.Tech. II Semester Supplementary Examinations Nov/Dec 2023

Power System Analysis

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

****

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: Oriented graph of a network.	1	1
b) State any advantage of Gauss Seidel load flow solution.	2	1
c) Draw the phasor diagram of negative sequence three phase voltages of sequence component for unbalanced phasors.	3	1
d) Sketch the Power-angle curve of a synchronous machine.	4	1
e) Write down the swing equation.	5	1

PART-B

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

	Marks	CO	BL

UNIT–I

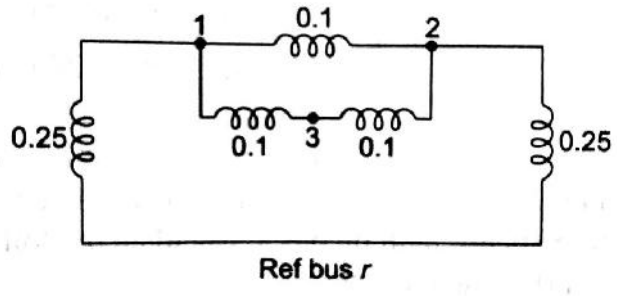
2. The parameters of a 3-bus system are as under, Find the bus admittance matrix using direct inspection method.

Bus Code	Impedance (pu)	Half-line Charging admittance (pu)
1-2	0.06+j0.18	j0.005
1-3	0.02+j0.06	j0.006
2-3	0.04+j0.12	j0.005

12M 1 2

OR

3. Obtain the Bus Impedance Matrix for the network shown in Figure (all impedances are in p.u.) using Z-bus building algorithm.



12M 1 2

UNIT–II

4. Explain clearly the computational procedure for load flow solution using Newton-Raphson method, considering the generator reactive power limit. 12M 2 2

OR

5. The load flow data for the sample power system are given below (all values are in per unit). The voltage magnitude at bus 2 is to be maintained at 1.04 p.u. The maximum and minimum reactive power limits of the generator at bus 2 are 0.35 and 0.0 p.u. respectively. Determine the voltage solution of the power system at the end of first iteration using Gauss-Seidel method

Bus code	Impedance	Line charging admittance
1–2	0.08 + j0.24	0.0
1–3	0.02 + j0.06	0.0
2–3	0.06 + j0.18	0.0

Bus code	Assumed voltages	Generation		Load	
		P	Q	P	Q
1	1.06 + j0.0	0.0	0.0	0	0
2	1.0 + j0.0	0.2	0.0	0	0
3	1.0 + j0.0	0.0	0.0	0.6	0.25

12M 2 2

UNIT–III

6. Write short notes on short circuit current and MVA calculation for symmetrical fault analysis. 12M 3 2

OR

7. A 25 MVA, 13.2 kV alternator with solidly grounded neutral has a sub-transient reactance of 0.25 p.u. The negative and zero sequence reactances are 0.35 and 0.1 p.u. respectively. Determine the fault current and the line-to-line voltages at the fault when a double line-to-ground fault occurs at the terminals of an unloaded alternator. Neglect resistance. 12M 3 2

UNIT–IV

8. Discuss the methods of improving steady state stability of the power system network. 12M 4 2

OR

9. With the help of Power-angle curve, explain how system stability can be studied? 12M 4 2

UNIT–V

10. Explain about determination of transient stability using equal area criterion. 12M 5 2

OR

11. Briefly describe the classical step by step solution of swing equation. 12M 5 2

*** End ***

Hall Ticket Number :										

R-20

Code: 20A26BT

III B.Tech. II Semester Supplementary Examinations Nov/Dec 2023

Power Semiconductor Drives

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

****

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)	Mention two drawbacks if the armature in DC motor is discontinuous.	CO1	L2
b)	How would you define four quadrant operation	CO2	L2
c)	List out some comparative advantages of choppers over controlled rectifiers for drive applications.	CO3	L2
d)	What is the need of V/F control in induction motor	CO4	L2
e)	Compare and tell the advantages of Kramer drive over Scherbius drive	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 relevant circuit and waveforms, explain the principle of operation of 1 fully controlled converter fed to dc drive. Derive an expression for average out-put voltage under continuous current mode.	6M	CO1	L2
b)	Two independent 1 phase semi converters are supplying the armature & field circuits of the separately exited DC motor, for controlling its speed. The firing angle of the converter supplying the field adjusted such that maximum field current flows. The machine parameters are i) armature resistance = 0.25 ohm, ii) Filed resistance=147ohm, iii) Motor voltage constant=0.7032 V-s/A-r iv) load torque=45N-m at 1000 rpm. The converter is fed from a 208V, 50Hz ac supply. The friction and windage losses are neglected. Find i) The current of the field & armature circuits which are sufficient enough to make the armature & field currents continuous. ii) Delay angle of the armature converter.	6M	CO1	L3
	OR			
3. a)	Explain the speed torque characteristics of a D.C series motor connected to a three phase fully controlled converter	6M	CO1	L2
b)	A separately excited DC motor at 10 kW, 300 V, 1000 rpm is supplied from 3- phase half controlled bridge rectifier. The three phase supply is rated at 220 V, 50 Hz. Armature resistance of motor Ra = 0.2 Ω and sufficient inductance is added to maintain continuous conduction. It delivers rated power at rated speed when $\alpha=0^{\circ}$. If the firing angle is retarded to $\alpha=30^{\circ}$, calculate the speed of the operation if: (i) The load torque is constant. (ii) The load torque is proportional to speed.	6M	CO1	L3

UNIT–II

4.		Explain how four quadrant operation is achieved by dual converter with 3 phase full wave configuration for DC separately excited dc motor	12M	CO2	L2

OR

5.	a)	Draw speed-torque characteristic for regenerative braking operation of a D.C shunt motor and explain the operation	6M	CO2	L2
	b)	Draw the block diagram and explain the closed loop operation of DC motor.	6M	CO2	L2

UNIT–III

6.		Explain the operation of four quadrant chopper fed to the DC series motor and also draw the current & voltage waveforms for continuous current operation.	12M	CO3	L2

OR

7.	a)	A 230V, 24A, 1000 rpm separately excited DC motor having an armature resistance of 2ohm is controlled by a chopper. The chopping frequency is 500Hz and the input voltage is 230V. Calculate the duty ratio for a motor torque 1.2 times rated torque at 500 rpm.	6M	CO3	L3
	b)	Explain the principle of closed loop control of chopper fed DC drive using suitable block diagram.	6M	CO3	L2

UNIT–IV

8.	a)	Mention various methods of speed control of an I.M. Explain stator frequency control with necessary characteristic curves	6M	CO4	L2
	b)	Explain the operation of voltage source inverter in 180 degrees conduction mode.	6M	CO4	L2

OR

9.	a)	Describe the operation of AC voltage controller fed three phase induction motor with neat circuit diagram and waveforms	6M	CO4	L2
	b)	For variable frequency control of induction motor explain for the speeds below base speed V/F ratio is maintained constant. Why?	6M	CO4	L2

UNIT–V

10.		Describe self control and separate control of Synchronous motor in detail.	12M	CO5	L3

OR

11.	a)	Explain the operation of load commutated CSI fed synchronous motor	6M	CO5	L2
	b)	Draw the speed torque characteristics of a rotor resistance controlled induction motor and explain the effect of rotor resistance variation.	6M	CO5	L3

*** End ***

Hall Ticket Number :										

R-20

Code: 20A263T

III B.Tech. II Semester Supplementary Examinations Nov/Dec 2023

Power System Operation and Control

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

****

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 the incremental transmission loss and give its significance	1	1
b)	What are the advantages of operation of hydro thermal combinations?	2	1
c)	What is meant by tie-line bias control?	3	1
d)	Emphasize the need of reactive power compensation.	4	3
e)	Define Market Power.	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 expression for optimum generation allocation without transmission line losses.	6M	1	1
b)	A power system consists of two 200MW units whose input cost data are represented by the equations: $C_1 = 0.03P_1^2 + 21P_1 + 750$ Rs/hour, $C_2 = 0.5P_2^2 + 18P_2 + 980$ Rs/hour. If the total received power $P_R = 350$ MW, determine the load division between the units for the most economic operation.	6M	1	3
	OR			
3. a)	How are B-coefficients evaluated for transmission lines of the power system?	6M	1	2
b)	Two power plants are connected together by a transmission line and load is connected at plant 2. When 150 MW are transmitted from plant-1, the transmission loss is 10MW. The cost characteristics of two plants are $C_1 = 0.05\ P_{G1}^2 + 13\ P_{G1}$ Rs/h $C_2 = 0.06\ P_{G2}^2 + 12\ P_{G2}$ Rs/h Find the optimum generation for λ=30.	6M	1	3

UNIT–II

4.	a)	Explain the hydrothermal scheduling problem.	6M	2	1
	b)	Explain the problem of scheduling hydrothermal power plants. Explain the constraints in the problem.	6M	2	1
		OR			
5.		Derive mathematical formulation for short term hydro thermal scheduling.	12M	2	2

UNIT–III

6.		Explain clearly about proportional plus integral LFC with a block diagram and prove that its change in frequency is zero.	12M	3	1
		OR			
7.		Derive the expression for change in static error frequency and tie line power in an identical two area LFC system with block diagram.	12M	3	2

UNIT–IV

8.	a)	Compare series, shunt compensations with their advantages and disadvantages.	6M	4	3
	b)	What is the importance of load compensation? What are the specifications of load compensation equipment?	6M	4	2
		OR			
9.	a)	Describe the performance of uncompensated transmission lines.	6M	4	3
	b)	Compare the different types of compensating equipment for transmission systems.	6M	4	3

UNIT–V

10.	a)	What are the major factor motivating the restructuring.	6M	5	2
	b)	Explain Transmission Pricing and Congestion Pricing.	6M	5	1
		OR			
11.	a)	Explain Electricity Price Volatility Electricity Price Indexes.	6M	5	1
	b)	Discuss about Short-time Price Forecasting.	6M	5	3

*** End ***

Hall Ticket Number :										

R-20

Code: 20A26DT

III B.Tech. II Semester Supplementary Examinations Nov/Dec 2023

Solar and Wind Energy Systems

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

****

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 difference between renewable and non renewable energy source of energy?	CO1	L1
b) What is solar collector? what are different types of solar collectors are used	CO2	L1
c) List the disadvantages of wind power generation.	CO3	L1
d) Write down the various types of wind power plants	CO3	L1
e) Mention various operating modes of Grid	CO4	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)	How to estimate solar radiation?	6M	CO1	L2
	b)	Describe solar pond with neat sketch.	6M	CO1	L2
		OR			
3.	a)	Mention the applications of non-concentrating type collectors.	6M	CO1	L2
	b)	What are the limitations of conventional energy sources?	6M	CO2	L2
		UNIT–II			
4.	a)	Write down advantages of solar PV system.	6M	CO2	L2
	b)	Draw I/V & P? V characteristics of Solar PV cells.	6M	CO2	L2
		OR			
5.	a)	Explain advantages and disadvantages of solar photo voltaic system.	6M	CO2	L2
	b)	Explain types of PV Solar cells and draw characteristics of it.	6M	CO2	L2
		UNIT–III			
6.	a)	Discuss the wind power statistics in India and global scenario?	6M	CO2	L2
	b)	Mention the advantages and disadvantages of wind energy?	6M	CO3	L2
		OR			
7.	a)	What is Betz Model?	6M	CO3	L2
	b)	What are the applications of wind energy?	6M	CO3	L2
		UNIT–IV			
8.		Explain fixed and variable speed wind turbines with neat diagram	12M	CO4	L2
		OR			
9.		Explain Doubly-Fed Induction Generators and their characteristics?	12M	CO4	L2
		UNIT–V			
10.	a)	Explain the Voltage and Frequency operating limits of Wind farms for Fault ride-through Capability.	6M	CO4	L2
	b)	Explain 'Grid code' and explain its technical requirements.	6M	CO4	L2
		OR			
11.		Explain the Hybrid and isolated Grid Integration operation of Solar PV and wind Systems.	12M	CO4	L2

*** End ***

Hall Ticket Number :										

R-20

Code: 20A262T

III B.Tech. II Semester Supplementary Examinations Nov/Dec 2023

Microprocessors and Microcontrollers

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

****

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) List different segment registers in 8086	CO1	L1
b) Describe memory mapped I/O	CO2	L2
c) Show the data transfer format in asynchronous communication	CO3	L1
d) Name the functions of port1 in 8051	CO4	L1
e) List the features of ARM	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.		Explain the architecture of 8086 processor with neat sketch	12M	1	L2
		OR			
3.	a)	Draw the memory read cycle diagram in Minimum mode	6M	1	L4
	b)	Develop an ALP in 8086 to sort 10 words of data	6M	1	L6
		UNIT–II			
4.	a)	Explain DMA operation	8M	2	L2
	b)	Differentiate I/O mapped and memory Mapped methods	4M	2	L2
		OR			
5.		Explain the architecture of 8259 with architecture diagram	12M	2	L2
		UNIT–III			
6.	a)	Differentiate synchronous and asynchronous communication	4M	3	L2
	b)	Discuss I2C protocol	8M	3	L2
		OR			
7.	a)	List the specifications of Blue-tooth	4M	3	L1
	b)	Discuss SPI protocol	8M	3	L2
		UNIT–IV			
8.		Discuss the serial communication module in 8051	12M	4	L2
		OR			
9.	a)	Discuss any four data transfer instructions in 8051	8M	4	L2
	b)	Develop a program to multiply two bytes in 8051	4M	4	L6
		UNIT–V			
10.	a)	List different applications of ARM	4M	5	L1
	b)	Explain the architecture of ARM with neat sketch	8M	5	L2
		OR			
11.	a)	List different pins and their functions in ARDUINO	8M	5	L1
	b)	Illustrate the application of ADC	4M	5	L3

*** End ***