Hall Ticket Number :										

R-20

Code: 20A262T

III B.Tech. II Semester Regular Examinations June 2023

Microprocessors and Microcontrollers

(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)	List different conditional flags in 8086	CO1	L1
b)	Describe How DMA helps in fast data transfer	CO2	L1
c)	Differentiate synchronous and asynchronous communication	CO3	L2
d)	List different interrupts in 8051	CO4	L1
e)	Describe the applications of ARM	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.		With a neat sketch explain in detail the internal hardware architecture of 8086 microprocessor	12M	CO1	L5
		OR			
3.	a)	Discuss any 6 arithmetic instructions with examples	8M	CO1	L2
	b)	Develop an ALP in 8086 to find the number is ODD or EVEN	4M	CO1	L6
		UNIT–II			
4.		Explain different I/O modes in 8255 PPI	12M	CO2	L2
		OR			
5.	a)	Show the interrupt vector table of 8086 and explain	8M	CO2	L3
	b)	Explain how the interrupts are handled in 8086	4M	CO2	L2
		UNIT–III			
6.	a)	Show how the data transferred in synchronous communication	4M	CO3	L3
	b)	Discuss ZIG-bee communication protocols	8M	CO3	L2
		OR			
7.		Explain RS232 signals and interfacing for serial communication	12M	CO3	L2
		UNIT–IV			
8.	a)	Describe the timer /counter in 8051	4M	CO4	L2
	b)	Explain timer in different modes	8M	CO4	L2
		OR			
9.		Explain the internal memory organization in 8051	12M	CO4	L2
		UNIT–V			
10.	a)	List architectural features of ARM processor	4M	CO5	L1
	b)	With neat sketch explain the architecture of ARM7	8M	CO5	L2
		OR			
11.	a)	Discuss the function of I/O ports in ARDUINO	8M	CO5	L2
	b)	Illustrate the applications of PWM	4M	CO5	L3

*** End ***

Hall Ticket Number :										

R-20

Code: 20A261T

III B.Tech. II Semester Regular Examinations June 2023

Power System Analysis

(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**

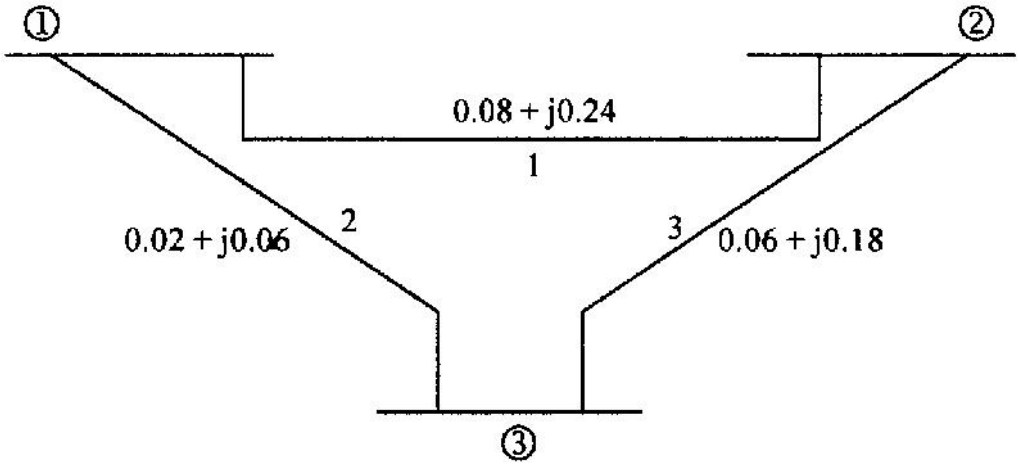
PART-A

(Compulsory question)

		CO	BL
1.	Answer ***all*** the following short answer questions (5 X 2 = 10M)		
a)	Define: Primitive network.	1	1
b)	Classify buses with known and unknown parameters.	2	1
c)	Define: Per unit system.	3	1
d)	What is meant by Steady state stability power limit?	4	1
e)	Classify the power system stability.	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.	Derive the expression for Y-bus matrix using singular transformation method.	12M	1	2
	OR			
3.	Form the Z-bus matrix for the network shown below using Z-bus building algorithm. Take bus 1 as the reference bus. 	12M	1	2
	UNIT–II			
4.	Develop the Newton Raphson load flow (polar) method with its algorithm considering without generator bus.	12M	2	2
	OR			

5. The following is the system data for a load flow solution:

The line admittances:

Bus code	Admittance
1–2	2–j8.0
1–3	1–j4.0
2–3	0.666–j 2.664

The schedule of active and reactive powers:

Bus code	P	Q	V	Remarks
1	–	–	1.06	Slack
2	0.5	0.2	1 + j0.0	PQ
3	0.4	0.3	1 + j0.0	PQ

Determine the voltages at the end of first iteration using Gauss-Seidel method. 12M 2 2

UNIT–III

6. a) A 3 phase, 33 kV, 100MVA alternator has sequence reactance of X1= X_2= 0.12p.u. If the generator is on no load, find the fault current when the LL fault occurs at the terminals of alternator 6M 3 4

b) Derive the expression for the fault current, when an unloaded alternator subjected to LLG fault. 6M 3 3

OR

7. Derive the expression for fault current and voltages for L-G fault Analysis with fault impedance. 12M 3 2

UNIT–IV

8. Write short notes on Synchronizing power coefficient in stability studies. 12M 4 2

OR

9. Briefly explain about steady state stability determination using power-angle curves. 12M 4 2

UNIT–V

10. Derive the swing equation. 12M 5 2

OR

11. Write short notes on

(a) Critical clearing time (b) Critical clearing angle. 12M 5 2

*** End ***

Hall Ticket Number :										

R-20

Code: 20A26BT

III B.Tech. II Semester Regular Examinations June 2023

Power Semiconductor Drives

(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)	When do you use controlled converter in the armature circuit and fixed excitation voltage in field winding?	CO1	L2
b)	What is meant by plugging?	CO2	L2
c)	What are the advantages in operating choppers at high frequency?	CO3	L2
d)	What are the two types of slip power recovery schemes?	CO4	L1
e)	Mention two advantages of CSI fed IM drives	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)	Explain the use of freewheeling diode in the converter fed DC drive take an example of 1 phase half controlled converter. How it is going to effect the machine performance.	6M	CO1	L3
	b)	220V, 1500rpm,11.6 A separately excited motor is connected by single phase fully controlled rectifier with an AC source voltage of 230V,50 Hz supply enough inductance is added to ensure continuous conduction for any torque greater than 25% of rated torque. a) what should be the value of the firing angle to get rated torque at 1000 rpm b) calculate the firing angle for the rated braking torque at -1500 rpm.	6M	CO1	L4
		OR			
3.		Describe the use of 3 phase semi converter for the speed control of DC series motor. Illustrate your answer with appropriate wave forms and also derive rms value of source & thyristor currents.	12M	CO1	L4
		UNIT–II			
4.		Draw speed-torque characteristic for regenerative braking operation of a D.C shunt motor and explain the operation	12M	CO2	L2
		OR			

5.		A 220 V DC series motor runs at 1200 rpm and takes an armature current of 100A when driving a load with a constant torque. Resistance of the armature and field windings are 0.05 ohm each. DC series motor is operated under dynamic braking at twice the rated torque and 1000rpm. Calculate the value of braking current and resistor. Assume linear magnetic curve.	12M	CO2	L2

UNIT–III

6.	a)	Explain the operation of Step-up chopper with circuit diagram & waveforms	6M	CO3	L2
	b)	A 220V, 24A, 1000rpm separately excited DC motor having an armature resistance of 2Ω is controlled by a chopper. The chopping frequency is 500Hz and the input voltage is 230V. Calculate the duty ratio for a motor torque of 1.2 times rated torque at 500rpm	6M	CO3	L3

OR

7.	a)	With relevant circuit and operating characteristics, explain two quadrant operation of separately excited DC motor	6M	CO3	L2
	b)	A 230V, 1200rpm, 15A separately excited motor has an armature resistance of 1.2ohm. Motor is operated under dynamic braking with chopper control, braking resistance has a value of 20 ohm. i) calculate duty ratio of chopper for motor speed of 1000rpm and braking torque equal to 1.5 times rated motor torque. ii) What will be the motor speed for duty ratio of 0.5 and motor torque equal to 1.5 times rated motor torque.	6M	CO3	L3

UNIT–IV

8.		Discuss in detail speed control of three phase induction motor through stator frequency for the following conditions: (i) Below rated frequency. (ii) Above rated frequency.	12M	CO4	L3

OR

9.	a)	What is stator voltage control for speed control of induction motor drive? List the applications where stator voltage control is used speed control	6M	CO4	L2
	b)	Compare CSI and VSI drives	6M	CO4	L3

UNIT–V

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

OR

11.	a)	With relevant circuit and characteristics, explain the operation of Static Kramer drive.	6M	CO5	L2
	b)	Compare slip power recovery scheme with rotor resistance control	6M	CO5	L3

*** End ***

Hall Ticket Number :										

R-20

Code: 20A263T

III B.Tech. II Semester Regular Examinations June 2023

Power System Operation and Control

(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 significance of incremental cost?	1	1
b)	What is the statement of optimization problem of hydro-thermal system?	2	1
c)	What is the need of a speed changer?	3	1
d)	Significance of series compensation.	4	3
e)	Define Congestion Pricing.	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 the various factors to be considered in allocating generation to different power stations for optimum operation.	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)	Derive the expression for general transmission line loss formula.	6M	1	2
b)	A system consists of two generating plants with fuel costs of: $C_1 = 0.03P_1^2 + 15P_1 + 1.0$ $C_2 = 0.04P_2^2 + 21P_2 + 1.4$ The system operates on economic dispatch with 120MW of power generation by each plant. The incremental transmission loss of plant-2 is 0.15. Find he penalty factor of plant-1.	6M	1	3

UNIT–II

4.		Explain the short-term hydrothermal scheduling problem.	12M	2	1

OR

5.	a)	Explain the hydroelectric power plant model with a neat diagram.	6M	2	1
	b)	How is optimal generation scheduling of hydrothermal system stated and solved in the power system?	6M	2	2

UNIT–III

6.		Explain LFC of a Two area system in both uncontrolled case and controlled case	12M	3	1

OR

7.		Explain how the integral control scheme results in zero tie-line deviation and zero frequency deviation under steady state condition. Following a step load change in one of the areas of a two area LFC system with block diagram.	12M	3	1

UNIT–IV

8.	a)	Explain the objectives of load compensator.	6M	4	1
	b)	Explain the effects on uncompensated line under no load conditions.	6M	4	1

OR

9.	a)	What are the merits and demerits of different types of compensation?	6M	4	2
	b)	Discuss the specification of load compensation.	6M	4	2

UNIT–V

10.	a)	Explain about Restructuring models	6M	5	1
	b)	Discuss various models of electricity markets.	6M	5	3

OR

11.	a)	Explain Short-time Price Forecasting	6M	5	1
	b)	Write a shot note on market operations.	6M	5	2

*** End ***

Hall Ticket Number :										

R-20

Code: 20A26AT

III B.Tech. II Semester Regular Examinations June 2023

Power System Protection

(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 relay? List out classification of Relays.		CO1	1
	b) List out the advantages of differential relays.		CO2	1
	c) Mention different types of faults occur in generators.		CO3	1
	d) State the types of faults in power system.		CO4	1
	e) Why earth wire is provided in overhead transmission lines?		CO5	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)	What do you understand by a zone of protection? Discuss various zones of protection for a modern power system.	6M	CO1	L2
	b)	What do you understand by incorrect operation of the protective relay? What are the reasons of incorrect operation?	6M	CO1	L1
		OR			
3.	a)	Explain the nature and causes of faults. Discuss the consequences of faults on a power system.	6M	CO1	L2
	b)	What are the various components of a protection system? Briefly describe their functions with the help of a schematic diagram.	6M	CO1	L3
		UNIT–II			
4.		Explain the characteristics of over current relays.	12M	CO1	L2
		OR			
5.	a)	Explain the operating principle and construction of induction disc type relay with neat sketch.	6M	CO2	L3

	b)	Explain the operation of microprocessor-based inverse over current relay with flowchart.	6M	CO2	L3

UNIT–III

6.		Write short notes on: a. Buchholz relay b. Inter-turn fault protection of alternator	12M	CO3	L1
		OR			
7.	a)	Discuss the protection of restricted earth fault in an alternator with help of neat diagram.	6M	CO3	L2
	b)	Explain Merz-Price protection of star connected alternator stator windings with neat circuit diagram.	6M	CO3	L3

UNIT–IV

8.		What is carrier current protection? With neat sketch, discuss the phase comparison scheme of carrier current protection.	12M	CO4	L3
		OR			
9.	a)	Explain over-current protection of feeders. How is the protection system graded with respect to the time of operation of relays for a radial feeder	6M	CO4	L2
	b)	What is the importance of bus-bar protection? What are the requirements of protection of lines?	6M	CO4	L1

UNIT–V

10.	a)	Explain valve type lightning arrester working principle with neat sketch.	6M	CO5	L3
	b)	Classify different types of neutral grounding in power system.	6M	CO5	L1
		OR			
11.	a)	Briefly explain the various methods of overvoltage protection of overhead transmission line.	6M	CO5	L2
	b)	Write a short notes on lightning strokes.	6M	CO5	L2

*** End ***

Hall Ticket Number :										

R-20

Code: 20A26DT

III B.Tech. II Semester Regular Examinations June 2023

Solar and Wind 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 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 solar cell? What is the use of solar cell	CO1	L1
	b) State the different usage of various types collectors used?	CO2	L1
	c) Define Solar constant?	CO3	L1
	d) State the different types of wind turbines	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)	Discuss the procedure of estimating the solar energy availability	6M	CO1	2
	b)	What is solar pond? Explain the main applications of solar pond?	6M	CO1	2
		OR			
3.	a)	Explain in detail about conventional sources of energy.	6M	CO1	2
	b)	Explain with neat sketches different types of concentrating type collectors	6M	CO2	2
		UNIT–II			
4.	a)	Discuss different solar photovoltaic technologies in detail	6M	CO2	2
	b)	Discuss the Power Electronic Converters for Solar Systems.	6M	CO2	2
		OR			
5.		How you are construct solar cell, module and array? Explain with neat diagram	12M	CO2	3
		UNIT–III			
6.	a)	Explain the local impact of wind power on the grid?	6M	CO2	2
	b)	Explain history of wind?	6M	CO3	2
		OR			
7.	a)	What are the environmental benefits and problems of wind energy?	6M	CO3	2
	b)	Write a short notes on Betz Limit	6M	CO3	2
		UNIT–IV			
8.	a)	Discuss the Converter Control Strategies in Wind Systems.	6M	CO4	3
	b)	Explain the Generator-Converter Configuration for Wind Power Generation.	6M	CO4	2
		OR			
9.		Explain different Power electronics converters involved in wind systems?	12M	CO4	2
		UNIT–V			
10.		What are the power quality issues in the interconnected systems of solar PV and windsystems? Elaborate.	12M	CO4	2
		OR			
11.		Explain Hybrid and isolated operations of solar PV and wind systems?	12M	CO4	2

*** End ***