ECE

③

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Define pen testing.	2	K1	CO1
2.	Write down one difference between passive sniffers and active sniffers in a network.	2	K2	CO1
3.	Name few credit card frauds.	2	K1	CO2
4.	Name few physical security measures which every organization should take to secure their devices.	2	K1	CO2
5.	What is buffer over flow?	2	K1	CO3
6.	How does a Backdoor Trojan affect a system?	2	K1	CO3
7.	What is spy phishing?	2	K1	CO4
8.	Name two countermeasures of phishing attacks?	2	K1	CO4
9.	Write down the advantage of Intellectual Property Rights in cyberspace.	2	K2	CO5
10.	Define cyber Terrorism.	2	K1	CO5

PART – B

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	Write down the Challenges & Preventions of Cyber Crime.	8	K2	CO1
		ii.	Differentiate Internal pen testing and External Pen Testing based on the functionalities and execution.	5	K2	
			(OR)			
	b)	i.	How to perform a wireless penetration testing?Explain the step by step procedure.	5	K2	CO1
		ii.	Describe various social Engineering attacks. Write down the methods to prevent social engineering attacks.	8	K2	
12.	a)	i.	Explain the various ways of credit card frauds.	7	K2	CO2
		ii.	Discuss the security implications and measures for handling mobile devices against attacks.	6	K2	
			(OR)			
	b)	i.	Write short note on the following: a. Bluejacking b. Wi-Fi Spoofing c. WEP attack d. RF Jamming	8	K2	CO2
		ii.	How to protect your device against possible mobile threats.	5	K2	
13.	a)	i.	Describe various types of software keyloggers and Hardware keyloggers with example.	8	K2	CO3
		ii.	What to avoid for creating a strong password?	5	K2	
			(OR)			
	b)	i.	Write down the most commonly used password cracking techniques by the hackers.	6	K2	CO3
		ii.	How does spyware enters the computer system? How it effects the devices.	7	K3	
14.	a)	i.	How does phishing occur? What is the impact of phishing attacks?	6	K2	CO4
		ii.	What are the common social media privacy issues?	7	K2	
			(OR)			
	b)	i.	Write down some of the popular anti phishing tools.	8	K2	CO4
		ii.	Describe some of the examples of social media threats.	5		
15.	a)	i.	What are the various copyright issues in cyberspace?	6.5	K2	CO5
		ii.	With a case study, discuss the mindset and skills of hackers and cyber criminals.	6.5	K3	
			(OR)			

			Marks	KL	CO
b)	i.	Differentiate between Copyright, patents, trade marks and trade secrets.	8	K2	CO5
	ii.	Explain the possible sociological theories of cyber crime.	5	K2	

PART – C

(1 x 15 = 15 Marks)

Q.No.			Questions	Marks	KL	CO
16. a)	i.		In July 2020, several Twitter employees became victims of spear phishing attacks enabling the malicious actors to access the administrator's tools. Malicious actors posed as Twitter IT administrators and emailed/phoned Twitter employees working from home, asking them to share user credentials. *Using these compromised accounts, the cyber adversaries gained access to the administrator's tools.* It enabled them to reset the Twitter accounts of celebrities like Elon Musk, Barack Obama, Jeff Bezos, Apple, Uber, and many more to tweet scam messages asking for Bitcoin contributions.	11	K3	CO4

As these celebrity accounts have a massive following, *many Twitter users transferred at least $180,000 in Bitcoins to scam accounts.* Luckily, the scam messages were published and noticed by the press. It forced Twitter to take immediate action.

    a. What are the lessons learned from the case?

    b. How to manage such phishing attacks?

| | ii. | How to protect the device against keylogging attacks? Discuss various mitigate measures. | 4 | K3 | CO3 |

<div align="center">(OR)</div>

b)	i.	In this case study, Anand Mathur, a well-known application security expert, was engaged to hack a client's web applications. Mr. Mathur was hired to perform a web application penetration test to assess the security of a well-known financial website. He is equipped with nothing more than the URL of the main financial site. Describe the steps he has to take to hack the web application?	6	K3	CO1
	ii.	Bellow are some scenarios of malware attack. State how to prevent attacks in the scenarios:			
		a. Scenario 1 – Advisory practices attacked by a trojan virus.	3	K3	CO2
		b. Scenario 2 - Adviser subject to a malware attack causing account lock.	3		
		c. Scenario 3 - Opening email attachment causes all PCs in the office to shutdown.	3		

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Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 13010

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fifth Semester
Electronics and Communication Engineering
U19CTOE1– FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE
(Common to IT, BT & BME)
(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	List down the four components of state space search.	2	K1	CO1
2.	Define Intelligent systems.	2	K1	CO1
3.	What is Heuristic Search?	2	K2	CO2
4.	What are the advantages of Depth First Search?	2	K2	CO2
5.	Define propositional logic.	2	K1	CO3
6.	For the given sentence "All Pompians were Romans" write a well formed formula in predicate logic.	2	K3	CO3
7.	Define Uncertainty.	2	K2	CO4
8.	Define frame problem.	2	K1	CO4
9.	What are the components in Expert System?	2	K1	CO5
10.	List Applications of Expert system.	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	Exemplify the necessary components to define an AI problem.	3	K1	CO1
		ii.	Consider a Water Jug Problem: "You are given two jugs, a 4-liter one and a 3-liter one. Neither has any measuring markers on it. There is a pump that can be used to fill the jugs with water. How can you get exactly 2 liters of water into a 4-liter jug." State the production rules for the water jug problem.	10	K3	

			(OR)			
	b)	i.	Explain any state-space search strategies with an example.	10	K1	CO1
		ii.	Apply problem solving algorithm to measure performance.	3	K3	
12.	a)		Write A* algorithm and discuss briefly the various observations about algorithm.	13	K1	CO2
			(OR)			
	b)	i.	Explain alpha-beta pruning algorithm.	8	K1	CO2
		ii.	Discuss about constraint satisfaction problem.	5	K1	

13. a) Translate into predicate logic and clause form of the following: 13   K3   CO3
1. John like all kinds of food.
2. Apples are food.
3. Chicken is food.
4. Anything anyone eats and isn't killed is food.
5. Bill eats peanuts and still alive.
6. Sue eats everything Bill eats.

(OR)

	b)	State Representation of facts in propositional logic with an example.	13	K5	CO3
14.	a)	Explain the production based knowledge representation technique.	13	K1	CO4
		(OR)			
	b)	Discuss about Bayesian Theory and Bayesian Network.	13	K1	CO4
15.	a)	Define expert system. Explain the architecture of an expert system in detail with a neat diagram.	13	K2	CO5
		(OR)			
	b)	i. Explain the need, significance and evolution of XCON expert system.	10	K2	CO5
		ii. List out the problems addressed by expert systems.	3		

PART – C

(1 x 15 = 15 Marks)

Q.No.	Questions	Marks	KL	CO
16. a)	Name an interesting AI startup that you came across in the recent times. Describe the problem solved by them. Describe the possible approaches they may have used to solve the problem.	15	K3	CO5
	(OR)			
b)	Explain how AI played an important role in the success of Chandrayaan 3 mission.	15	K3	CO5

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	What is meant by the DIT and DIF algorithms?	2	K2	CO1
2.	What are Twiddle factors in DFT?	2	K2	CO1
3.	State the need for Prewarping.	2	K1	CO2
4.	What is meant by the Impulse Invariant method?	2	K2	CO2
5.	Draw the direct form realizations of FIR systems.	2	K2	CO3
6.	Mention the properties of the Chebyshev filter.	2	K2	CO3
7.	Define co-efficient quantization error.	2	K1	CO4
8.	Compare fixed-point and floating-point representations of data.	2	K2	CO4
9.	Give the different addressing formats of digital signal processors.	2	K1	CO5
10.	Differentiate Von Neumann and Harvard architecture.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11. a)	Derive and draw the 8-point FFT-DIF butterfly structure.	13	K3	CO1
	(OR)			
b)	Compute the DFT for the following sequence: $x(n) = \{1, 1, 1, 1, 1, 1, 0, 0\}$.	13	K3	CO1

1

12.	a)	For the analog transfer function H(s) = 2 / (s+1) (s+3), Determine H(z) using bilinear transformation, with T = 0.1 sec.	13	K3	CO2
		(OR)			
	b)	Design a single pole low pass digital IIR filter with -3db bandwidth of 0.2π using bilinear transformation.	13	K3	CO2
13.	a)	Design a HPF of length 7 with a 2 rad/sec cut-off frequency using a Hamming window. Plot the magnitude and phase response.	13	K3	CO3
		(OR)			
	b)	i. Determine the direct form realization of the following system $H(z) = 1 + 2z^{-1} - 3z^{-2} + 4z^{-3} - 5z^{-4}$.	7	K3	CO3
		ii. Obtain the cascade form realization of FIR system $H(z) = 1 + (2.5) z^{-1} + 2z^{-2} + 2z^{-3}$.	6		
14.	a)	With relevant examples, briefly discuss the effect of Quantization noise on the location of poles and zeroes in the z-plane.	13	K2	CO4
		(OR)			
	b)	Discuss the effect of finite word length and rounding errors in a DSP system.	13	K2	CO4
15.	a)	Explain the process of Decimation and Interpolation with a neat block diagram.	13	K3	CO5
		(OR)			
	b)	Explain the concept of circular buffering and pipelining in DSP architecture.	13	K2	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Describe with a neat diagram the generic internal architecture of TMS320C50 DSP processor and explain the function of the main components.	15	K3	CO5
		(OR)			
	b)	Describe the direct form and linear phase realization of a typical FIR filter structure.	15	K3	CO3

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Question Paper Code: 7007

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fifth Semester
Electronics and Communication Engineering
U19EC520 – TRANSMISSION LINES AND WAVEGUIDES
(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions
(Smith Chart is to be provided)

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	What are the secondary constants of a transmission line? Why transmission line parameters are called as distributed parameters?	2	K1	CO1
2.	Define the term insertion loss.	2	K2	CO1
3.	What is a dissipation less line? What is the nature and value of Z_0 for the dissipation less line?	2	K3	CO2
4.	Why is a quarter wave line calling an impendence inverter?	2	K3	CO2
5.	What is Transverse electric wave?	2	K1	CO3
6.	Mention the characteristics of TEM waves.	2	K1	CO3
7.	What is the dominant mode of TM waves in circular waveguides?	2	K1	CO4
8.	How rectangular cavities can be used as microwave resonators?	2	K2	CO4
9.	Give the applications of planar transmission lines.	2	K2	CO5
10.	List the physical parameters of a microstrip transmission line.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11. a)	Derive the transmission line equation and obtain an expression for voltage and current on a transmission line.	13	K3	CO1

(OR)

b)	Prove that an infinite line is equal to a finite line terminated with characteristic impedance.	13	K3	CO1

12.	a)		Derive an expression for the input impedance of the dissipation-less lines.	13	K3	CO2
			(OR)			
	b)		A load of $(50 - j100)$ ohms is connected across a 50 ohms line. Design a short-circuited stub to provide matching between the load and line at a signal frequency of 30 MHz using Smith chart.	13	K3	CO2
13.	a)	i.	What are degenerated modes in a rectangular waveguide?	6	K2	CO3
		ii.	Mention the application of Maxwell's equation to the rectangular waveguides.	7	K2	
			(OR)			
	b)		Derive the expression for field components of TE waves in parallel plane waveguide.	13	K3	CO3
14.	a)		An air-filled circular waveguide having an inner radius of 1cm is excited with dominant mode at 10 GHz. Find		K3	CO4
		i.	The cutoff frequency of the dominant mode at 10 GHz.	5		
		ii.	The guide wavelength.	4		
		iii.	Bandwidth of operation in dominant mode.	4		
			(OR)			
	b)		Mention Bessel's differential equation, Bessel function, and the field components of TM and TE waves in Circular waveguides.	13	K3	CO4
15.	a)		Describe in detail about the geometrical structure and field configurations of microstrip and coplanar waveguide transmission lines.	13	K2	CO5
			(OR)			
	b)	i.	Discuss the characteristics of planar transmission lines.	8	K2	CO5
		ii.	Derive the characteristic impedance of the microstrip line.	5	K3	

PART – C

(1 x 15 = 15 Marks)

Q.No.			Questions	Marks	KL	CO
16.	a)	i.	Derive the condition for the distortion-less operation of the transmission line.	8	K3	CO1
		ii.	A transmission line of 50 ohms is terminated with a load impedance of 75+j80Ω. Determine the reflection coefficient and return loss at the load.	7	K4	CO1
			(OR)			
	b)	i.	Derive the relationship between the quality factor and Bandwidth of a resonator.	5	K3	CO5
		ii.	Discuss the propagation, of TE waves in a circular waveguide with relevant expressions and discuss the dominant modes.	10	K3	

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Question Paper Code: 7005

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Seventh Semester
Electronics and Communication Engineering
U19ECE23 - INDUSTRIAL PSYCHOLOGY
(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Define group dynamics in organizational behavior.	2	K1	CO1
2.	Enumerate the different stages of group dynamics.	2	K2	CO1
3.	Differentiate between perspective and perception.	2	K2	CO2
4.	List the seven principles of ethical leadership.	2	K2	CO2
5.	What are the different types of interpersonal relationship?	2	K1	CO3
6.	Mention the symptoms of stress.	2	K2	CO3
7.	What is the role of organizational culture?	2	K1	CO4
8.	How to build strong organizational culture?	2	K2	CO4
9.	Mention the effects of industrial fatigue.	2	K2	CO5
10.	What is monotony and fatigue in industrial psychology?	2	K1	CO5

PART – B

Q.No.		Questions	Marks	KL	CO
11.	a)	Explain in detail the objectives of group dynamics and factors affecting the group dynamics in detail.	13	K2	CO1
		(OR)			
	b)	Explain the structure of group with a diagram. Explain the significances and differences between formal and informal groups with examples.	13	K2	CO1
12.	a)	Enumerate and explain the effect of perception in group interactions with examples.	13	K2	CO2
		(OR)			
	b)	List and explain in detail the types of leadership styles in organizational behavior.	13	K2	CO2
13.	a)	Why interpersonal relationship is so important in industrial sectors? Explain in detail with examples.	13	K2	CO3
		(OR)			
	b)	What are the causes of workplace stress and elucidate the ways to coping such stresses with some strategies.	13	K3	CO3
14.	a)	Mention and explain the important functions of organizational culture.	13	K2	CO4
		(OR)			
	b)	State and explain the benefits of organizational culture.	13	K2	CO4
15.	a)	What are the symptoms and causes of industrial fatigue? Explain with examples in detail.	13	K2	CO5
		(OR)			

	b)	Discuss the following
		  i. Effective ways to reduce industrial fatigue boredom.
		  ii. Types of industrial fatigue.
			13	K2	CO5

PART – C

Q.No.		Questions	Marks	KL	CO
16.	a)	Draw a neat sketch of industrial boredom influence diagram and explain the functions of each of its components in detail.	15	K2	CO5
		(OR)			

	b)	Give an account on
		  1. Strategies in managing the Boss.
		  2. Ways to improve employee motivation.
			15	K2	CO5

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Question Paper Code: 7004

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Seventh Semester
Electronics and Communication Engineering
U19ECE21 – INTRODUCTION TO ROBOTICS
(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels	K1 – Remembering	K3 – Applying	K5 - Evaluating
(KL)	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Enumerate the commonly used robot configurations.	2	K1	CO1
2.	Define the term repeatability.	2	K2	CO1
3.	Differentiate Forward kinematics and reverse kinematics.	2	K2	CO2
4.	What is the significance of kinematic study of the robot?	2	K1	CO2
5.	What are the common imaging devices used for robot vision system?	2	K1	CO3
6.	What is the concept of proximity sensor? Mention its potential applications.	2	K2	CO3
7.	What is the principle of pneumatic actuators?	2	K2	CO4
8.	Mention the types of mechanical and magnetic grippers.	2	K1	CO4
9.	Recall the meaning of the command DMOVE (1, 10).	2	K2	CO5
10.	What is offline robot programming? Give an example.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11. a)	i.		State and prove the Asimov's laws of Robotics.	6	K2	CO1
	ii.		Discuss in detail the generations of Robots.	7		

(OR)

	b)	i.	With neat sketches, explain the six degrees of freedom associated with robot wrist.	6	K2	CO1
		ii.	A cylindrical robot can reach any point in a cylinder of height L and radius 2L, except for the points in an inner cylinder of height L and radius L. Fine the volume for the cylindrical robot work envelope.	7		
12.	a)		Derive the forward and reverse kinematics with two degree of Freedom. Explain the steps with examples.	13	K3	CO2
			(OR)			
	b)		Derive the forward and reverse kinematics for RRR robot. Explain the steps with examples.	13	K3	CO2
13.	a)		Explain direction control scheme for DC motors using H bridge, illustrate it with neat sketches.	13	K2	CO3
			(OR)			
	b)		Discuss the salient features, capabilities, applications, merits and limitations of non-servo and servo-controlled robots.	13	K2	CO3
14.	a)		Explain the features of hydraulic and pneumatic actuators systems in detail. Explain their working principles with diagrams.	13	K2	CO4
			(OR)			
	b)		Compare and contrast electric, hydraulic and pneumatic actuators in detail.	13	K2	CO4
15.	a)		Elucidate the role of Robots in manufacturing and non-manufacturing applications with diagrams and examples.	13	K3	CO5
			(OR)			
	b)		Classify various programming languages used in computer controlled robots and illustrate any one in detail.	13	K2	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Write a VAL program for pick- and-place operation on the conveyor system. It consists of two conveyors running parallel with center distance of 650 mm at same level. An industrial robot is fixed centrally between the conveyors. The robot is used to transfer work pieces from conveyor 1 to 2 at a constant speed. Draw a schematic view of the system. Assume all necessary dimensions.	15	K4	CO5
		(OR)			
	b)	For an image digitized at 128 points per line and 128 lines, determine (a) the total number of bits to represent the gray level values required if an8-bit A/D converter is used to indicate various shades of gray, and (b) the reduction in data volume if only black and white values are digitized.	15	K3	CO3

Time: Three Hours   Maximum: 100 Marks
Answer ALL the questions.

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	List out the functions of Managers.	2	K1	CO1
2.	Label the importance of management.	2	K1	CO1
3.	Classify the different types of plans.	2	K2	CO2
4.	Define MBO.	2	K1	CO2
5.	Infer the steps involved in organizing.	2	K2	CO3
6.	Summarize the term organization chart.	2	K2	CO3
7.	Show the elements in the Maslow hierarchy of needs.	2	K1	CO4
8.	Recall the meaning of downward communication.	2	K1	CO4
9.	Outline the benefits of IT in controlling.	2	K2	CO5
10.	Rephrase concept of PERT.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11. a)	Explain briefly about the various functions of Management.	13	K2	CO1

(OR)

b)	Outline and explain the different responsibilities of managers in effective management.	13	K2	CO1

12.	a)	Explain in detail about the TOWS matrix and SWOT analysis.	13	K2	CO2
		(OR)			
	b)	Summarize the major kinds of strategies in detail.	13	K2	CO2
13.	a)	Compare and contrast the Formal and Informal organization.	13	K2	CO3
		(OR)			
	b)	Interpret the various types of Organizational structures.	13	K2	CO3
14.	a)	Interview the essence of MIS in detail.	13	K3	CO4
		(OR)			
	b)	Organize the different barriers and breakdowns of communication process in detail.	13	K3	CO4
15.	a)	Explain in detail the preventive control mechanism towards achieving a unified global management theory.	13	K2	CO5
		(OR)			
	b)	Classify in detail the techniques used for improving productivity in organizations.	13	K2	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.	Questions	Marks	KL	CO

16. a) Nutan Tiffin Box service was started in Mumbai by the Mumbai Dabbawalas. The Dabbawalas who are the soul of the entire Mumbai aim to provide prompt and efficient services by providing tasty homemade tiffin to all office goers at the right time and place. The service is uninterrupted even on the days of bad weather, political unrest, and social disturbances. Recently, they have started an online booking system through their website 'mydabbawala.com'. Owing to their tremendous popularity amongst happy and satisfied customers and members, the Dabbawalas were invited as guest lecturers by top business schools. The Dabbawalas operate in a group of 25-30 people along with a group leader. Each group teams up with other groups to deliver the tiffin on time. They are not transferred on a frequent basis as they must remember the addresses of their customers. They follow certain rules while doing trade—no alcohol during working hours; no leaves without permission; wearing white caps and carrying ID cards during business hours. Recently, on the suggestion of a few self-motivated fellow men, the dabbawalas thought out and executed a plan of providing food left in tiffin by customers to slum children. They have instructed their customers to place red stickers if food is left in the tiffin, to be fed to poor children later.

2

Questions

    i.   Summarize any one principle of management given by Fayol and one characteristic of management related is the above case.   7.5   K2   CO1

    ii.   Infer any two values which the Dabbawalas want to communicate to society.   7.5   K2   CO1

(OR)

b)   'Brightest Papers' is a leading paper manufacturing company. The enthusiasm level of employees in this organization is very high. The management has applied a process of directing where the financial and non-financial needs of the employees are identified and are satisfied accordingly. The result has been amazing for the organization. The output levels of the employees have reached a new high. Recently an award was also given to the HR department of the organization for doing its job in the best manner in the industry. Two years back when the organization had not applied this process the employees were leaving the organization and were not loyal but now the situation has changed and there has been an increase in the number of applicants for various jobs in the company. The organization believes that its best resource is the human. The idea is to maximize the output of human resources. There are many steps taken to increase the input of the employees and for this the work environment is made interesting to increase their regularity, which has obviously increased the labor input during the recent years. The company is now among the most inspiring organizations in the industry.

Questions

    i.   Organize in detail the element of directing which has been applied by the management in this case.   8   K3   CO4

    ii.   Identify the benefits, which are highlighted in the above case.   7   K3   CO4

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Question Paper Code: 7010

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fifth Semester / Sixth Semester
Electronics and Communication Engineering / Biomedical Engineering
U19EC519 – MICROPROCESSOR AND MICROCONTROLLER
(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels	K1 – Remembering	K3 – Applying	K5 - Evaluating
(KL)	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Compare 8085 with 8086 microprocessor.	2	K2	CO1
2.	What do you infer from addressing modes?	2	K2	CO1
3.	List the different types of signals in 8086.	2	K1	CO2
4.	What is meant by Coprocessor? Give an example.	2	K2	CO2
5.	Recall the need for memory-mapped I/O devices.	2	K2	CO3
6.	Outline the importance of DMA in microcontroller.	2	K2	CO3
7.	List any four special function registers.	2	K1	CO4
8.	Draw the flag register of 8051.	2	K1	CO4
9.	List the built-in peripherals of 8051.	2	K2	CO5
10.	Compare interrupt programming with serial port programming.	2	K2	CO5

PART – B

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	Develop an 8086 ALP to find the sum of 10 numbers stored in successive memory locations and store the result at the subsequent location. Compile the results for sample data as per the assumption.	7	K2	CO1
		ii.	Draw and explain the architecture of 8085 with neat sketches.	6	K2	
			(OR)			
	b)	i.	Assume that six data bytes are stored in the memory locations starting from 8100H. Develop an 8085 ALP to transfer the data to the locations 8200H to 8205H in the reverse order. Compile the results for sample data as per the assumption.	7	K4	CO1
		ii.	Draw and explain the architecture of with neat sketches.	6	K2	
12.	a)	i.	Interpret the content of DS and IP to locate the physical address location 35678H? Assume, offset address.	5	K2	CO2
		ii.	Draw the bus-cycle timing diagrams for memory read and write operations in minimum mode and explain.	8	K2	
			(OR)			
	b)	i.	Why does the 8086-memory structure organized in two banks of even and odd addresses? Explain how the even and odd bank are selected using the BHE and A_0 signals.	5	K2	CO2
		ii.	Compare and contrast closely coupled with loosely coupled configurations.	8	K2	
13.	a)		Draw the functional block diagram of parallel communication interface and explain the operation of each sub-block.	13	K2	CO3
			(OR)			
	b)		Draw the functional block diagram of keyboard display interface and explain the operation of each sub-block.	13	K2	CO3
14.	a)		Draw the architecture of the 8051 and explain the operation of each block.	13	K2	CO4
			(OR)			
	b)		Discuss about the addressing modes of 8051 microcontroller. Summarize each addressing mode with an example.	13	K2	CO4

| 15. | a) | i. | Categorize and explain the various timer modes of 8051 microcontroller. | 8 | K2 | CO5 |
| | | ii. | Develop an 8051 ALP to subtract two 8-Bit numbers. Infer results for sample data as per the assumption. | 5 | K2 | |

(OR)

| | b) | i. | Explain the memory organization of 8051 microcontroller. | 8 | K2 | CO5 |
| | | ii. | Develop an 8051 ALP to find the 2's complement of an 8-Bit number. Infer the results for sample data as per the assumption. | 5 | K2 | |

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Design a microprocessor-based traffic-light control system with neat sketches. Develop an ALP for the system and illustrate its operation.	15	K6	CO3

(OR)

| | b) | Design a microcontroller-based stepper motor control system with neat sketches. Develop an ALP for the system and illustrate its operation. | 15 | K6 | CO5 |

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Question Paper Code: 7022

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fifth Semester
Electronics and Communication Engineering
U19ECV11 – ANALOG IC DESIGN
(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	If a Nyquist plot of G (jω) H (jω) for a closed loop system passes through (-2, j0) point in GH plane, what would be the value of gain margin of the system in dB?	2	K3	CO1
2.	Differentiate positive and negative feedback amplifier.	2	K2	CO1
3.	What is the significance of negative feedback on bandwidth of op-amp?	2	K2	CO2
4.	Define slew rate.	2	K2	CO2
5.	What is the use of op-amp frequency compensation?	2	K2	CO3
6.	State the condition for a Non-inverting amplifier circuit to operate in linear region of operation.	2	K1	CO3
7.	Given that CMRR is 100dB. Input common-mode voltage is 12V. Differential voltage gain is 4000. Calculate output common-mode voltage.	2	K3	CO4
8.	The unity gain bandwidth for an op-amp having open loop gain 2×10^6 is 10 MHz. Calculate the AC gain of op-amp at an input of 2000 Hz.	2	K3	CO4
9.	Given f_0 = 1.2 kHz and V = 13 v, find the lock-in range of monolithic Phase-Locked Loop.	2	K4	CO5
10.	What causes phase shift in an opamp?	2	K2	CO5

1

PART – B

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	Design a negative feedback amplifier using an integrator.	8	K1	CO1
		ii.	Explain effect of multiple poles in a negative feedback amplifier system.	5	K3	
			(OR)			
	b)		A unity feedback control system is to work under Proportional Control. The process transfer function is described as follows:	13	K3	CO1

$$G(s)= \frac{1}{s^3+2s^2+3s+4}$$

Apply the Nyquist criterion to determine the system closed loop stability.

Q.No.			Questions	Marks	KL	CO
12.	a)	i.	Discuss the operation of op-amps with current mirror load.	8	K2	CO2
		ii.	Explain the terms stability, frequency compensation and phase margin in an op-amp.	5	K2	
			(OR)			
	b)	i.	Draw the circuit diagram of common source stage with active load and find its gain.	5	K3	CO2
		ii.	Draw the noise model of a source follower with necessary equations and explain why common mode feedback is required.	8	K2	
13.	a)	i.	Explain inverting and non-inverting configuration of summing Amplifier.	8	K2	CO3
		ii.	The circuit of inverting amplifier is to provide the gain of 10 at a peak frequency of 16 kHz. Determine the values of all the components.	5	K3	
			(OR)			
	b)	i.	Explain with the neat circuit diagram & waveform the operation of Inverting and non-inverting Zero crossing detector.	8	K2	CO3
		ii.	With the neat circuit diagram explain Voltage to Current converter with grounded load.	5	K2	
14.	a)		Explain working principal of a two-stage miller compensated Op-amp with neat diagram and equations.	13	K3	CO4
			(OR)			
	b)	i.	Explain fully differential folded cascade OPAMP.	7	K3	CO4
		ii.	Design a practical integration circuit using OP-AMP and explain its frequency response.	6		

15. a) i. Explain the operating principle of PLL. Hence define   8   K3   CO5
lock range, capture range & pull in time of PLL.
ii. Explain monostable multivibrator, realized using   5
IC555 timer.

(OR)

b) Explain with neat circuit diagram any one sine wave   13   K3   CO5
oscillator using Op-Amp and derive expression for frequency
of oscillation and gain of Op-Amp.

PART – C

(1 x 15 = 15 Marks)

Q.No.	Questions	Marks	KL	CO
16. a)	With proper diagram and equations explain analysis of Telescopic Cascode Amplifier.	15	K3	CO4
	(OR)			
b)	Explain in detail about the usage of miller capacitance for op-amp compensation.	15	K3	CO3

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Why we use non-linear activation functions in ML/DL?	2	K1	CO1
2.	Infer the ranges of each of the followings: a. Sigmoid activation function b. Tanh activation function c. Derivative of sigmoid activation function d. Derivative of tanh activation function	2	K2	CO1
3.	Recall the issue that can be handled by Dropout regularization and can not be tackled through either L1 or L2 regularization.	2	K1	CO2
4.	Compare batch gradient descent, minibatch gradient descent with stochastic gradient descent with the help of an example.	2	K2	CO2
5.	How Exponentially Moving Weighted Average (EMWA) is used in momentum?	2	K1	CO3
6.	When does the 1x1 convolution is employed? State the intuition behind this layer.	2	K1	CO3
7.	In the context of visualization of CNN outputs, how each of the followings is useful. a. Visualizing intermediate convnet outputs (intermediate activations). b. Visualizing heatmaps of class activation in an image.	2	K1	CO4
8.	Autoencoder is a classic example of unsupervised learning. Justify the statement.	2	K2	CO4
9.	How does machine learning is employed in cognitive radio network?	2	K1	CO5

1

10.	How does attention differs in processing the inputs from conventional sequence to sequence model? State the implications of these differently processed inputs.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	Illustrate how does the logistic regression is implemented with the help of sigmoid function? State the logistic loss formulation along with its intuition.	8	K2	CO1
		ii.	When you would require SoftMax as the activation function in the last layer of a deep neural network? Give an example along with its mathematical expression.	5		

(OR)

	b)	Interpret the formulation of one iteration of gradient descent in implementing logistic regression for the following shallow neural network:	13	K2	CO1
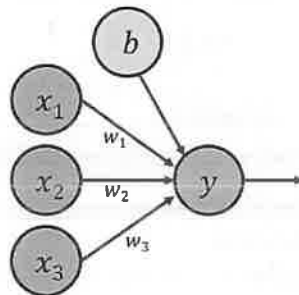
State the formulation for forward pass, logistic loss, gradient computation, and parameter updates.

12.	a)	i.	How regularization is used to mitigate the over fitting problem in deep neural networks? Compare L1 regularization with L2 regularization.	7	K2	CO2
		ii.	How does dropout regularization is different from drop connect regularization? Give an example. When we should prefer one over the other?	6		

(OR)

	b)	How bias and variance are interrelated in model training and inferences? How the generic plot looks like between each of the followings? Also, demonstrate your plot in brief.	13	K2	CO2

    i. Validation error and model complexity
    ii. Model variance and model complexity
    iii. Training error and model complexity
    iv. Total error and model complexity

13.	a)	What do you mean by internal covariate shift? How batch norm handles the problem of internal covariate shift? Analyze the process for implementing batch norm in model training and inferences.	13	K4	CO3

(OR)

	b)	Analyze and explain the working of the following underlying layers of the CNN Architectures:		K4	CO3
		i. Convolution layer	5		
		ii. Max pooling layer	4		
		iii. Average pooling	4		

14.	a)	How autoencoders used in denoising? Give detailed explanation with example. Also provide a sample implementation of the same in Tensor Flow.	13	K2	CO4

(OR)

	b)	What do you mean by vanishing gradients problem in deep neural networks? How it affects the learning parameters in gradient descent? Illustrate the same mathematically in the context of RNNs.	13	K2	CO4

15.	a)	Long term dependency and vanishing gradient problem of RNN is handled using LSTM. Clearly list the working of each and every gate utilized in an LSTM cell along with the mathematical intuition of the same. How nonlinearity is utilized in the gate operations?	13	K3	CO5

(OR)

	b)	Summarize the role of machine learning algorithms in the following applications.		K2	CO5
		i. Network for routing	6		
		ii. Traffic prediction and classification	7		

PART – C

(1 x 15 = 15 Marks)

Q.No.	Questions	Marks	KL	CO
16. a)	YOLO is a regression formulation for the object detection task that draws all the bounding boxes along with the object class probabilities by looking at the image only once. Answer and explain the followings in brief:	15	K3	CO5

    i. An input image is divided into an 8x8 grid cells. Each grid cell predicts 10 bounding boxes, responsible for predicting any one class among 1k classes. Calculate the shape and size of output tensor.

    ii. Can confidence score affect the conditional class probabilities?

    iii. Small deviations in large bounding boxes matter less than in small bounding boxes. How this problem is resolved? Give an example.

iv. Detection generally don't perform well on coarse grained visual contents. How this problem is treated in YOLO?

v. What could be the probable reason behind the usage of linear activation function for the final layer and leaky ReLU for all other layers in YOLO architecture?

(OR)

b) i. Consider the following convolutional neural network wherein two convolutional layers and three fully connected layers are employed: 9   K2   CO3
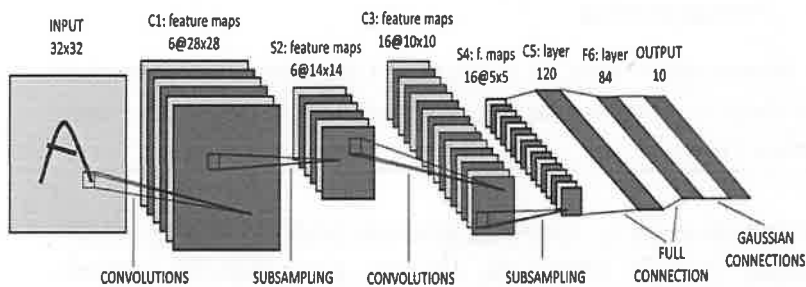
Compute the number of parameters in each and every layer. Mention number of filters and receptive field size for each of the convolution layers.

ii. What changes will you observe if: 6

    a. You apply 1x1 convolution for all the convolutional layers?

    b. Instead of grey scale input if would have applied same transformations on colored images?

Reg.No.: ☐☐☐☐☐☐☐☐☐☐☐☐☐

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Question Paper Code: 7002

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Seventh Semester
Electronics and Communication Engineering
U19ECE36 – FIBER OPTIC SENSORS
(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels	K1 – Remembering	K3 – Applying	K5 - Evaluating
(KL)	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	List the two types of light sources commonly used in fiber optic sensors.	2	K1	CO1
2.	Define optical modulators in the context of fiber optic sensors.	2	K1	CO1
3.	Recall the working principles behind multimode grating sensors.	2	K1	CO2
4.	Define grating period modulation in the context of sensor technology.	2	K1	CO2
5.	Differentiate between magnetostrictive and Lorentz force sensors in magnetic field detection.	2	K2	CO3
6.	State the concept of sensor multiplexing.	2	K1	CO3
7.	How are chloride ions detected using fiber optic sensors?	2	K1	CO4
8.	Outline the principle of glucose sensing with fiber optic technology.	2	K2	CO4
9.	List the parameters that the fiber optic sensors measure in industrial applications	2	K1	CO5
10.	How are rotation measurements facilitated through fiber optic sensors in industries?	2	K1	CO5

1

PART – B

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	Explain in detail about the principles underlying interferometric sensors in fiber optic technology.	7	K2	CO1
		ii.	Outline the advantages of using fiber optic sensors over traditional sensing methods.	6	K2	CO1
			(OR)			
	b)	i.	Interpret the functions and significance of optical fibers, light sources, detectors, and modulators in fiber optic sensor systems.	7	K2	CO1
		ii.	Compare and contrast different types of optical fibers and their suitability for specific sensing applications.	6	K2	CO1
12.	a)		Discuss the complexity of implementing multimode grating sensors, polarization sensors, and fiber grating sensors in real-world applications.	13	K2	CO2
			(OR)			
	b)		Explain the function and significance of retardation plates in sensor systems, emphasizing their role in polarization-based sensing.	13	K2	CO2
13.	a)	i.	Summarize the working mechanisms of Faraday effect sensors and how they are utilized in measuring magnetic fields.	7	K2	CO3
		ii.	Compare the performance of Faraday effect sensors with other magnetic sensor technologies.	6	K2	CO3
			(OR)			
	b)	i.	Explain the underlying principles of evanescent field absorption sensors and their working mechanism.	7	K2	CO3
		ii.	Compare and contrast magnetostrictive and Lorentz force sensors, highlighting their operating principles in detecting magnetic fields.	6	K2	CO3
14.	a)		Explain the concept of reagent-mediated sensors in fiber optic biosensing, detailing their mechanism and applications in biochemical analysis.	13	K2	CO4
			(OR)			
	b)		Compare and contrast the sensing mechanisms, sensitivities, and selectivities of different fiber optic chemical sensors, discussing their potential integration in multi-parameter sensing systems.	13	K2	CO4

2

15. a) Discuss the applications of fiber optic skins in industries, emphasizing their benefits in structural integrity assessment, material characterization, or environmental monitoring.　13　K2　CO5

(OR)

b) Compare and contrast the applications of fiber optic sensors in temperature, pressure, fluid level, flow, position, vibration, rotation, current, voltage, and chemical analysis within industrial settings, highlighting the unique challenges and advantages of each application.　13　K2　CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.	Questions	Marks	KL	CO
16. a)	Compare and contrast the operation and applications of Fabry-Perot, Mach-Zehnder, Michelson, and Sagnac interferometers in sensor technology.	15	K2	CO1
	(OR)			
b)	Examine the applications of smart structures equipped with fiber optic sensors in various industries, detailing how these technologies improve structural health monitoring and performance.	15	K3	CO5

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Question Paper Code: 7024

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – April / May 2023
Sixth Semester
Electronics and Communication Engineering
U19EC625 – VLSI DESIGN
(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART–A

(10x2 = 20 Marks)

| Q.No.	Questions	Marks	KL	CO
1.	List the manufacturing issues in CMOS process technology.	2	K1	CO1
2.	Mention the types of design rules.	2	K1	CO1
3.	Draw the Elmore delay model for RC ladder and write the equation for propagation delay.	2	K2	CO2
4.	If a unit transistor has R = 10 k and C = 0.1 fF in a 65 nm process, compute the delay in picoseconds of the inverter with a fan out of h = 4.	2	K3	CO2
5.	Draw the circuit using Bubble Pushing for the compound gate $F = (AB + CD)$.	2	K2	CO3
6.	Differentiate between synchronous reset and asynchronous reset.	2	K2	CO3
7.	Give some examples of fault models. Define stuck at fault.	2	K1	CO4
8.	List the advantages of BIST.	2	K1	CO4
9.	Write the Verilog code for 4:1 multiplexer using conditional operator.	2	K3	CO5
10.	Write the Verilog code for full adder using behavioral level modeling.	2	K3	CO5

PART – B

(5x13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11. a.	Explain in brief the IV characteristics of MOS transistors with the necessary diagram and equations.	13	K2	CO1

(OR)

	b.		Explain the manufacturing steps involved in the formation of the CMOS transistor with a neat diagram.	13	K2	CO1
12.	a.	i.	Explain in brief the logical effort and transistor sizing.	9	K2	CO2
		ii.	Estimate the delay of a fanout-of-4(FO4) inverter with an example.	4	K3	
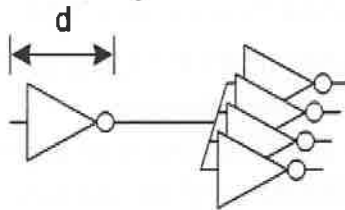
<center>(OR)</center>

	b.	i.	Calculate the delay logical effort, electrical effort, branch effort, path effort and best stage effort for the given diagram.	4	K3	CO2
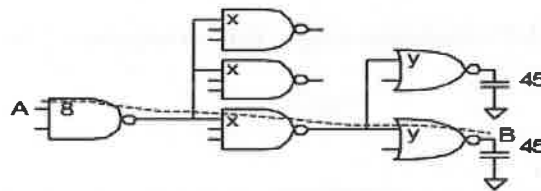
		ii.	Explain about static and dynamic power dissipation.	9	K2	CO2
13.	a.		Describe the following with neat diagram			
		i.	Dual rail logic.	7	K2	CO3
		ii.	Dual-rail domino logic.	6		

<center>(OR)</center>

	b.		Explain with the necessary diagram	7	K2	CO3
		i.	Cascode voltage switch logic.	6		
		ii.	NP and zipper domino logic.			
14.	a.		Describe manufacturing test principles with examples for fault models.	7	K2	CO4
			Explain logic verification principles for a sample combinational circuit.	6		

<center>(OR)</center>

	b.		Explain with neat diagram		K2	CO4
		i.	Adhoc based and scan based testing.	6		
		ii.	BIST approach for testability.	7		
15.	a.		Write the Verilog code and test bench stimulus for 4-Bit ripple carry adder using structural level modeling.	13	K3	CO5

<center>(OR)</center>

	b.		Design and write the Verilog code for n-bit encoder and decoder using structural level modeling where n = 3.	13	K3	CO5

<center>2</center>

(15 x 1 = 15 Marks)

Q.No.			Questions	Marks	KL	CO
16.	a.		Design an asymmetric 3-input NOR gate that favors a critical input over the other two. Choose transistor sizes so the logical effort on the critical input is 1.5. What is the logical effort of the noncritical inputs?	15	K3	CO2
			(OR)			
	b.	i.	Describe the behavioral modeling in HDL coding with an example.	8	K3	CO5
		ii.	Design a modulo-6 counter using a Finite-State-Machine (FSM) and write the Verilog code.	7		

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Question Paper Code: 11001

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023

Seventh Semester

Electronics and Communication Engineering

U19BA701 - PRINCIPLES OF MANAGEMENT

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	What are the effective characteristics of Managers?	2	K1	CO1
2.	Who is referred as the father of scientific management? What is the goal of scientific management?	2	K1	CO1
3.	State the important observations suggested about planning.	2	K1	CO2
4.	Define MBO in planning.	2	K1	CO2
5.	When is matrix structure appropriate to organizations?	2	K1	CO3
6.	Mention the different stages in career planning.	2	K1	CO3
7.	Illustrate the merits and demerits of grapevine communication.	2	K2	CO4
8.	State any two motivational techniques with examples.	2	K1	CO4
9.	Distinguish between direct and preventive control.	2	K2	CO5
10.	What are the steps involves in Zero Based Budgets?	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	Describe the relative importance of each type of skills to lower, middle and upper level managers.	6	K2	CO1
		ii.	Explain the system based approach towards the management.	7	K2	CO1
			(OR)			
	b)		Discuss the main characteristics of different types of business organizations with illustrations.	13	K2	CO1

1

12.	a)	In detail explain the importance of planning in the present Indian business environment. Also highlight the different types of plans. .	13	K2	CO2
		(OR)			
	b)	Define decision- making and explain the process of decision – making that affects the efficiency of the business decisions.	13	K2	CO2
13.	a)	Bring out the factors affecting centralization and decentralization. Also highlight the merits and demerits of centralization and decentralization with examples.	13	K2	CO3
		(OR)			
	b)	i. List the functions of staffing in HRM.	6	K2	CO3
		ii. Discuss in detail the steps involved in a selection of human resources.	7	K2	CO3
14.	a)	Discuss about the different modes of communication along with their merits and demerits. Also highlight role of IT in today's communication.	13	K2	CO4
		(OR)			
	b)	What is the role of physical layout as an indicator of company culture? What type of a physical layout would you expect from a company that is People-oriented? Team-oriented? Stable?	13	K2	CO4
15.	a)	i. Compare and contrast between feed forward and feedback systems in controlling.	6	K2	CO5
		ii. What is the role of IT in controlling?	7	K2	CO5
		(OR)			
	b)	Explain any four non-budgetary control techniques with suitable examples.	13	K2	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Suppose you are a HR manager of a multinational company; you are expected to identify the training needs of the employee's in various departments. How will you identify the training needs and what training method(s) would be most effective in training and developing the employee's of this company.	15	K3	CO3
		(OR)			
	b)	"Poor communication is the source of interpersonal conflict". Do you agree? Discuss the major functions of communication in organization by elucidating the barriers to effective communication. Also give a guideline for effective communication.	15	K2	CO4

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Question Paper Code: 7027

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Sixth Semester
Electronics and Communication Engineering
U19EC627 – ANTENNA AND WAVE PROPAGATION
(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Define Radiation pattern.	2	K2	CO1
2.	State the directivity of an antenna.	2	K2	CO1
3.	Draw the radiation pattern of a short dipole antenna.	2	K1	CO2
4.	Give the expression for binomial array.	2	K1	CO2
5.	What are the uses of helical antenna?	2	K1	CO3
6.	Define Rhombic antenna.	2	K2	CO3
7.	State field equivalence principle.	2	K2	CO4
8.	Calculate the power gain of an optimum horn antenna approximately with a square aperture of 10λ on a side.	2	K3	CO4
9.	Find the range of LOS systems when the receive and transmit antenna heights are 10 m and 100 m respectively.	2	K3	CO5
10.	Define Critical Frequency.	2	K2	CO5

PART – B

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	An antenna has a gain of 44 dB. Assume that the main beam of the antenna is circular in cross-section. Calculate the beam width?	7	K3	CO1
		ii.	A dipole antenna of $\lambda/8$ length has an equivalent total loss resistance of 1.5 Ω. Calculate the efficiency of the antenna.	6	K3	

(OR)

	b)	i.	Elucidate the different antenna field zones with a neat sketch and mention their significances.	7	K2	CO1
		ii.	Derive FRIIS transmission formula and deduce an expression for the gain of an antenna.	6	K3	

12.	a)		Deduce the field associated with Hertzian dipole and also explain power radiated and radiation resistance of short dipole.	13	K3	CO2

(OR)

	b)	i.	Compare and contrast BSA and EFA. Derive the 3dB beam width for both antenna structures.	7	K3	CO2
		ii.	Enumerate and explain the features of pattern multiplication principle and binomial array.	6	K2	

13.	a)		With suitable diagrams explain the construction and working principle of helical antenna in different mode of operation.	13	K2	CO3

(OR)

	b)		With necessary illustration explain the characteristics of Rhombic antenna and mention its possible applications.	13	K2	CO3

14.	a)		Describe the principle of operation and applications of Horn antenna and derive its necessary equations.	13	K3	CO4

(OR)

	b)	i.	Find the terminal impedance of a thin $\lambda/2$ slot antenna when the impedance of thin $\lambda/2$ dipole antenna is $73 + j42.5$ ohms.	7	K3	CO4
		ii.	Find the terminal impedance of complementary slot for a cylindrical dipole with length to diameter ratio of 28 and length of 0.925λ having terminal impedance of $710 + j0$ ohms. Also find the width of complementary slot antenna.	6	K3	

15.	a)	i.	Explain about ground wave propagation and the phenomena related to the earth behaves like a leaky capacitor.	7	K2	CO5
		ii.	Draw the Two ray model of space wave propagation and explain it. Derive an expression for its received electric field strength.	6	K3	

<div align="center">(OR)</div>

b)	i.	Assume the reflection takes place at a height of 400 KM and maximum density corresponds to 0.9 refractive index at 10MHz. What will be the range for which MUF is 10 MHz.		10	K4	CO5
	ii.	Find fc at vertical incidence if the maximum value of electron density is $1.24 \times 10^6 cm^{-3}$		3	K4	

<div align="center">PART – C</div>

<div align="right">(1 x 15 = 15 Marks)</div>

Q.No.			Questions	Marks	KL	CO
16. a)	i.		An uniform linear array consists of 16 isotropic point sources with a spacing of $\lambda/4$. If the phase difference is -90^0, calculate the directivity, HPBW, Beam Solid angle and effective aperture.	8	K4	CO2
	ii.		For an end fire consisting of several half wave length isotropic radiators is to have a directive gain of 30^0. Find the array length and width of the major lobe (i.e., beam width between first nulls). What will be these values for a BSA?	7	K4	

<div align="center">(OR)</div>

b)	i.	The observed critical frequencies of E and F layers at a particular time are 2.5 MHz and 8.4 MHz respectively. Calculate the maximum electron concentrations of the layers.		11	K3	CO5
	ii.	A television transmitter antenna has a height of 169 m and the receiving antenna has a height of 16 m. What is the maximum distance through which the TV signal could be received by space propagation?		4	K4	

<div align="center">_____</div>

<div align="center">3</div>

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Question Paper Code: 2004

B.E./ B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fourth Semester
Electronics and Communication Engineering
U19MA407 – PROBABILITY AND RANDOM PROCESSES
(Regulation 2019)

Time: Three Hours　　　　　　　　　　　　　　　　Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A
(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Find the value of k from a continuous random variable X has a probability density function $f(x) = kx^3, 0 \le x \le 1$.	2	K2	CO1
2.	If X is uniformly distributed over the interval $[0,10]$ Compute $P(2 < X < 9), P(X < 5)$.	2	K1	CO1
3.	Two regression lines are $5x - y = 22, 64x - 45y = 24$. Find the means of X and Y.	2	K2	CO2
4.	State the central limit Theorem.	2	K1	CO2
5.	State the four types of random processes.	2	K1	CO3
6.	Define Mean Ergodic process.	2	K1	CO3
7.	Find the Mean square value of the random process whose Auto correlation is $\frac{A^2}{2}\cos\omega\tau$.	2	K2	CO4
8.	State Wiener- Khintchine Theorem.	2	K1	CO4
9.	Define a system. When it is called as a linear system?	2	K2	CO5
10.	Define white noise.	2	K1	CO5

1

(5 x 16 = 80 Marks)

Q.No.			Questions	Marks	KL	CO
11. a)	i.		A random variables X has the following probability function:	8	K3	CO1

X	0	1	2	3	4	5	6	7
$P(X)$	0	K	$2K$	$2K$	$3K$	K^2	$2K^2$	$7K^2 + K$

1. Find K
2. If $P[X \leq C] > 1/2$ Find the minimum value of C
3. Evaluate $P[1.5 < X < 4.5 / X > 2]$ ... 8 K3 CO1

ii. The probability function of an infinite discrete distribution is given by $P[X = j] = \frac{1}{2^j}, j = 1,2,3 \dots$. Find

1. Mean of X
2. P[X is even]
3. P[X is divisible by 3].

(OR)

b) i. In a large consignment of electric bulbs 10% are defective. A random Sample of 20 is taken for inspection. Find the probability that ... 8 K3 CO1

    a. All are good bulbs
    b. At most there are 3 defective bulbs
    c. Exactly are 3 defective bulbs.

ii. Derive moment generating function of Exponential distribution and hence find its Mean and Variance. ... 8 K3 CO1

12. a) i. The joint probability mass function of (X, Y) is given by $P(x,y) = k(2x + 3y), x = \{0, 1, 2\}; y = \{1, 2, 3\}$. Find K and all the Marginal and Conditional probability distributions. ... 8 K5 CO2

ii. The joint PDF of the two dimensional RV is ... 8 K5 CO2

$$f(x,y) = \begin{cases} \frac{8}{9}xy & , 1 < x, y < 2 \\ 0 & , otherwise \end{cases}$$. Find the Marginal density

function of X and Y. Find the Conditional density function of Y given X = x.

(OR)

b) i. A random sample of size 100 is taken from a population whose mean is 60 and variance is 400. Using central limit theorem, with what probability can we assert that the mean of sample will not differ from $\mu = 60$ by more than 4? ... 8 K5 CO2

ii. Calculate the lines of regression from the following date ... 8 K5 CO2

X	1	2	3	4	5	6	7
Y	9	8	10	12	11	13	14

13. a) i. The process $\{X(t)\}$ whose probability distribution under certain condition is given by   8   K3   CO3

$$P\{X(t) = n\} = \begin{cases} \dfrac{(at)^{n-1}}{(1+at)^{n+1}}, n = 1,2\dots. \\ \dfrac{at}{1+at}, \quad n = 0 \end{cases}$$

Find the mean and variance of the process. Is the process first – order stationary?

ii. Show that the random process $X(t) = ACos(\omega t + \theta)$ is WSS, if   8   K3   CO3
A $\&\omega$ are constants and θ is a uniformly distributed in $(0,2\pi)$.

(OR)

b) i. Find the nature of the state of the Markov chain with the transition   8   K3   CO3

probability matrix $\begin{pmatrix} 0 & 1 & 0 \\ \dfrac{1}{2} & 0 & \dfrac{1}{2} \\ 0 & 1 & 0 \end{pmatrix}$ and prove that all the states are not

ergodic.

ii. Suppose that a customer's arrive at a bank according to a Poisson   8   K5   CO3
process with a mean rate of 3 per minute. Find the probability that during a time interval of 2 minutes.
   a. Exactly 4 customers arrive and
   b. More than 4 customers arrive
   c. Fewer than 4 customers arrive.

14. a) i. Two random processes X(t) and Y(t) are defined as follows: 8   K3   CO4
$X(t) = A \cos(\omega t + \theta)$ and $Y(t) = A \sin(\omega t + \theta)$ where A, B and ω are constants; θ is a uniform random variable over $(0,2\pi)$. Find the cross correlation function of X(t) and Y(t).

ii. The Auto correlation of the random binary transmission is given   8   K5   CO4

by $R_{XX}(\tau) = \begin{cases} 1 - \dfrac{|\tau|}{T}, & for\,|\tau| \le T \\ 0 & ,for\,|\tau| > T \end{cases}$. Find the power spectrum.

(OR)

b) i. Let X(t) and Y(t) be both zero-mean and WSS random processes.   8   K3   CO4
Consider the random process Z(t) defined by $Z(t) = X(t) + Y(t)$. Find
   a. The Auto correlation function and the power spectrum of Z(t) if X(t) and Y(t) are jointly WSS.
   b. The power spectrum of Z(t) if X(t) and Y(t) are orthogonal.

ii. The cross-power spectrum of real processes X(t) & Y(t) is given   8   K5   CO4
by $S_{XY}\{\omega\} = \begin{cases} \{a + jbw, for\,|w| < 1\} \\ 0 , elsewhere \end{cases}$. Find the cross correlation function.

3

15. a)	i.	Show that $S_{YY}(\omega) = |H(\omega)|^2 S_{XX}(\omega)$ where $S_{XX}(\omega)$ and $S_{YY}(\omega)$ are the power spectral density functions of the input X(t) and the output Y(t) and $H(\omega)$ is the system transfer function.	8	K3	CO5
	ii.	If X(t) is the input voltage to a circuit and Y(t) is the output voltage. {X(t)} is a stationary random process with $\mu_x = 0$ and $R_{xx}(\tau) = e^{-2|\tau|}$. Find the mean μ_y and power spectrum $S_{YY}(\omega)$ of the output if the system transfer function is given by $(\omega) = \frac{1}{\omega+2i}$.	8	K3	CO5

<div align="center">(OR)</div>

b)	i.	Check whether the following systems are linear. $a)y(t) = t\,x(t),\ \ b)y(t) = x^2(t)$.	8	K5	CO5
	ii.	If {X(t)} is a band limited process such that $S_{XX}(\omega) = 0, |\omega| > \sigma$ prove that $2|R_{XX}(0) - R_{XX}(\tau)| \le \sigma^2\tau^2 R_{XX}(0)$.	8	K5	CO5

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Question Paper Code: 7025

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fourth Semester
Electronics and Communication Engineering / Biomedical Engineering
U19EC413 / U19EC420 – LINEAR INTEGRATED CIRCUITS
(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	How will you classify the IC based on integration?	2	K1	CO1
2.	Compare the Ideal Vs. practical operational amplifiers.	2	K1	CO1
3.	Mention the difference between Schmitt trigger and comparator.	2	K1	CO2
4.	List the features of instrumentation amplifier.	2	K1	CO2
5.	Define lock-in range of a PLL.	2	K1	CO3
6.	VCO is also called as V-F converter. Why?	2	K1	CO3
7.	What are the specifications of D/A converter?	2	K1	CO4
8.	Compare and contrast binary ladder and R-2R ladder DAC.	2	K1	CO4
9.	Mention some applications of 555 timer.	2	K1	CO5
10.	What is an isolation amplifier?	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11. a)	Explain in detail about monolithic IC fabrication process.	13	K2	CO1
	(OR)			
b)	Explain the DC &AC characteristics of an operational amplifier.	13	K2	CO1
12. a)	Discuss the need for an instrumentation amplifier? Give a detailed analysis for the same.	13	K1	CO2

b) Design a 1st order LPF for the following specification Pass band voltage gain = 2. Cut off frequency, f_C = 10 KHz. | 13 | K3 | CO2

13. a) With a neat functional diagram, explain the operation of VCO. Also derive an expression for 'fo'. | 13 | K2 | CO3

(OR)

b) Illustrate the operation of analog multiplier using emitter coupled transistor pair. | 13 | K2 | CO3

14. a) i. Explain the principle of operation of successive approximation ADC. | 7 | K2 | CO4

    ii. Explain the working of weighted resistor D/A convertor. | 6 | K2 | CO4

(OR)

b) Explain the working R-2R ladder DAC, by taking example of a three bit DAC circuit. Sketch the corresponding equivalent circuits and hence obtain the equation for output. | 13 | K2 | CO4

15. a) i. In detail discuss the 723 IC general purpose voltage regulator. | 7 | K2 | CO5

    ii. Draw the circuit diagram of V/F converter using 9400 and explain. | 6 | K2 | CO5

(OR)

b) What is 555 timer? What are the features of 555 timer? Explain the monostable mode in detail. | 13 | K2 | CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16. a)	i.	Compare single slope and dual slope ADC.	5	K2	CO4
	ii.	For a particular dual slope ADC, t1 is 83.33ms and the reference voltage is 100mv.Calculate t2 if 1) v1 is 100 mv and 200 mv.	10	K5	CO4
		(OR)			
b)	i.	What would be produced by a DAC, whose output range is 0 to 10V and whose input binary number is 10111100 (for a 8 bit DAC).	8	K5	CO4
	ii.	With circuit, explain current mode type of DACs. Compare with voltage mode type.	7	K2	CO4

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[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]

Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 7026

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023

Sixth Semester

Electronics and Communication Engineering

U19EC626 – COMPUTER NETWORKS

(Regulation 2019)

Time : Three Hours   Maximum : 100 Marks

Answer ALL the questions

Knowledge Levels	K1 – Remembering	K3 – Applying	K5 - Evaluating
(KL)	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	What are the concerns of the physical layer in the Internet model?	2	K1	CO1
2.	Differentiate LAN and WAN.	2	K1	CO1
3.	A receiver receives the bit pattern 011010011.If the system is using even parity VRC, check whether the received pattern contains error.	2	K2	CO2
4.	Write short notes on CSMA/CD technique.	2	K2	CO2
5.	How does the source host know that the destination host is on the same IP Protocol?	2	K1	CO3
6.	Discuss the class field in IP address.	2	K1	CO3
7.	What are the types of QoS tools?	2	K1	CO4
8.	Define FDDI.	2	K1	CO4
9.	How does a DNS Resolver bootstrap the domain name lookup process?	2	K2	CO5
10.	Define SMTP.	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11. a)	Illustrate the ISO-OSI model of computer network with a neat diagram.	13	K2	CO1

(OR)

	b)	i.	How the message switching implemented in Circuit switched Network?	3	K2	CO1
		ii.	Discuss briefly about the Virtual Circuit Network and Datagram Network.	10		

12. a) Explain the various error detection and correction Mechanisms used in computer network.   13   K2   CO2

(OR)

b) What are the Services provided to Network layer by Data link layer? Also derive the transmitted frame for the given data 1101011011 and generator polynomial $G(x) = X^4 + X^2 + 1$.   13   K2   CO2

13. a) Discuss about distance vector routing and link state routing.   13   K2   CO3

(OR)

b) Mention the differences between IP4 & IP6 and explain the header format of Internet Protocol 4.   13   K2   CO3

14. a) Enumerate the User Datagram Protocol (UDP) with neat diagram.   13   K2   CO4

(OR)

b) Illustrate the ICMP Message format and error reporting in detail. Also explain the MPLS header format and list few of the application where TCP is used.   13   K2   CO4

15. a) Explain in detail about the following   K2   CO5
    i. DNS   5
    ii. SMTP   4
    iii. ARP   4

(OR)

b) Enlighten the various features and functions of Network service models. Illustrate and give the detail about the additive increase and multiplicative decrease of Congestion Control Techniques with necessary diagrams.   13   K2   CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.	Questions	Marks	KL	CO
16. a)	Consider sending a packet of L bits over a path of Q links. Each link transmits at R bps. The network is lightly loaded so that there are no queuing delays.	15	K4	CO4

     i. Suppose the network is a packet switched virtual circuit network. Denote the VC set up time by t_s seconds. Suppose to each packet the sending layers add a total of h bits of header, how long does it take to send the file from source to destination?

     ii. Suppose the network is a packet switched datagram network and a connectionless service issued. Now suppose each packet has 2h bits of header, how long does it take to send the file?

2

<div align="center">(OR)</div>

b) Evaluate the following protocols :   K4   CO5
    i.   File Transfer Protocol (FTP)   5
    ii.   Domain Name System (DNS)   5
    iii.   Hyper Text Transfer Protocol (HTTP)   5

Time : Three Hours   Maximum : 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q. No.	Questions	Marks	KL	CO
1.	Define resolution of an instrument.	2	K1	CO1
2.	In Maxwell capacitance bridge for calculating unknown inductance, the various values at balance are R1 = 300 Ω, R2 = 700 Ω, R3 = 1500 Ω, C4 = 0.8 μF. Calculate R1, L1 and Q Factor if the frequency is 110 Hz.	2	K1	CO1
3.	List advantages of electrical transducer.	2	K1	CO2
4.	Define Hall Effect.	2	K1	CO2
5.	What is barkhausen criterion for sustained oscillation?	2	K2	CO3
6.	Why time delay is necessary in oscilloscopes?	2	K2	CO3
7.	Evaluate moving coil with moving iron instruments.	2	K2	CO4
8.	Show the comparison table between analog and digital storage oscilloscope.	2	K2	CO4
9.	Sketch a neat block diagram of digital data acquisition system.	2	K2	CO5
10.	Category of digital voltmeter in measurement systems.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q. No.	Questions	Marks	KL	CO
11. a)	Write the functional elements and illustrate the errors in measurement and instruments systems.	13	K2	CO1

(OR)

1

			Marks	KL	CO
	b)	Obtain expression for Hays' bridge measurement system with neat circuit diagram.	13	K2	CO1
12.	a)	Explain the working principle of LVDT and state advantages and disadvantages of LVDT.	13	K3	CO2
		(OR)			
	b)	Write short notes on types of smart sensors in real world applications.	13	K3	CO2
13.	a)	Enumerate the frequency synthesizer's functions in detail with neat block diagrams.	13	K2	CO3
		(OR)			
	b)	With a neat block diagram explain the function of basic CRO.	13	K2	CO3
14.	a)	Describe the working of PMMC with torque equation for deflection.	13	K2	CO4
		(OR)			
	b)	Draw the circuit and explain working principle of Q - meter with various sources of error.	13	K2	CO4
15.	a)	What is meant by logging data? Explain in details about data loggers with functional blocks.	13	K3	CO5
		(OR)			
	b)	Explain the architecture of computer controlled virtual instrumentation and mention its applications in various fields.	13	K3	CO5

PART – C

(1 x 15 = 15 Marks)

Q. No.		Questions	Marks	KL	CO
16.	a)	"The advanced version of oscilloscope with some added features and uses for the special purpose" justifies the statement.	15	K3	CO3
		(OR)			
	b)	Write a case study on sensor data collection and analysis in smart city especially provenience in smart food supply chain. Explain.	15	K3	CO2

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN

[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]

Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 7031

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023

Fourth Semester

Electronics and Communication Engineering

U19EC410 – ELECTRONIC CIRCUITS-II

(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Write the significance of feedback in amplifiers.	2	K1	CO1
2.	In a negative feedback amplifier if the open loop gain is -1,00,00 and feedback factor is -1/10. Calculate the closed loop gain.	2	K3	CO1
3.	Draw the structure of Hartley oscillator.	2	K2	CO2
4.	Mention the essential conditions to be satisfied by an oscillator circuit.	2	K2	CO2
5.	In tuned amplifier if the resonant frequency fo = 2.5 GHz and Quality factor Q = 10. Calculate the Bandwidth of tuned amplifier.	2	K3	CO3
6.	Draw the equivalent circuit of single tuned amplifier.	2	K1	CO3
7.	Differentiate between clipper and clamper circuits.	2	K2	CO4
8.	List the applications of multivibrators.	2	K2	CO4
9.	What is Pulse transformer?	2	K1	CO5
10.	Mention the applications of UJT relaxation oscillator.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11. a	i.		Derive an expression for transfer gain, input resistance and output resistance in series - shunt mixing feedback configuration.	8	K2	CO1
	ii.		Explain the Nyquist criterion to analyze the stability of feedback.	5		

b	An amplifier has voltage gain with feedback of 100. If the gain without feedback changes by 20% and the gain with feedback should not vary more than 2%, determine the values of open loop gain, feedback ratio and loop gain of the amplifier.	13	K3	CO1
12.	a)	Illustrate with a neat diagram the structure of RC phase shift oscillator and derive its frequency of oscillation.	13	K2	CO2

(OR)

	b)	Describe the working principle LC oscillator with neat diagram.	13	K2	CO2
13.	a)	Design a capacitor coupled single tuned amplifier with necessary equations.	13	K3	CO3

(OR)

	b)	Outline the effect of cascading single tuned amplifiers on bandwidth.	13	K3	CO3
14.	a)	Explain the operation of astable multivibrator with a circuit diagram and sketch the input-output waveforms.	13	K3	CO4

(OR)

	b)	With a neat sketch, explain the working of a Schmitt trigger circuit.	13	K2	CO4
15.	a)	Illustrate the operation of free running blocking oscillator with base timing using necessary diagram and waveform.	13	K2	CO5

(OR)

	b)	Briefly describe about the working of UJT for relaxation oscillator with the help of suitable circuit diagram and derive its frequency of oscillation.	13	K4	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Compare and contrast the different types of feedback topology in amplifier configurations.	15	K3	CO1

(OR)

	b)	In a colpitts oscillator, the value of inductor and the value of capacitor in LC circuit are 40 mH, 100 pF and 500 pF respectively.	15	K3	CO2

  i. Determine the frequency of oscillations.
  ii. If the output voltage is 10V, find the feedback voltage.
  iii. Find the minimum gains if the frequency is changed by changing L alone.
  iv. Determine the value of C_1 for a gain of 10.
  v. Also, calculate the new frequency.

Reg.No.: | | | | | | | | |

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 9021

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Sixth Semester
Electronics and Communication Engineering
U19BTOE6 – WASTE MANAGEMENT
(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels	K1 – Remembering	K3 – Applying	K5 – Evaluating
(KL)	K2 – Understanding	K4 – Analyzing	K6 – Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Define waste management logistics.	2	K1	CO1
2.	List out the protective equipment that waste pickers must wear during their collection hours.	2	K1	CO1
3.	Write a short note on Ex- situ bioremediation method.	2	K1	CO2
4.	List the types of municipal solid waste.	2	K1	CO2
5.	Mention the colors used to differentiate the disposal of biomedical waste.	2	K2	CO3
6.	Distinguish between genotoxic and radioactive waste.	2	K2	CO3
7.	Justify why E- waste is hazardous. Name the chemicals released from E- waste.	2	K2	CO4
8.	Differentiate E, C & D waste.	2	K2	CO4
9.	State the types of plastics to be avoided.	2	K2	CO5
10.	Indicate the best way to recycle plastics.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11. a)	Discuss on Equipment, transport, RFID and cloud-based waste management.	13	K2	CO1

(OR)

1

	b)	Explain with the flowchart of steps in waste management logistics in detail.	13	K2	CO1
12.	a)	Illustrate the different treatment methods used for the disposal of municipal waste.	13	K2	CO2
		(OR)			
	b)	Elaborate the segregation of different types of hotel waste.	13	K2	CO2
13.	a)	i. Differentiate major and minor sources of BMW.	4	K2	CO3
		ii. Explain the classification of BMW.	9		
		(OR)			
	b)	Elucidate the segregation, process and disposal methods of Hospital waste.	13	K2	CO3
14.	a)	Describe the process of segregation of E- waste and plastic waste based on type.	13	K2	CO4
		(OR)			
	b)	With a neat flowchart elaborate the process of recycling of E-waste.	13	K2	CO4
15.	a)	Define 3R. Explain the process and precautions for recycling paper from waste.	13	K2	CO5
		(OR)			
	b)	Compare various methods of composting organic matter. Suggest which method is most suitable for your lifestyle.	13	K4	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Waste Management needs societal support, manpower, equipment and technical expertise. The intention is removing as much re-usable, recyclable, compostable components and energy out of it and reduce its volume before safe disposal.		K4	CO1
		i. If you are a solid waste collection manager of a small town, what equipment will you need for operating effectively?	10		
		ii. Explain Human dignity through floral waste – a case study.	5		
		(OR)			
	b)	Proper management of Biomedical waste highly essential. Since it induces various risk to the environment and human health.		K4	CO3
		i. Elucidate the segregation process of biomedical waste.	5		
		ii. How the color-coding system helping in medical waste management?	5		
		iii. Tabulate the waste category based on the types and treatment / disposal of BMW.	5		

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Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 7030

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Sixth Semester
Electronics and Communication Engineering
U19ECE10 - WIRELESS COMMUNICATION
(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Calculate the Brewster angle for a wave impinging on ground having a permittivity of $\xi_r = 4$.	2	K2	CO1
2.	Define coherence time (Tc). In what way does this parameter decide the behavior of the channel?	2	K2	CO1
3.	Name the types of interference occur in a cellular system.	2	K1	CO2
4.	What is an umbrella cell concept?	2	K1	CO2
5.	Define Offset QPSK.	2	K1	CO3
6.	Explain Windowing.	2	K1	CO3
7.	What are the techniques used to improve the received signal quality?	2	K2	CO4
8.	Why non-linear equalizers are preferred?	2	K2	CO4
9.	Draw the MIMO model.	2	K2	CO5
10.	Define Spatial multiplexing.	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11. a)	Discuss about Two Ray Ground reflection model with necessary equations.	13	K2	CO1

(OR)

	b)	Explain fading effects due to multipath time delay spread and fading effects due to Doppler spread.	13	K3	CO1
12.	a)	Summarize the features of various multiple access techniques used in wireless mobile communication. State the advantage and disadvantages of each technique.	13	K2	CO2
		(OR)			
	b)	Describe Channel assignment strategies and Hand-off strategies.	13	K2	CO2
13.	a)	With neat diagrams, explain the modulation and demodulation of $\pi/4$ DQPSK modulation technique.	13	K2	CO3
		(OR)			
	b)	Prove that the OFDM system converts the delay spread channel into a set of parallel fading channels, using the concept of cyclic prefix.	13	K3	CO3
14.	a)	Explain in detail the various factors to determine the algorithm for adaptive equalizer. Also derive the Least Mean Square Algorithm for adaptive equalizer.	13	K3	CO4
		(OR)			
	b)	Outline the working principle of RAKE receiver with suitable diagrams.	13	K2	CO4
15.	a)	What is meant by MIMO systems? Explain the system model with necessary diagrams.	13	K2	CO5
		(OR)			
	b)	Calculate the capacity of a MIMO system in flat fading and non-fading channels.	13	K3	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.			Questions	Marks	KL	CO
16.	a)	i.	Develop a free space propagation model and derive the loss in the signal strength.	10	K3	CO1
		ii.	Determine the proper spatial sampling interval required to make small scale propagation measurements which assume that consecutive samples are highly correlated in time. How many samples will be required over 10m travel distance if fc = 1900 MHz and v = 50 m/s. How long would it take to make these measurements, assuming they could be made in real time from a moving vehicle? What is the Doppler spread Bd for the Channel?	5		
			(OR)			
	b)		Identify the various approaches to improve coverage and channel capacity in cellular systems.	15	K3	CO2

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Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 7028

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fourth Semester
Electronics and Communication Engineering
U19EC412 - ELECTROMAGNETIC FIELDS
(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Transform vector $2xya_x - x^2a_y$ into cylindrical co-ordinates.	2	K2	CO1
2.	What is Del operator? Mention its applications in electromagnetic.	2	K1	CO1
3.	State Gauss's law in point form.	2	K1	CO2
4.	The electric potential near the origin of a system of co-ordinates is $V = ax^2 + by^2 + cz^2$. Determine the electric field at (1, 2, 3).	2	K2	CO2
5.	Define dielectric strength of a material also mention its unit.	2	K1	CO3
6.	State the boundary conditions for electric field between conductor and free space.	2	K1	CO3
7.	A long straight wire carries a current of $I = 1$ A. At what distance is the magnetic field $H = 1$ A/m.	2	K3	CO4
8.	What should be the direction of currents of same magnitude in two identical co-axial cylindrical coils to have maximum magnitude of B at a point on the axis?	2	K2	CO4
9.	State the Faraday's law of electromagnetic induction.	2	K1	CO5
10.	Prove that the intrinsic impedance of free space is 377 Ω.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11. a)	i.		State and prove divergence theorem.	7	K2	CO1
	ii.		Find the Laplacian of the scalar field $V = \rho^2 z\cos 2\varphi$.	6	K3	

(OR)

b)	i.	Describe briefly about spherical co-ordinate system along with necessary diagrams and expressions.	7	K2	CO1
	ii.	Find the curl of the vector field $A = e^{xy}a_x + \sin xy a_y + \cos^2 xz a_z$.	6	K3	
12. a)		Derive an expression for electric field intensity E due to an infinite sheet of charge placed on xy-plane.	13	K3	CO2

(OR)

b)	i.	Obtain the relationship between E and V.	7	K4	CO2
	ii.	Six equal point charges of 10nC each are located at 2, 3, 4, 5, 6, 7 m, respectively. Find the potential V at the origin.	6	K3	
13. a)	i.	In a certain region, $J = 3r^2\cos\theta a_r - r^2\sin\theta a_\theta$ A/m, find the current crossing the surface defined by $\theta = 30°$, $0 < \varphi < 2\pi$, $0 < r < 2$ m.	8	K3	CO3
	ii.	Derive continuity equation of current in both integral and differential form.	5	K2	

(OR)

b)	i.	Derive the boundary conditions for electric field at the interface of two different dielectric materials.	8	K2	CO3
	ii.	Determine whether the field $V = r\cos\theta + \theta$ satisfy the Laplace's equation.	5	K3	
14. a)	i.	Derive any one form of maxwell's equation from Ampere's law.	6	K2	CO4
	ii.	Determine the Magnetic flux density both inside and outside an infinitely long straight conductor with a circular cross section of radius a carrying a steady current I. Plot the variations of the flux density with radial distance.	7	K3	

(OR)

b)		Validate the expression which relates magnetic flux density B and magnetic vector potential A. Demonstrate the expression with the supporting laws.	13	K3	CO4
15. a)	i.	The electric field and magnetic field in free space are given by $E = (50/\rho) \cos (10^6 t + \beta z) a_\varphi$ V/m $H = (H_o/\rho) \cos (10^6 t + \beta z) a_\rho$ A/m. Express these in phasor form and hence obtain the modified Maxwell's equations for this case.	7	K3	CO5
	ii.	A plane wave $E = E_o \cos (\omega t - \beta z) a_x$ is incident on a good conductor at $z = 0$. Find the current density in the conductor.	6	K3	

(OR)

b)		State and prove Poynting theorem. Also describe the Poynting vector, average power and, instantaneous power.	13	K2	CO5

PART – C

Q.No.			Questions	Marks	KL	CO
16.	a)	i.	Discuss about the propagation of the plane waves in free space and in a homogeneous material.	10	K2	CO4
		ii.	A uniform plane wave propagating in a medium has $E = 2e^{-\alpha z} \sin(10^8 t - \beta z)\ a_y$ V/m. If the medium is characterized by $\varepsilon_r = 1$, $\mu_r = 20$, and $\sigma = 3$ mhos/m, Evaluate α and β.	5	K5	CO5

(OR)

	b)		The plane wave $E = 50 \sin(\omega t - 5x)\ a_y$ V/m in a lossless medium with $\mu = 4\mu_0, \varepsilon = \varepsilon_0$ encounters a lossy medium with $\mu = \mu_0$, $\varepsilon = 4\varepsilon_0$, $\sigma = 0.1$ mhos/m normal to the x-axis at $x = 0$. Determine		K5	CO5
		i.	Γ, τ and s	3		
		ii.	Er and Hr	4		
		iii.	Et and Ht,	4		
		iv.	The time-average Poynting vectors in both regions	4		

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Question Paper Code: 7003

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fifth Semester
Electronics and Communication Engineering
U19EC518 – CONTROL SYSTEMS
(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels	K1 – Remembering	K3 – Applying	K5 - Evaluating
(KL)	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Obtain the fundamental differences between open-loop and closed-loop control systems.	2	K1	CO1
2.	Define transfer function.	2	K1	CO1
3.	What is steady state error?	2	K1	CO2
4.	Define the Dirac Delta function.	2	K1	CO2
5.	Given a transfer function, $G(s) = \frac{1}{(s+3)}$, calculate the magnitude and phase at a frequency of 5 rad/s.	2	K3	CO3
6.	Given $G(s) = \frac{s(s+1)}{(s^2+s+1)(s+3)}$, $draw\ the\ pole - zero\ plot$.	2	K3	CO3
7.	State the Nyquist Criteria of Stability.	2	K1	CO4
8.	Why are Bode Plots drawn on semi-log graphs?	2	K2	CO4
9.	What is the difference between sampling and holding?	2	K1	CO5
10.	Define state and state variables.	2	K1	CO5

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Explain the state space representation of continuous time systems with the help of a suitable example.	13	K1	CO1
		(OR)			
	b)		13	K3	CO1
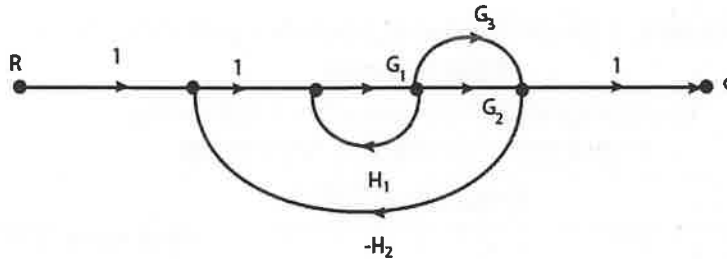
Find out the transfer function of the above shown signal graph using the mason's gain formula.

12.	a)	Derive the time response of second order systems for unit step input.	13	K2	CO2
		(OR)			
	b)	What do you understand by position (Kp), velocity (Kv) and acceleration (Ka) error coefficients in the control system? How to calculate these errors for type 1 and 2 systems?	13	K2	CO2
13.	a)	Draw the polar plot of the open loop transfer function $G(s)H(s) = \frac{10}{(s+2)(s+6)}$.	13	K3	CO3
		(OR)			
	b)	What do you understand by the frequency response of the system? How these responses are useful to know about the system? Explain with an example.	13	K2	CO3
14.	a)	Why a compensator is needed? With suitable example, explain the steps of designing a lead compensator.	13	K2	CO4
		(OR)			
	b)	Explain the Routh Hurwitz stability criterion. Consider a characteristic equation of linear control systems: $2S^5 + 5s^4 + 2s^3 + 4s^2 + 2s + 4 = 0$ Comment on the stability using the Routh Hurwitz stability criterion.	13	K2	CO4
15.	a)	Explain the concepts of Controllability and Observability with the help of one example for each.	13	K1	CO5
		(OR)			

b) How the digital control system (DCS) is different from analog   13   K2   CO5
control systems? Explain one controller design of your choice
for DCS.

PART – C

<div align="right">(1 x 15 = 15 Marks)</div>

Q.No.	Questions	Marks	KL	CO
16. a)	Explain and sketch the root locus of the following open loop transfer function $G(s)H(s) = \dfrac{K}{s(s+2)(s+5)}$.	15	K3	CO4

<div align="center">(OR)</div>

b) Consider a second-order continuous-time system with the   15   K3   CO3
following transfer function:

$$H(s) = \frac{10}{(s+2)(s+5)}$$

Plot the Bode magnitude and phase plots for the given transfer
function over the frequency range from 0.1 rad/s to 100 rad/s.

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions
(Smith Chart is to be provided)

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	What are the secondary constants of a transmission line? Why transmission line parameters are called as distributed parameters?	2	K1	CO1
2.	Define the term insertion loss.	2	K2	CO1
3.	What is a dissipation less line? What is the nature and value of Z_0 for the dissipation less line?	2	K3	CO2
4.	Why is a quarter wave line calling an impendence inverter?	2	K3	CO2
5.	What is Transverse electric wave?	2	K1	CO3
6.	Mention the characteristics of TEM waves.	2	K1	CO3
7.	What is the dominant mode of TM waves in circular waveguides?	2	K1	CO4
8.	How rectangular cavities can be used as microwave resonators?	2	K2	CO4
9.	Give the applications of planar transmission lines.	2	K2	CO5
10.	List the physical parameters of a microstrip transmission line.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11. a)	Derive the transmission line equation and obtain an expression for voltage and current on a transmission line.	13	K3	CO1
	(OR)			
b)	Prove that an infinite line is equal to a finite line terminated with characteristic impedance.	13	K3	CO1

1

12.	a)		Derive an expression for the input impedance of the dissipation-less lines.	13	K3	CO2

<div align="center">(OR)</div>

	b)		A load of $(50 - j100)$ ohms is connected across a 50 ohms line. Design a short-circuited stub to provide matching between the load and line at a signal frequency of 30 MHz using Smith chart.	13	K3	CO2

13.	a)	i.	What are degenerated modes in a rectangular waveguide?	6	K2	CO3
		ii.	Mention the application of Maxwell's equation to the rectangular waveguides.	7	K2	

<div align="center">(OR)</div>

	b)		Derive the expression for field components of TE waves in parallel plane waveguide.	13	K3	CO3

14.	a)		An air-filled circular waveguide having an inner radius of 1cm is excited with dominant mode at 10 GHz. Find		K3	CO4
		i.	The cutoff frequency of the dominant mode at 10 GHz.	5		
		ii.	The guide wavelength.	4		
		iii.	Bandwidth of operation in dominant mode.	4		

<div align="center">(OR)</div>

	b)		Mention Bessel's differential equation, Bessel function, and the field components of TM and TE waves in Circular waveguides.	13	K3	CO4

15.	a)		Describe in detail about the geometrical structure and field configurations of microstrip and coplanar waveguide transmission lines.	13	K2	CO5

<div align="center">(OR)</div>

	b)	i.	Discuss the characteristics of planar transmission lines.	8	K2	CO5
		ii.	Derive the characteristic impedance of the microstrip line.	5	K3	

<div align="center">PART – C</div>

<div align="right">(1 x 15 = 15 Marks)</div>

Q.No.			Questions	Marks	KL	CO
16.	a)	i.	Derive the condition for the distortion-less operation of the transmission line.	8	K3	CO1
		ii.	A transmission line of 50 ohms is terminated with a load impedance of 75+j80Ω. Determine the reflection coefficient and return loss at the load.	7	K4	CO1

<div align="center">(OR)</div>

	b)	i.	Derive the relationship between the quality factor and Bandwidth of a resonator.	5	K3	CO5
		ii.	Discuss the propagation, of TE waves in a circular waveguide with relevant expressions and discuss the dominant modes.	10	K3	

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Question Paper Code: 7017

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fifth Semester
Electronics and Communication Engineering
U19EC521 – ANALOG AND DIGITAL COMMUNICATION
(Common to Biomedical Engineering)
(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels	K1 – Remembering	K3 – Applying	K5 - Evaluating
(KL)	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Compare DSB-SC and SSB-SC modulation techniques.	2	K4	CO1
2.	What is the need for modulation?	2	K1	CO1
3.	Give the characteristics of shot noise.	2	K2	CO2
4.	What is White Noise?	2	K1	CO2
5.	What are the effects of quantization on signal?	2	K2	CO3
6.	Name the types of uniform quantizer?	2	K1	CO3
7.	Represents '101011' using Manchester format.	2	K2	CO4
8.	State the use of equalization in baseband transmission.	2	K1	CO4
9.	List the advantages of digital modulation techniques.	2	K1	CO5
10.	What do you mean by bit error rate?	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	Illustrate the expression for transmitted power of AM wave.	6	K2	CO1
		ii.	With the help of mathematical expression explain about AM, its generation and detection.	7	K2	CO1

1

b)	With the help of neat block diagram, explain about the generation of SSBSC wave and demodulation.	13	K1	CO1
12. a)	What is narrowband noise? Discuss the properties of the In phase and Quadrature components of a narrowband noise.	13	K1	CO2
	(OR)			
b)	What is noise temperature? Deduce the expression for effective noise temperature of a cascaded system.	13	K1	CO2
13. a)	Explain any three communication channel models with appropriate mathematical equations.	13	K2	CO3
	(OR)			
b)	Explain in detail about uniform and non uniform quantization techniques.	13	K2	CO3
14. a)	Derive the expression for the Nyquist criterion for distortion less baseband transmission in the absence of noise in terms of time domain & Frequency domain.	13	K3	CO4
	(OR)			
b)	What is correlative coding? Explain its types in details.	13	K3	CO4
15. a) i.	Explain the generation and detection of BPSK modulation	7	K4	CO5
ii.	Discuss in brief about Non-coherent detection of binary FSK modulation.	6		
	(OR)			
b) i.	Describe the generation and detection of DPSK	7	K4	CO5
ii.	Illustrate the pass band transmission model with neat diagram?	6		

PART – C

(1 x 15 = 15 Marks)

Q.No.	Questions	Marks	KL	CO
16. a)	Summarize the characteristics of various noise found in a communication channel, and its influence on digital communication systems.	15	K1	CO2
	(OR)			
b) i.	Explain envelope detection with a suitable diagram.	8	K3	CO5
ii.	Briefly describe the principle of DPSK modulation technique.	7	K3	

Reg.No.: ☐☐☐☐☐☐☐☐☐☐☐☐

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Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 7019

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fifth Semester
Electronics and Communication Engineering
U19ECE07 – ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Define Artificial intelligence.	2	K1	CO1
2.	List the steps involved in the problem-solving technique.	2	K1	CO1
3.	Estimate the performance of the problem-solving method based on the depth-first-search algorithm.	2	K2	CO2
4.	What is blind search method?	2	K2	CO2
5.	Mention how the scree plot is useful.	2	K1	CO3
6.	Compare supervised learning and unsupervised learning.	2	K2	CO3
7.	Mention the disadvantage of Principal Component Analysis.	2	K2	CO4
8.	Define Naïve Bayes model.	2	K1	CO4
9.	Differentiate Artificial intelligence, machine learning and deep learning.	2	K2	CO5
10.	Express the equation of Linear Basis Function Models.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11. a)	Give an example AI problem and describe the typical AI agents and the characteristics of an AI problem.	13	K2	CO1

(OR)

1

				Marks	KL	CO

b) Consider a water jug problem. You are given 2 jugs: a 4-gallon and a 3-gallon jug. Neither has any measuring mark in it. There is a pump that can be used to fill the jugs with water. How can you get exactly 2 gallons of water into a 4-gallon jug? State production rules for the water jug problem.   13   K2   CO1

12. a)   i.   Illustrate the use of first-order logic to represent knowledge.   7   K3   CO2

      ii.   Interpret in detail the models for predicate logic.   6   K3   CO2

(OR)

b) Use the following types of Hill Climbing Search Techniques to solve real-time problems.

      i.   Simple Hill Climbing   7   K3   CO2

      ii.   Steepest –Ascent Hill Climbing   6   K3   CO2

13. a) Mention the different types of ensemble learning methods. State the ways by which classifiers are combined. List the merits and demerits of combining classifiers.   13   K2   CO3

(OR)

b) Describe the application of neural network which is used for learning to steer an autonomous vehicles.   13   K2   CO3

14. a) Explain in detail how the Expectation Maximization algorithm is used as general technique to find solution for probabilistic models.   13   K2   CO4

(OR)

b) Elucidate the principal component analysis of dimensionality reduction techniques with its applications.   13   K2   CO4

15. a) Interpret the Linear Basis Function Models with necessary equations.   13   K3   CO5

(OR)

b) Give two scenarios with real-time, how ML is used with computer networks.   13   K3   CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.	Questions	Marks	KL	CO

16. a) Consider the following sentences and answer the queries below stating the assumptions made:

Marcus was a man

Marcus was a pompeian

Marcus was born in 40 AD

All men are mortal

All pompeian's died in the Volcano erupted in 79AD

No mortal lives for more than 150 years

2

| | i. | Convert them to clause form. | 8 | K4 | CO2 |
| | ii. | Answer the question "is Marcus dead now" in two different ways. | 7 | | |

<div align="center">(OR)</div>

b) Use the k-means algorithm and Euclidean distance to cluster the following 8 examples into 3 clusters: A1 = (2, 10), A2 = (2, 5), A3 = (8, 4), A4 = (5, 8), A5 = (7, 5), A6 = (6, 4), A7 = (1, 2), A8 = (4, 9). The distance matrix based on the Euclidean distance is given below   15   K4   CO4

	A1	A2	A3	A4	A5	A6	A7	A8
A1	0	$\sqrt{25}$	$\sqrt{36}$	$\sqrt{13}$	$\sqrt{50}$	$\sqrt{52}$	$\sqrt{65}$	$\sqrt{5}$
A2		0	$\sqrt{37}$	$\sqrt{18}$	$\sqrt{25}$	$\sqrt{17}$	$\sqrt{10}$	$\sqrt{20}$
A3			0	$\sqrt{25}$	$\sqrt{2}$	$\sqrt{2}$	$\sqrt{53}$	$\sqrt{41}$
A4				0	$\sqrt{13}$	$\sqrt{17}$	$\sqrt{52}$	$\sqrt{2}$
A5					0	$\sqrt{2}$	$\sqrt{45}$	$\sqrt{25}$
A6						0	$\sqrt{29}$	$\sqrt{29}$
A7							0	$\sqrt{58}$
A8								0

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Question Paper Code: 7020

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fifth Semester
Electronics and Communication Engineering
U19ECE06 / U19ECV41– EMBEDDED SYSTEM DESIGN AND REAL TIME
. APPLICATIONS
(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Identify the commercial processors which use CISC and RISC architectures.	2	K2	CO1
2.	Differentiate memory mapped I/O and I/O mapped I/O.	2	K2	CO1
3.	List the special registers available in ARM cortex M4.	2	K1	CO2
4.	Highlight the significance of Hibernation Module in ARM Cortex M4.	2	K1	CO2
5.	Write the function of 32-bit Real-Time Clock (RTC) in GPTM module of ARM Cortex M4.	2	K2	CO3
6.	Write short notes on analog comparators.	2	K1	CO3
7.	Write the steps involved in porting the embedded software into target system.	2	K1	CO4
8.	Identify the role of host and target machines.	2	K2	CO4
9.	Categorize the software architectures.	2	K2	CO5
10.	Define thread and semaphore.	2	K1	CO5

PART – B

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	Write the characteristics of an embedded system.	5	K1	CO1
		ii.	With suitable examples explain fixed point and floating point arithmetic operations.	8		
			(OR)			
	b)	i.	Mention the challenges involved in embedded system design.	5	K2	CO1
		ii.	Elaborate the instruction formats and addressing modes with suitable examples.	8		
12.	a)		Draw the Block Diagram of Arm Cortex M4 processor and explain the functions of each block.	13	K2	CO2
			(OR)			
	b)		Explain the programming model of ARM Cortex M4.	13	K2	CO2
13.	a)	i.	Draw the block diagram of RTC module in arm cortex M4 processor, and explain each block.	6	K2	CO3
		ii.	Draw the µDMA Block Diagram of arm cortex M4 processor, and give the functional description.	7		
			(OR)			
	b)	i.	Draw the block diagram of JTAG interface module in arm cortex M4 processor, and give the signal description.	6	K2	CO3
		ii.	Draw the block diagram of PWM Generator module in arm cortex M4 processor, and give the functional description.	7		
14.	a)	i.	Distinguish In-System programming and In-Application programming.	5	K2	CO4
		ii.	With suitable program, explain how the hexa keyboard is interfaced with ARM cortex M4 processor.	8		
			(OR)			
	b)		Illustrate the Stepper motor's interface with the ARM Cortex M4 and describe its operation using an appropriate program.	13	K2	CO4
15.	a)	i.	What is a mail box? How does a mailbox pass a massage during inter process communication?	6	K2	CO5
		ii.	What is meant by a pipe? How does a pipe may differ from a queue?	7		
			(OR)			

b)	i.	How does use of a counting semaphore differ from a Mutex?	6	K2	CO5
	ii.	Explain about Multitasking OS and Multitasking scheduler.	7		

PART – C

Q.No.		Questions	Marks	KL	CO
16.	a)	Develop a model to interface DC motor with a processor and write appropriate program to control the speed and direction of rotation of the motor.	15	K2	CO4
		(OR)			
	b) i.	What are the factors to be considered for selecting a processor during the system design phase?	7	K2	CO5
	ii.	With suitable example, explain product design life cycle.	8		

_____

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Question Paper Code: 7018

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fifth Semester
Electronics and Communication Engineering
U19ECV61 – ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Explain briefly the concept of machine learning.	2	K1	CO1
2.	What is adversarial search?	2	K2	CO1
3.	Draw the architecture of multilayer perceptron.	2	K1	CO2
4.	State the basic principle of Support Vector Machine.	2	K4	CO2
5.	Name any two-activation function.	2	K1	CO3
6.	Explain role of reasoning in machine learning.	2	K3	CO3
7.	Explain in brief, problem solving strategies in AI.	2	K2	CO4
8.	What is the significance of Gaussian mixture model?	2	K2	CO4
9.	Explain elements of Deep Learning.	2	K3	CO5
10.	Demonstrate Multilayer Feed Forward Network using schematic diagram.	2	K2	CO5

PART – B

Q.No.		Questions	Marks	KL	CO
11.	a)	What is the role of Machine learning in AI? Explain following learning schemes using examples. • supervised learning • unsupervised learning • reinforcement learning	13	K1	CO1
		(OR)			
	b)	What is meant by the term artificial intelligence? What is the motivation behind AI approach? Differentiate AI and data science with respect to their scope.	13	K2	CO1
12.	a)	Explain entropy reduction, information gain and Gini index in decision tree. Many times, while training decision tree tends to overfit. What is the reason behind it and how to avoid it?	13	K1	CO2
		(OR)			
	b)	Explain optimizers. Why optimizers are required? What is Gradient Descent (GD) and its variants? What are GD optimization methods and which optimizer to use?	13	K2	CO2
13.	a)	i. What is bagging and boosting? Give example.	6	K2	CO3
		ii. Outline the steps of Ada Boost algorithm with an example.	7	K4	CO3
		(OR)			
	b)	Explain the steps in back propagation learning Algorithm. What is the importance of it in designing?	13	K2	CO3
14.	a)	State constraint satisfaction problems (CSP).Outline local search for constraint satisfaction problem with an example.	13	K3	CO4
		(OR)			
	b)	Define the following: • ReLu • Hyper parameter tuning • Expectation maximization • Naïve Bayes models	13	K2	CO4
15.	a)	i. What is Convolutional Neural Network (CNN)? Explain the architecture of Convolutional Neural Networks (CNN)? Explain activation functions in CNN?	6	K1	CO5
		ii. State different architectures of Deep Learning network. Also, State difference between Machine Learning and Deep Learning.	7	K2	CO5
		(OR)			

b) Define uncertainty. What are the scopes of Uncertainty in   13   K2   CO5
Artificial Intelligence.? How Bayesian Belief Model modifies the
conventional Stochastic Bayesian approach in decision making.
Discuss with a graphical model.

PART – C

(1 x 15 = 15 Marks)

Q.No.			Questions	Marks	KL	CO
16. a)	i.		Explain approximate reasoning appearing in uncertainty of knowledge and in the problem of incompleteness of relevant information?	7	K2	CO2
	ii.		Explain the probabilistic approach for decision making. Discuss Bayesian inference to drive the posterior probability as a consequence.	8	K3	CO3
			(OR)			
b)	i.		Describe k means clustering for unsupervised learning process.	6	K1	CO4
	ii.		What is role of linear regression models in supervised learning? Explain in details.	9	K2	CO3

3

Reg.No.: | | | | | | | | | |

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Question Paper Code: 5008

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023

Seventh Semester

Electronics and Communication Engineering

U19CSOE5 – DATA ANALYTICS

(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	What is Cross-Validation?	2	K2	CO1
2.	Mention Probability Axioms.	2	K1	CO1
3.	Classify the levels of the techniques in multivariate analysis.	2	K2	CO2
4.	Differentiate between point estimation and Interval Estimation.	2	K2	CO2
5.	Specify the main idea of time series analysis.	2	K2	CO3
6.	Define propositional rule learning.	2	K1	CO3
7.	How would you show the understanding of delta rule in neural networks?	2	K2	CO4
8.	Define Reinforcement learning by suitable example.	2	K2	CO4
9.	What are the benefits of visual data exploration?	2	K2	CO5
10.	State the purpose of Dense Pixel Displays in visualization.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11. a)	What is the need for sampling? Explain about different sampling methods.	13	K2	CO1

(OR)

b)	Consider the population of size n = 6, displayed in the table given below. 'X' is the population variable. A random sample of size m = 2 is drawn with replacement from this population. Show the distribution of sample and the sampling distribution of statistics $\bar{x}$ and S^2.	13	K4	CO1

UNIT	1	2	3	4	5	6
X	1	1	2	2	2	3

1

12.	a)	List and explain the features of Bayesian learning methods.	13	K1	CO2
		(OR)			
	b)	Enumerate the significance of dimensionality reduction. What are the merits of kernel PCA over a standard PCA?	13	K2	CO2
13.	a)	What is the purpose of time series model? Explain the components of time series.	13	K2	CO3
		(OR)			
	b)	Elaborate the representation of data in propositional rule learning with an example.	13	K2	CO3
14.	a)	Enumerate and explain the following Principal Component Analysis rules:	8	K2	CO4
		i. Hebbian Learning	5	K2	CO4
		ii. The Autoassociator Scheme			
		(OR)			
	b)	What is a neural network? With an example, illustrate how it can be used in data analytics.	13	K2	CO4
15.	a)	Illustrate, how data visualization is done for n-dimensional data, text & hypertext and graph hierarchies.	13	K2	CO5
		(OR)			
	b)	What is data visualization? Explain any four data visualization techniques.	13	K2	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Enumerate the concept of Linear Regression and Calculate the Correlation Coefficient between Monthly E-commerce Sales and Online Advertising costs of the company for the given data	15	K3	CO1

Online store	Monthly E-Commerce Sales (in 1000 s)	Online advertising Dollars (1000 s)
1	368	1.7
2	340	1.5
3	665	2.8
4	954	5
5	331	1.3
6	556	2.2
7	376	1.3

(OR)

	b)	i. Jerry has two bags. Bag I has 9 red and 4 blue balls and bag II has 5 red and 11 blue balls. Amy draws a ball at random and it turns out to be red. Determine the probability that the ball was from the bag I using the Bayes theorem.	8	K3	CO2
		ii. Write short notes on prediction and prediction error.	7	K2	CO2

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Question Paper Code: 7002

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Seventh Semester
Electronics and Communication Engineering
U19EC731 – RF AND MICROWAVE ENGINEERING
(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels	K1 – Remembering	K3 – Applying	K5 - Evaluating
(KL)	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Which properties of S-matrix must be satisfied for a lossless reciprocal two-port network.	2	K1	CO1
2.	Define a microwave network and describe its scattering matrix.	2	K3	CO1
3.	Describe the factors which influence the stability of a microwave amplifier.	2	K2	CO2
4.	List the important features of a microstrip line matching network.	2	K1	CO2
5.	Describe how R, L, and C are realized in MIC form.	2	K2	CO3
6.	The PIN diode is not used as a microwave detector. True or false? Justify your choice.	2	K2	CO3
7.	Define the electronic and mechanical tuning of a reflex klystron.	2	K2	CO4
8.	What are the high-frequency limitations observed in conventional tubes?	2	K1	CO4
9.	How do you extend the range of power measurement?	2	K1	CO5
10.	Describe how an ordinary voltmeter can be calibrated to read VSWR directly.	2	K2	CO5

1

PART – B

Q.No.	Questions	Marks	KL	CO
11. a)	List the important properties and applications of hybrid and ABCD parameters.	13	K1	CO1
	(OR)			
b)	Prove the Unitary and Lossless properties of S matrix.	13	K3	CO1
12. a)	Differentiate T and Pi Matching Networks and discuss their physical significance in the field of RF and microwave Engineering.	13	K2	CO2
	(OR)			
b)	Explain how a T-section low-pass filter is simulated in microstrip form. How are the component values determined?	13	K2	CO2
13. a)	A varactor diode has a junction capacitance of 0.5 pF with $v = 0$, the barrier potential 1.1 V, and $n = 0.3$. Calculate the junction capacitance and the cut-off frequency for a reverse voltage of 0.8 V, if the substrate resistance is 0.7 Ω.	13	K4	CO3
	(OR)			
b)	Explain what terminations can not be matched with a lossless line by the double-stub system and Why? A lossless 100 Ω transmission line is terminated with an admittance 0.003-j0.003 mho. Design a double stub tuner with spacing $\lambda/8$ when the first stub is at the position of the load.	13	K4	CO3
14. a)	How is bunching achieved in a cavity magnetron? Explain the phase-focusing effect. Also, develop an expression for the cut-off magnetic flux density with reference to a cylindrical cavity magnetron.	13	K3	CO4
	(OR)			
b)	Explain the operation of the GUNN diode with the help of a neat sketch. Compute the negative electron mobility of a typical n-type GaAs GUNN diode has the following parameters: threshold field: 2800 V/cm, applied field: 3200 V/cm, device length: 10 μm, doping concentration: 2×10^{14} cm^{-3}, and frequency: 10 GHz.	13	K3	CO4
15. a)	Compare the power ratio and RF substitution methods of measuring attenuation provided by a microwave component.	13	K1	CO5
	(OR)			
b)	Explain any two methods of measuring the impedance of a terminating load in a microwave system.	13	K1	CO5

2

(1 x 15 = 15 Marks)

Q.No.	Questions	Marks	KL	CO

16. a) By means of an Applegate diagram, explain the operation of a reflex klystron. Prove that the theoretical efficiency of reflex klystron is 27.78%. Also, draw voltage characteristics of reflex klystron for possible modes.   **15   K4   CO4**

(OR)

b) Determine the scattering parameters for a 10 dB directional coupler with a directivity of 30 dB. Assume that it is lossless and VSWR at each port is 1.0 under matched conditions. Designate the ports in the main guide as 1 or 2 and the ports in the auxiliary guide as 3 and 4.   **15   K2   CO3**

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Question Paper Code: 7014

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fifth Semester
Electronics and Communication Engineering
U19ECV12 – SYSTEM ON CHIP DESIGN
(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Relate the trade-off between performance and power consumption in SoC design.	2	K2	CO1
2.	Recall the challenges faced during the SoC design flow.	2	K1	CO1
3.	What are the differences in the design process of hard cores from that of soft cores?	2	K1	CO2
4.	What is scheduling? List the main considerations in the scheduling during a operation of SoC.	2	K1	CO2
5.	What is Network-on-Chip (NOC), and how it is differs from traditional on-chip buses?	2	K1	CO3
6.	How does the reconfigurability be integrated with on-chip communication architecture benefits in SoC design?	2	K1	CO3
7.	Differentiate concurrency and parallelism in the context of hardware software co-design.	2	K4	CO4
8.	Define the elements tokens, actors, and queues that make up a data flow model.	2	K1	CO4
9.	Recall FPGA with SoC.	2	K2	CO5
10.	How does RTOS differ from a general-purpose operating system?	2	K1	CO5

PART – B

Q.No.			Questions	Marks	KL	CO
11.	a)		Illustrate the concept of system-on-a-chip (SoC). Summarize the approaches involved in the design of SoC.	13	K2	CO1
			(OR)			
	b)	i.	Discuss the various components in the present day system on chip.	5	K2	CO1
		ii.	Design validation is a very important SOC design consideration. Categorize the several approaches specific to SOC designs. Evaluate each from the perspective of a small SOC vendor.	8		
12.	a)		Illustrate the concepts behind the processor selection for SoC and discuss the Instruction set Architecture (ISA) in detail.	13	K2	CO2
			(OR)			
	b)		Summarize the important design steps involved in soft and firm core processor design with suitable example.	13	K2	CO2
13.	a)		Interpret how a bus interconnect architecture influence the performances of a system by considering any one of the SoC bus standard. Explain arbitration and bus protocol with respect to the system interconnects in SoC.	13	K4	CO3
			(OR)			
	b)		Interpret the role of Network-on-Chip as communication architecture in System-on-Chip (SoC) design. Examine the different topologies commonly used in NOC architecture.	13	K4	CO3
14.	a)		Analyze the Important driving factors of hardware / software co-design with suitable example.	13	K4	CO4
			(OR)			
	b)		Examine the data flow modeling to the system design. Discuss Synchronous Data Flow Graphs (SDF) and how it can be analyzed.	13	K4	CO4
15.	a)		Explain RTOS. Summarize the different functions of a RTOS used in Embedded system. With neat diagram, explain SPI protocol used for communication.	13	K2	CO5
			(OR)			
	b)		Draw and explain the architecture diagram of FPGA and briefly explain the functions of CLB, LUT and routing switches.	13	K2	CO5

PART – C

Q.No.			Questions	Marks	KL	CO
16. a)	i.		Explain the Design Issues in SoC.	6	K3	CO1
	ii.		If the following Modules are given to you, how will develop the Physical Design?	9		CO3
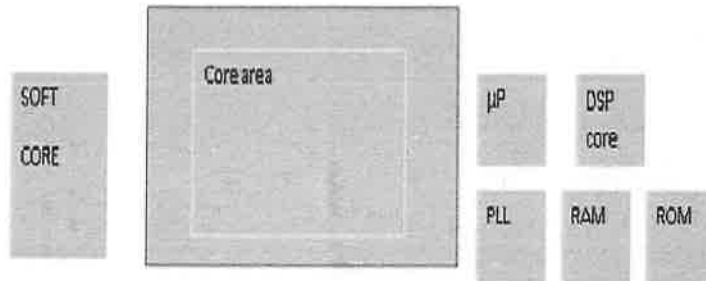
(OR)

b) Interpret the SOC configuration that uses a superscalar processor and describe the architecture of the processor (register sets, number of rename registers, control flow or dataflow, instruction format etc.)   15   K2   CO2

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Recall the role of diversity technique in wireless communication system.	2	K1	CO1
2.	List any two channel coding techniques.	2	K1	CO1
3.	State Shannon's channel capacity theorem.	2	K1	CO2
4.	Infer the impact of fading channel over communication receivers.	2	K2	CO2
5.	Show the constellation diagram of QPSK signal.	2	K1	CO3
6.	Rephrase the role of Space Time Trellis Code (STTC).	2	K2	CO3
7.	Recall the importance of Space time block codes.	2	K1	CO4
8.	Sketch a concatenated coding system.	2	K1	CO4
9.	Interpret frequency-selective channel in terms of bandwidth and delay.	2	K2	CO5
10.	What is the purpose of cyclic prefix in OFDM system?	2	K1	CO5

1

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	The average SNR of a branch in a selection combining is 20 dB. Compute the probability that the instantaneous Signal-to-Noise ratio (SNR) of the selection combiner drops below 10 dB when the number of antennas $M = 1$, and $M = 5$.	13	K2	CO1
		(OR)			
	b)	Derive an expression for probability of error for an AWGN channel.	13	K2	CO1
12.	a)	With a suitable example, determine the capacity of a non-coherent MIMO channels.	13	K2	CO2
		(OR)			
	b)	Relate the channel capacity and information rate for an AWGN channels and also plot a curve over Eb/No versus BER.	13	K2	CO2
13.	a)	With a suitable example, compare space-time block and trellis codes.	13	K2	CO3
		(OR)			
	b)	Design a 2x2 MIMO system and justify its principle using Alamouti scheme.	13	K2	CO3
14.	a)	With a suitable diagram, explain Turbo-coded modulation in MIMO channels.	13	K2	CO4
		(OR)			
	b)	Explain the concatenated coding system formation for an AWGN channel.	13	K2	CO4
15.	a)	Describe the principle of MIMO-OFDM system with a suitable diagram.	13	K2	CO5
		(OR)			
	b)	Explain the responsibilities of zero forcing algorithm in MIMO detectors with suitable expressions and diagram.	13	K2	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Evaluate the procedure followed in orthogonal space time block code technique with a suitable example.	15	K3	CO4
		(OR)			
	b)	Discuss channel detection process in MIMO system under frequency selective channels with a suitable diagram.	15	K2	CO2

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Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 7012

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Seventh / Fifth Semester
Electronics and Communication Engineering
U19ECE30 / U19ECV63 – NEURAL NETWORKS AND ITS APPLICATIONS
(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	What is Sigmoid function? Give mathematical relationship of its input & output.	2	K1	CO1
2.	Compare weights and biases in neural network.	2	K2	CO1
3.	Define delta rule.	2	K1	CO2
4.	Define Hopefield network.	2	K1	CO2
5.	What is winner-takes-all strategy of learning?	2	K1	CO3
6.	Define learning vector quantization.	2	K1	CO3
7.	What is intra cluster cohesion?	2	K1	CO4
8.	Differentiate between supervised and unsupervised learning.	2	K2	CO4
9.	Define Bayes' theorem.	2	K1	CO5
10.	What do you understand by histogram?	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11. a)	Define artificial neural network (ANN). Compare artificial neural network with biological neural network in detail & comment.	13	K2	CO1

(OR)

b)	Discuss perception algorithm in detail with one example of training.	13	K2	CO1

				Marks	KL	CO

12. a) Explain the working principle of back propagation algorithm. Also, discuss the importance of different parameters used in this algorithm.   13   K2   CO2

(OR)

    b) Discuss the difference between auto-associative and hetero-associative memories. Explain properly with models and an example of each.   13   K1   CO2

13. a) Explain the learning vector quantization (LVQ) in detail. How this model is used for clustering of data.   13   K2   CO3

(OR)

    b) Explain the algorithm of Kohonen self organizing map and apply the same of a sample data.   13   K2   CO3

14. a) Compare and discuss hierarchical clustering and partitional clustering with one example.   13   K2   CO4

(OR)

    b) Why efficient feature extraction is a very important aspect of a good pattern recognition algorithm. Explain it with the help of one example.   13   K2   CO4

15. a) Discuss the time complexity of K-nearest neighbor algorithm. Logically show its dependence on data size, number of clusters and dimension of each data point.   13   K3   CO5

(OR)

    b) How supervised learning can be used for the classification of human voices into two classes: male and female voices. Explain in detail.   13   K3   CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.	Questions	Marks	KL	CO
16. a)	In supervised learning, why the dataset is divided into test, training, and validation data. Mention functionality of each type (test, train, validation). Recall the significance of k-fold cross-validation in data classification.	15	K2	CO4

(OR)

b)	Differentiate adaline and madeline models of neural network. Discuss the merits, demerits and any one application of both models.	15	K2	CO1

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Question Paper Code: 7013

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Seventh Semester
Electronics and Communication Engineering
U19ECE37 – MOBILE ADHOC NETWORKS
(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	What are the features of MANET?	2	K1	CO1
2.	What is hidden terminal problem?	2	K1	CO1
3.	What are the mechanisms used in MAC layer?	2	K2	CO2
4.	What is meant by directional antenna? Write its characteristics.	2	K1	CO2
5.	Mention the role of sequence number in the AODV routing protocol.	2	K2	CO3
6.	What are the responsibilities of routing protocol?	2	K1	CO3
7.	List the network security requirements.	2	K1	CO4
8.	What is replay attack?	2	K1	CO4
9.	What are the benefits of optical wireless networks?	2	K2	CO5
10.	What is the concept of UWB?	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11. a)	Explain in detail about Adhoc wireless internet, with diagrams and examples.	13	K2	CO1

(OR)

b)	i.	Differentiate cellular Network and AdHoc Network.	8	K2	CO1
	ii.	List the major applications of adhoc wireless networks.	5	K2	

12. a) List the important goals of designing a MAC protocol for adhoc wireless networks.   13   K2

CO2

(OR)

b) How MAC layer optimization is achieved with respect to its higher layers and physical layer? Also write its impact on bit rate and power control.   13   K3   CO2

13. a) Discuss about the tree based and meta based multicast routing protocols.   13   K3   CO3

(OR)

b) Characterize and classify the routing protocols based on the routing information update mechanism.   13   K3   CO3

14. a) Explain various network and application layer security attacks in detail.   13   K2   CO4

(OR)

b) Write short note on: K2   CO4
     i. Energy aware routing algorithm.   7
     ii. QoS aware routing.   6

15. a) Describe the salient features of IEEE Standards 802.11.   13   K2   CO5

(OR)

b) i. Discuss the issues in battery management in wireless networks.   6   K2   CO5
     ii. Explain the concept of optical wireless networks.   7

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Explain integration of adhoc with mobile IP networks in detail.	15	K3	CO1
		(OR)			
	b)	List out and explain how some of the internet properties of the wireless Adhoc networks introduce difficulties while implementing security in routing protocols.	15	K3	CO3

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels	K1 – Remembering	K3 – Applying	K5 - Evaluating
(KL)	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Infer values from ethics and culture.	2	K2	CO1
2.	List any two aspects of honesty.	2	K1	CO1
3.	Recall the Senses of Engineering Ethics.	2	K1	CO2
4.	Interpret the uses of Ethical Theories.	2	K2	CO2
5.	Rephrase the term Engineering Experimentation.	2	K2	CO3
6.	Show the roles of codes.	2	K2	CO3
7.	Summarize the term professional rights.	2	K2	CO4
8.	Label the main clauses of IPR.	2	K1	CO4
9.	Outline the concept of environmental ethics.	2	K2	CO5
10.	Recall the idea of corporate social responsibility.	2	K1	CO5

PART – B

Q.No.		Questions	Marks	KL	CO
11.	a)	Explain the important human values in detail.	13	K2	CO1
		(OR)			
	b)	Summarize caring, sharing and living peacefully.	13	K2	CO1
12.	a)	Outline the various types of Ethical inquiries available.	13	K2	CO2
		(OR)			
	b)	Infer in detail the various theories on right action.	13	K2	CO2
13.	a)	Interpret engineer how can become a responsible experimenter in the light of code of ethics for engineers.	13	K2	CO3
		(OR)			
	b)	Rephrase in detail the balanced outlook on law.	13	K2	CO3
14.	a)	Summarize in detail about the employee rights.	13	K2	CO4
		(OR)			
	b)	Explain the procedures to be followed for Whistle Blowing.	13	K2	CO4
15.	a)	Classify the pros and cons of multinational companies from ethical point of view.	13	K2	CO5
		(OR)			
	b)	Outline the idea of 'morally creative leaders' and their participation in professional societies.	13	K2	CO5

PART – C

Q.No.		Questions	Marks	KL	CO
16.	a)	Engineers would learn not only from their earlier design and operating results, but also from those of designs of other engineers. Explain with suitable examples.	15	K2	CO3
		(OR)			
	b)	Summarize in detail about the white-collar crimes happening in the organizations.	15	K2	CO4

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Question Paper Code: 7016

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023

Seventh Semester

Electronics and Communication Engineering

U19ECE36 - FIBER OPTIC SENSORS

(Regulation 2019)

Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Discuss Snell's law.	2	K1	CO1
2.	Differentiate Spontaneous and Stimulated Emission.	2	K2	CO1
3.	Discuss photoeleastic effect.	2	K1	CO2
4.	Write short notes on Fiber optic Gyros.	2	K2	CO2
5.	Discuss about Sensor Multiplexing.	2	K2	CO3
6.	Outline the Faraday Effect in Optical Fibers.	2	K1	CO3
7.	Write about two beam interference method.	2	K1	CO4
8.	Identify the role of absorption in gas sensors.	2	K2	CO4
9.	Discuss Evanescent wave phenomena.	2	K2	CO5
10.	List the issues on the use of fiber optic sensors in industrial applications.	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11. a)	i.		Explain different types of optical fibers with suitable diagrams.	6	K2	CO1
	ii.		Model the Noise spectral density function in optical detectors.	7	K3	CO1

(OR)

b)	i.	Discuss the properties of optical fibers as sensors.	6	K2	CO1
	ii.	Explain the integrated phase modulation in waveguides.	7	K2	CO1
12. a)		Explain the sensors based on grating period modulation with the chirped grating displacement sensing with wavelength encoding.	13	K2	CO2

(OR)

b)	i.	Elaborate the various optical encoding techniques.	6	K2	CO2
	ii.	Explain Sagnac Interferometer-Based Acoustic Sensor.	7	K2	CO2
13. a)	i.	Explain Optical Time-Domain Reflectometry.	6	K2	CO3
	ii.	Outline the modified fiber optic Mach-Zehnder interferometer for the measurement of magnetic field with suitable diagram.	7	K2	CO3

(OR)

b)	i.	Explain a fiber optic Lorentz force sensor.	6	K2	CO3
	ii.	Discuss about Interferometric Sensor Multiplexing Topologies.	7	K2	CO3
14. a)		Describe with suitable diagrams the method for the measurement of			
	i.	Hydrogen	6	K2	CO4
	ii.	Ammonia	7	K2	CO4

(OR)

	i.	Discuss about fiber optic biosensor.	6	K2	CO4
b)	ii.	Explain Surface plasmonic resonance-based sensor.	7	K2	CO4
15. a)		Explain with suitable diagrams the method for the measurement of			
	i.	Temperature	6	K2	CO5
	ii.	Pressure	7	K2	CO5

(OR)

b)	Discuss the applications of fiber optic smart structures and skins.	13	K3	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16. a)		Examine the power dissipated in a load due to an optical signal incident on a photo detector.	15	K3	CO2

(OR)

b)	i.	Summarize the fiber optic chemical and biosensors with its application.	8	K3	CO5
	ii.	Analyze how scattering & fluorescence used in chemical analysis.	7	K3	CO5