CSE (4)

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: 5005

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Seventh Semester
Computer Science and Engineering
U19CSE20 – TOTAL QUALITY MANAGEMENT
(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 quality.	2	K1	CO1
2.	Recall the dimensions of product and service.	2	K1	CO1
3.	Infer the term Quality Councils.	2	K2	CO2
4.	Interpret to concept of Performance appraisal.	2	K2	CO2
5.	Summarize the Bench marking.	2	K2	CO3
6.	Define the term 'Six sigma'.	2	K1	CO3
7.	What is meant by Control Charts?	2	K1	CO4
8.	Outline the Taguchi quality loss function.	2	K2	CO4
9.	What is Quality Auditing?	2	K1	CO5
10.	Infer the need for ISO 9000 - ISO 9001-2008 certificate.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Summarize the obstacles associated with TQM implementation with suitable examples.	13	K2	CO1
		(OR)			
	b)	Outline and explain in detail the various factors which constitute the framework of TQM.	13	K2	CO1

12.	a)	Interpret the use Kaizen for continuous improvement in the workplace and give suitable examples.	13	K2	CO2
		(OR)			
	b)	Show the key criteria when selecting a supplier and explain the steps of supplier selection process.	13	K2	CO2
13.	a)	Identify the major reason for benchmarking a process or project and its significance in business operation.	13	K3	CO3
		(OR)			
	b)	Organize the different types and explain the steps involved in FMEA.	13	K3	CO3
14.	a)	Summarize the needs for TPM improvement and show the stages involved in TPM improvement.	13	K2	CO4
		(OR)			
	b)	Explain Quality Function Development (QFD) and its significance.	13	K2	CO4
15.	a)	Organize the concepts and benefits of ISO 14000 with suitable examples.	13	K3	CO5
		(OR)			
	b)	Identify the documentation requirement in TQM. Interview the developments and technology interventions in it.	13	K3	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.			Questions	Marks	KL	CO
16.	a)	i.	Outline the requirements of TQM implementation in manufacturing sector and explain in detail.	8	K2	CO5
		ii.	Illustrate with suitable example.	7		
			(OR)			
	b)		Tata Steel's Journey	15	K2	CO3

Tata Iron and Steel Company (TISCO) was established in 1907 by renowned Indian industrialist,
J.N. Tata, at Jamshedpur in Bihar, India. It was established as Asia's first integrated private steel company. It was renamed Tata Steel in 2005. In 2007, Tata Steel purchased Corus, a steel manufacturer based in the United Kingdom.
Tata Steel offered a wide range of products – hot-rolled, cold-rolled, galvanized, branded solution offerings, and more. The Indian product portfolio was divided into four segments – Automotive and Special Products; Industrial Products, Projects and Exports; Branded Products and Retail; and Services and Solutions.

As of 2023, Tata Steel was one of the world's largest steel producers, with an annual crude steel capacity of 34 million tonnes per annum (MnTPA). It was also one of the world's most geographically diversified steel producers. Its steel operations were fully integrated – from mining to the manufacturing and marketing of finished products. Together with its subsidiaries, associates, and joint ventures, its operations were spread across five continents and it had an employee base of over 65,000.

ABOUT THE DEMING PRIZE

The Deming Prize, established in Japan in 1951, was one of the most recognized quality awards in the world given by The Union of Japanese Scientists and Engineers (JUSE). It was the most difficult to qualify for as it involved a rigorous selection process and included statistical quality control tools used from the lowest work level. It aimed to promote quality consciousness and encouraged the development of quality control in companies. The prize had a significant influence on quality control in Japan, inspiring companies to implement effective quality management techniques.

It was in late 1980 that the TQM philosophy was adopted at Tata Steels as a part of its competitive strategy. It was started with a massive effort in education and training in TQM. TQM was introduced formally in Tata Steel's ecosystem in 1989 after Dr. J. J. Irani's (the then Joint MD) visit to JUSE, Japan, where he experienced the positive impact of TQM in an organization. TQM as a concept was still not very well-established in India at that time and Irani brought that to Tata Steel.

In the *Modernization of Mind* (1992-96) phase, the company's top management identified the fact that to make continuous improvement it was necessary to modernize the employee's mind. The key challenge was to change the mindset of employees and make them look at improvement activities as an essential part of the corporate culture and for achieving targets and goals. Tata Steel created guidelines and reference manuals to have uniformity and alignment across the organization. It explicitly stated and documented improvement targets, apart from laying out the way to achieve them in a systematic manner using standardized approaches. It also sought to create alignments to profits and goals.

During that phase, the company specifically looked at strategic aspects or policy management. *Policy management* was defined as activities that were conducted with the cooperation of the entire company, to establish and efficiently achieve mid-and-long-term business plans and short- term business policies based on fundamental management policies. The policy management was basically *Strategic Planning* which followed the principles of PDCA (Plan, Do, Check, Act). It was done through *MD Diagnosis* sessions – comprising Sr. Executives and the MD, who met twice a year to check for robustness of planning. There were also four *Student Analysis* sessions to identify the weak areas in policy deployment.

The phase involved the adoption of Value Engineering (VE), Quality Improvement Projects (QIP), Benchmarking, Total Operative Performance (TOP), Total Productive Maintenance, and Annual Quality Improvement Plan (AQUIP).

In the *Cost Competitiveness* (1997-2004) phase, the company strove to be cost competitive when compared to its competitors. In this phase, basic TQM tools, Knowledge Management, and Six Sigma were introduced in the company. There was a reexamination of the company's vision and mission, apart from enhancement in EVA. Tata Steel won the JRD Tata Quality Value Award (JRD-QV) in 2000.

In the *Global Outlook Growth* (2005-2008) phase, TQM's attempt to attain DAP was started in 2005. On the journey toward DAP, Tata Steel's customer focus and approach to the market underwent a significant change. Tata Steel started changing the levers of improvement from an internally focused efficiency driven culture to a culture of value creation with customers and suppliers.

To institutionalize TQM, Tata Steel adopted the Integrated TQM Framework. Then the frame work for integrated TQM (complete value chain), ASPIRE, and TOC (Theory of Constraint) were implemented. The framework was strengthened using cross functional management as one of the key vehicles to ensure robust systems like quality assurance, safety, etc. The Theory of Constraint (ToC) methodology was introduced under the TQM framework, specifically to ensure customer delight through the logistics experience.

Daily Management (DM) was a fundamental part of TQM at Tata Steel and was introduced in 2006. It was done with the objective of achieving stability through identification and removal of abnormalities, thereby achieving incremental improvement. It was defined as all the activities that had to be carried out to efficiently achieve the business objectives of each department.

TATA STEEL'S TQM JOURNEY AFTER DAP

Tata Steel was awarded the DAP in 2008 and the company continued with its quality journey. In the *Seeking World Class* (2009 & Beyond) phase, it put in efforts to be better than its competitors from across the world. In 2011, the company embarked on a quest to attain the Deming Grand Prize (DGP). The company codified the *Tata Steel Way* of creating and sustaining change. It introduced CQA and Benchmarking in innovation practices and expert creation.

From 2008, performance improvement was done through the *'Performance Improvement' (PI) Committee* to drive performance improvement on a continual and accelerated basis. PI Groups were formed for iron making; steel making; flat rolling; long rolling; maintenance; distribution service centers; and building systems. HM Nerurkar (Nerukar), its Chief Operating Officer (COO), ensured that things were moving in the right direction through the monthly performance improvement review of the company's TQM efforts.

WINNING THE DGP AND THE WAY AHEAD

In 2012, JUSE granted Tata Steel the DGP, considered as the highest honor in TQM. This was the first instance of a non-Japanese steel making facility winning the prestigious award. Nerurkar said, "Looking into the future when Tata Steel sets out to realize more challenging targets in an increasingly uncertain environment with multiple and new stakeholders, I am confident that the TQM journey will help us in sustaining the positive energy in the entire organization enabling the achievement of customer focused business goals."

Over the years, Tata Steel gained recognition from various agencies that included accreditation on ISO standards for quality systems; business excellence awards based on the Malcolm Baldridge model – the JRDQV award; EFQM (European Foundation for Quality Management) model- CII Exim Bank award; and JIPM (Japanese Institute of Plant Maintenance) – TPM Excellence award.

The long-term impact of TQM on Tata Steel was that the *Continuous Improvement Process* became an integral part of the organization. It optimized the usage of consumables such as lime, zinc, etc. Critical chain project management enabled a reduction in turnaround and shutdown time.

Tata Steel claimed that it saved around Rs. 20-30 million each year by adopting TQM. From FY 2005 onward, the company claimed that its revenue year-on-year grew over 10% and that its EBITDA also grew at the same rate, which was higher than the rate of its competitors. By the early 2010s, it was able to attain significant quality improvements with a reduction in defects at the customer's end by almost 50%. It was also able to improve its Due Date Performance (DDP) in shipping to customers.

Tata Steel believed that ensuring quality was an ongoing process and required going well beyond traditional approaches, especially in the modern era. Embracing the principles of Industry 4.0required innovation with agility and a cultural change that Tata Steel planned to bring across the organization. The company constantly strove to make things less complex, promoting collaboration, experimenting, and developing new skills on design thinking, modeling, and analytics.

Summarize the important production and operation actions along with strategies of TATA steels for sustainable business growth.

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Question Paper Code: 9016

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fifth Semester
Computer Science and Engineering
U19BTOE3 – BIO BUSINESS
(Common to ECE & 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 out the demands for biotechnological products in India.	2	K2	CO1
2.	Highlight the challenges in transforming R&D units to business units.	2	K2	CO1
3.	Illustrate the various stages of mushroom cultivation.	2	K2	CO2
4.	Mention the application of spirulina cultivation.	2	K2	CO2
5.	Give few examples of value added products from agro substances.	2	K1	CO3
6.	What are the advantages of bio-plastics?	2	K2	CO3
7.	List few schemes for women entrepreneurs for starting business.	2	K1	CO4
8.	Discuss the challenges in availing bank loans for entrepreneurs.	2	K2	CO4
9.	Mention the need of IPR for new bio-products.	2	K2	CO5
10.	Brief the fear of public for bio-research and development.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	Explain the steps involved in product design.	7	K2	CO1
		ii.	Brief the importance of budget planning.	6	K2	

(OR)

	b)	Discuss the importance of market analysis in starting a bio-business.		13	K2	CO1
12.	a)	i.	Describe the limitations and advantages of bio-fertilizer production.	8	K2	CO2
		ii.	Explore the market potential of Vermicomposting.	5	K2	
			(OR)			
	b)	Describe the methodology of organic farming. Compare it with traditional farming methods.		13	K2	CO2
13.	a)	i.	Explain the potential of fermentation in bio-product development.	8	K2	CO3
		ii.	Illustrate steps involved in developing biosensors.	5	K3	
			(OR)			
	b)	i.	Explain how IOT can be utilized in Agriculture.	10	K3	CO3
		ii.	Discuss the challenges in production of biofuels.	3	K3	
14.	a)	Describe the importance of licensing and branding for new bio-products.		13	K2	CO4
			(OR)			
	b)	i.	Explain the policy and regulatory concerns in starting new business.	8	K2	CO4
		ii.	Discuss how NGOs support the bio-business.	5	K2	
15.	a)	i.	Describe the different types of IPR and its importance.	8	K2	CO5
		ii.	Summarize few regulatory bodies concerning bio-business.	5	K2	
			(OR)			
	b)	i.	Explain the need for educating the public regarding bioprocessing and its challenges.	8	K2	CO5
		ii.	Discuss the risks associated for research and innovation of bioproducts.	5	K3	

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Perform a SWOT analysis for starting a small plant tissue culture unit for mass production of medicinal plant saplings.	15	K5	CO1
		(OR)			
	b)	Discuss with an example about ethical, legal and social implications of genetically modified crops	15	K5	CO5

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Question Paper Code: 8014

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fifth Semester
Computer Science and Engineering
U19EEOE2 – ELECTRICAL SAFETY
(Common to ECE, BME & BT)
(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 a secondary electric hazard? Give an example.	2	K1	CO1
2.	List any two protection strategy for working with energized conductors.	2	K1	CO1
3.	List out at least two differences between proximity tester and contact tester.	2	K2	CO2
4.	Where are Hot Sticks used? What is it made of?	2	K2	CO2
5.	List out at least three different ways that electrical switchgear such as circuit breakers and switches can be operated safely.	2	K1	CO3
6.	Under what conditions, locks may be used without tags during equipment maintenance?	2	K2	CO3
7.	Write the IEC standard for grounding in electrical safety.	2	K1	CO4
8.	Why should the grounding connection point have always clean surfaces?	2	K1	CO4
9.	What are the maintenance techniques employed in a reliability centered maintenance?	2	K1	CO5
10.	List out the three questions that are central in understanding the fatalities or injuries seen as health effects following an electrical failure.	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Explain the following factors that influence the severity of electrical shock. i. Physical condition and responses of the victim ii. Current duration iii. Current magnitude iv. Frequency v. Voltage Magnitude vi. Current magnitude	13	K2	CO1
		(OR)			
	b)	i. Write the objectives and scope of Indian Electricity Act and Indian Electricity Rule.	7	K1	CO1
		ii. State the responsibilities of supplier of electricity and user of electricity as per Indian Electricity Act.	6		
12.	a)	Explain about the various inspection techniques and periodic testing of rubber insulation goods such as rubber gloves, sleeves, line hose, blankets, covers and mats.	13	K2	CO2
		(OR)			
	b)	List out and explain the various standards and usage of protective wearing followed for the head, eye, and hand protection.	13	K2	CO2
13.	a)	Explain the hot-work decision tree with the hot-work flow chart for the safety requirements to de-energize a circuit before employees work on or near it.	13	K2	CO3
		(OR)			
	b)	Explain the procedures followed on safe work practices for operating the following equipment. i. Moulded-case breakers and panel boards. ii. Enclosed switches and disconnects.	13	K2	CO3
14.	a)	What is the purpose of system grounding? Interpret the various methods of system grounding methods with their advantages and disadvantages.	13	K1	CO4
		(OR)			
	b)	Explain the eight simple steps that should be at the heart of an electrical preventive maintenance program.	13	K2	CO4
15.	a)	Explain how medical triage and evacuation, stabilization and initial evaluation treatment is carried out for an injured victim due to electrical trauma.	13	K3	CO5
		(OR)			

	b)	Interpret the electrical safety aspects for medical equipment like Over current safety, Isolation, EMI and Harmonics.	13	K2	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16. a)	i.	Summarize the causes and effects of electric shocks, electric arc flash and electric blast on personnel and infer the usage of PPEs.	7	K2	CO1
	ii.	Outline the concept of lock out and tag out to protect the working personnel.	8	K2	CO3
		(OR)			
b)	i.	Infer the procedures in handling unresponsive victims due to electrical accidents.	8	K2	CO5
	ii.	Explain the procedures to be followed for performing an elevated, pole-top rescue with necessary sketches.	7	K2	

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Question Paper Code: 6014

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fifth Semester
Computer Science and Engineering
U19ITOE7 – BUSINESS INTELLIGENCE AND ITS APPLICATIONS
(Common to ECE & CST)
(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 down the purpose of Using IT in BI.	2	K2	CO1
2.	How to use BI for Decision-Making and Problem Solving?	2	K3	CO1
3.	Define Data Warehouse.	2	K1	CO2
4.	Outline Business Intelligence. Write it's other names.	2	K1	CO2
5.	Write down the differences between OLTP and OLAP.	2	K2	CO3
6.	Mention the benefits and limitations of Data Modeling.	2	K1	CO3
7.	Summarize the features of good reporting.	2	K1	CO4
8.	Why does the balanced scorecard considers the non-financial measures as well?	2	K2	CO4
9.	What is Cloud BI?	2	K1	CO5
10.	Recall the Future of Business Intelligence.	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Explain the various strategic techniques used in implementing BI.	13	K1	CO1

(OR)

	b)	Write notes on structured, unstructured and semi-structured data with example.	13	K2	CO1
12.	a)	Write in detail about data mart and virtual data warehouse with an example.	13	K1	CO2
		(OR)			
	b)	Illustrate in detail the extract/transform/load (ETL) design of an automated warehouse.	13	K1	CO2
13.	a)	What is OLAP? Write its functionalities, server types, features, and applications. Draw the diagram if necessary.	13	K2	CO3
		(OR)			
	b)	Write a brief note on Fact Table? Design a dimensional data model and explain its life cycle.	13	K1	CO3
14.	a)	Explain the steps involved in Dashboard design. Write in detail about the Closed Loop BPM Cycle.	13	K2	CO4
		(OR)			
	b)	What are Balanced Scorecards? Explain the Four Perspectives of BSC in detail.	13	K2	CO4
15.	a)	Discuss the role of BI in the healthcare industry.	13	K3	CO5
		(OR)			
	b)	Explain the requisite for implementing business intelligence software on the web.	13	K1	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Describe the legal and ethical issues involved in BI on the web.	15	K2	CO5
		(OR)			
	b)	Explain how BI tools can be used by Banks for historical analysis, performance budgeting, business performance analytics, employee performance measurement, executive dashboards, marketing and sales automation, product innovation, customer profitability, regulatory compliance and risk management.	15	K3	CO5

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Question Paper Code: 5006

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Seventh Semester
Computer Science and Engineering
U19CS730 – 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.	What Is Inductive Bias in Machine Learning?	2	K1	CO1
2.	List any two common issues in Machine Learning problems?	2	K1	CO1
3.	Why do we use non linear regression?	2	K1	CO2
4.	Define Gini index and entropy measure in decision tree learning.	2	K1	CO2
5.	What is the difference between k-medoids and K-Means?	2	K1	CO3
6.	What is KNN in machine learning with example?	2	K1	CO3
7.	What are the two types of Reinforcement Learning algorithms?	2	K1	CO4
8.	What is Markov decision process in machine learning?	2	K1	CO4
9.	What is first-order inductive learner (FOIL) in machine learning?	2	K1	CO5
10.	What are the five phases of a genetic algorithm?	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Describe find-S algorithm in detail to find a Maximally Specific Hypothesis.	13	K2	CO1

(OR)

	b)	Describe Candidate Elimination Algorithm (CEA). Give two advantages of CEA over find-S algorithm.	13	K2	CO1
12.	a)	Explain working principle of Random Forest Algorithm. List any two Assumptions for Random Forest algorithm.	13	K2	CO2
		(OR)			
	b)	What is maximum likelihood in regression analysis? Discuss the assumptions of maximum likelihood.	13	K1	CO2
13.	a)	What is principle component analysis? Explain with an example. Also discuss the various types of principle component analysis.	13	K2	CO3
		(OR)			
	b)	Discuss in detail the components of perceptron learning algorithm. Give any two real-life applications of perceptron.	13	K2	CO3
14.	a)	What is SARSA in reinforcement learning? Why is SARSA on policy and Q-learning off policy?	13	K3	CO4
		(OR)			
	b)	Write an outline on locally weighted regression with example. Highlight the difference between weighted and unweighted regression.	13	K2	CO4
15.	a)	Enunciate on "Induction as inverted deduction in machine learning".	13	K2	CO5
		(OR)			
	b)	Describe the evolution and learning using genetic algorithm with an example.	13	K2	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Using k-means algorithm cluster the following points into three clusters where the points are A1 (2, 10), A2 (2, 5), A3 (8, 4), B1 (5, 8), B2 (7, 5), B3 (6, 4), C1 (1, 2), C2 (4, 9). Use A1, B1, C1 as initial cluster heads.	15	K3	CO3
		(OR)			
	b)	Discuss sequential covering algorithms with an example.	15	K3	CO5

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Question Paper Code: 7009

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Seventh Semester
Computer Science and Engineering
U19ECOE7 – BASICS OF COMMUNICATION SYSTEMS
(Common to Computer Science and Technology)
(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.	A 400-watt carrier is modulated to a depth of 75 percent. Calculate the total power in the modulated wave.	2	K2	CO1
2.	Find out the transmission bandwidth using Carson's rule if frequency deviation is 75 kHz and the modulation frequency is 15 KHz.	2	K2	CO1
3.	Determine the baud and minimum bandwidth necessary to pass a 10 kbps binary signal using amplitude shift keying.	2	K2	CO2
4.	What is DPSK?	2	K1	CO2
5.	Define the following terms: data and information.	2	K2	CO3
6.	Why data communications standards are needed?	2	K3	CO3
7.	Determine the Nyquist sample rate for a maximum analog input frequency of 4 kHz.	2	K2	CO4
8.	Define companding.	2	K1	CO4
9.	Why cell in mobile communication has a honeycomb shape?	2	K2	CO5
10.	Define apogee and perigee.	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	Define amplitude modulation and modulation index. Use a sketch of a sinusoidally modulated AM waveform to help explain the definition.	5	K2	CO1
		ii.	A certain transmitter radiates 9 kW with the carrier unmodulated and 10.125 kW when the carrier is sinusoidally modulated. Calculate the modulation index, percent of modulation. If another sine wave, corresponding to 40 percent modulation, is transmitted simultaneously, determine the total radiated power.	8	K2	
			(OR)			
	b)	i.	Compare amplitude and angle modulation in any six aspects.	5	K2	CO1
		ii.	When the modulating frequency in an FM system is 400 Hz and the modulating voltage is 2.4 V, the modulation index is 60. Calculate the maximum deviation. What is the modulating index when the modulating frequency is reduced to 250 Hz and the modulating voltage is simultaneously raised to 3.2 V?	8	K2	
12.	a)	i.	Explain the process and blocks in the FSK Transmitter and Receiver system.	8	K2	CO2
		ii.	Explain the differences between absolute PSK and differential PSK.	5		
			(OR)			
	b)	i.	Explain the process and blocks in the QPSK Transmitter and Receiver system.	8	K2	CO2
		ii.	Determine (a) the peak frequency deviation, (b) minimum bandwidth, and (c) baud for a binary FSK signal with a mark frequency of 49 kHz, a space frequency of 51 kHz, and an input bit rate of 2 kbps.	5	K2	
13.	a)		Explain error detection and correction techniques and their types with suitable examples.	13	K3	CO3
			(OR)			
	b)		Explain serial and parallel data communication hardware interfaces and compare them.	13	K3	CO3
14.	a)		Explain Pulse code Modulation with block diagram, figures and equations.	13	K2	CO4
			(OR)			
	b)		Compare various Pulse Communication Systems.	13	K2	CO4

15.	a)	i.	Elaborate GSM system architecture.	10	K2	CO5
		ii.	Determine the number of channels per cluster and the total channel capacity for a cellular telephone area comprised of 10 clusters with seven cells in each cluster and 10 channels in each cell.	3	K2	
			(OR)			
	b)	i.	Describe the differences between the CDMA radiated power procedures and AMPS.	7	K2	CO5
		ii.	Determine a. The channel capacity for a cellular telephone area comprised of seven macrocells with 10 channels per cell. b. Channel capacity if each macrocell is split into four minicells. c. Channel capacity if each minicell is further split into four microcells.	6	K2	

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	For the following modulation schemes, construct a table showing the number of bits encoded, number of output conditions, minimum bandwidth, and baud for an information data rate of 12 kbps: QPSK, 8-PSK, 8-QAM, 16-PSK, and 16-QAM. When do you choose a particular modulation scheme? Give real time scenarios and reasons.	15	K2	CO2
		(OR)			
	b)	Explain the cellular concept and frequency reuse with necessary diagrams and equations and analyze the following scenario. A cellular telephone company has acquired 150 full-duplex channels for a given service area. The company decided to divide the service area into 15 clusters and use a seven-cell reuse pattern and use the same number of channels in each cell. Determine the total number of channels the company has available for its subscribers at any one time.	15	K2	CO5

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: 9006

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Seventh Semester
Computer Science and Engineering
U19BTOE7 – FOOD PROCESSING AND PRESERVATION TECHNOLOGY
(Common to EEE, ECE & 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.	Write suitable examples for macro and micro nutrients in food.	2	K1	CO1
2.	Name any two enzymes and its application in food industries.	2	K1	CO1
3.	What is pasteurization? How is it useful in dairy industries?	2	K2	CO2
4.	List the techniques used for grading of eggs.	2	K2	CO2
5.	What are the textural changes in meat product after thawing?	2	K2	CO3
6.	State the advantage of blanching vegetables.	2	K1	CO3
7.	"Fermentation aids in food preservation" – justify the statement	2	K4	CO4
8.	What is smoking? Give two examples for smoked food products.	2	K1	CO4
9.	Name the various types of packaging material available for food packing.	2	K1	CO5
10.	Give the methods for recycling of materials of food packaging.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Explain in detail about the intentional additives added to food with suitable examples.	13	K2	CO1

(OR)

	b)	Narrate the contribution of interaction among food bio molecules in its organoleptic and textural properties.	13	K2	CO1
12.	a)	Explain the processing of oil seeds in industry with a suitable example.	13	K2	CO2
		(OR)			
	b)	Outline the processing of robust coffee in industry with a neat flow sheet.	13	K2	CO2
13.	a)	Give a detailed account on Low temperature food preservation methods.	13	K1	CO3
		(OR)			
	b)	Elaborate on the thermal destruction of microorganism.	13	K2	CO3
14.	a)	Exemplify the super critical technology for food preservation.	13	K2	CO4
		(OR)			
	b)	Apply the process of hurdle technology in pickle and point out the CCPs in the process.	13	K3	CO4
15.	a)	Classify the types of packaging designs with appropriate examples.	13	K2	CO5
		(OR)			
	b)	Demonstrate the various layers of retort pouch packages used in RTE foods.	13	K2	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	A start up meat processing industry approaches you for the meat packaging of their product. Suggest how you would design the food packaging? What material will be your choice and how cost effective will your packing for the industry? Explain in detail.	15	K6	CO4
		(OR)			
	b)	You are asked to design the processing of cloves for a spices industry. Write in detail with process flow sheet of the processing of the cloves.	15	K6	CO2

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[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 12006

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Seventh Semester
Computer Science and Engineering
U19BMOE9 – ICU AND OPERATION THEATRE EQUIPMENTS
(Common to EEE, ECE, IT & BT)
(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 principle of suction apparatus.	2	K2	CO1
2.	Mention the significance of closed loop control in fusion system.	2	K4	CO1
3.	Compare hemodialysis and peritoneal dialysis.	2	K2	CO2
4.	Write the composition of dialysate used in dialysis machine.	2	K1	CO2
5.	Mention the conditions to be satisfied by an ideal oxygenator.	2	K2	CO3
6.	Write the principle of a peristaltic pump.	2	K1	CO3
7.	Indicate the different types of current waveforms used in electro surgery unit.	2	K1	CO4
8.	Define the term: Humidification.	2	K1	CO4
9.	Define: Leakage current.	2	K1	CO5
10.	Differentiate between micro shock and macro shock.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Explain the different types of sterilizers with necessary diagrams.	13	K2	CO1
		(OR)			
	b)	What is an infusion pump? Explain its components in detail. Also explain the ways in which it is operated.	13	K2	CO1
12.	a)	Discuss in detail about the different types of dialyzers and membranes.	13	K2	CO2
		(OR)			
	b)	Describe the dialyzer machine controls and measurements.	13	K2	CO2
13.	a)	State the purpose of a heart lung machine. Explain its principle of working with necessary illustration.	13	K3	CO3
		(OR)			
	b)	Explain in detail the working of bubble and disc type oxygenator and indicate their merits and demerits. Which is highly preferred? Why?	13	K3	CO3
14.	a)	Write about the principle of operation of surgical diathermy. What are the hazards associated with this system?	13	K2	CO4
		(OR)			
	b)	State the purpose of Boyle's apparatus. Explain its principle with necessary diagram.	13	K2	CO4
15.	a)	Explain the process and principle behind the inspection of grounding and the importance of patient isolation.	13	K2	CO5
		(OR)			
	b)	Explain the role of couplers and pulse transformers in patient safety.	13	K2	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Identify the machine used for treating person with kidney failure. Draw the general block diagram of the machine and describe its principle in detail.	15	K3	CO4
		(OR)			
	b)	Why is anesthesia needed during surgery? Explain the anesthesia equipment and its working principle in detail.	15	K3	CO3

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

Question Paper Code: 13004

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Seventh Semester
Computer Science and Engineering
U19CTOE3 – FUNDAMENTALS OF DATA SCIENCE
(Common to ECE & IT)
(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 3 steps involved in formulating a Hypothesis.	2	K2	CO1
2.	With respect to data security issues, what does a deceptive phishing attack mean?	2	K2	CO1
3.	Outline the purpose of data cleansing. How missing and nullified data attributes are handled and modified during preprocessing stage?	2	K3	CO2
4.	List down the salient benefits of Data Discretization process.	2	K3	CO2
5.	Define the term Pearson's correlation coefficient specific to Bivariate analysis.	2	K2	CO3
6.	Discern the difference between Univariate and Bivariate analysis models. Give examples.	2	K2	CO3
7.	What is the purpose of centroid-based clustering in Data Science?	2	K3	CO4
8.	State the purpose of adding additional quantitative and/or categorical explanatory variables to any developed linear regression model. Justify with an example.	2	K3	CO4
9.	How data visualization can be done for n-dimensional data?	2	K2	CO5
10.	List down the different types of graphs that are used to display scientific data.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Assume that Advertisements shown per day in a daily TV news channel is given as a csv file. Each one represents one (simulated) days' worth of ads shown and clicks recorded on that TV channel home page. Each row represents a single user. There are five columns: age, gender (0 = female, 1 = male), number impressions, number clicks, and logged-in. Perform a few exploratory data analysis by writing code snippets in R / Python / any preferred P/L.			
		i. Read the prescribed csv file, load the data and print the user click details.	6	K3	CO1
		ii. Plot the distributions of number impressions and click through-rate (CTR=# clicks/# impressions) for the age group [20, 30].	7	K3	CO1
		(OR)			
	b)	i. Mention various roles and stages associated with a data science project.	6	K2	CO1
		ii. State the purpose of Data Analytics specific to stock market sector.	7	K2	CO1
12.	a)	What is data cleansing? Explain in detail about the time-series analysis.	13	K3	CO2
		(OR)			
	b)	List down the five steps that are involved in dimensionality-reduction method that is often used to reduce the dimensionality of large data Sets. Explain each step in detail.	13	K3	CO2
13.	a)	i. Give the philosophy of Poisson and Normal Distributions in statistics. Under what circumstances we can opt Poisson distribution? Assume that the average number of homes sold by the JK Realtors company is 2 homes per day.	7	K3	CO3
		ii. What is the probability that exactly 3 homes will be sold tomorrow?	6	K3	CO3
		(OR)			
	b)	i. Explain ANOVA in detail.	8	K3	CO3
		ii. How does pivot table takes role in data analytics? Explain.	5	K3	CO3
14.	a)	Outline the working philosophy of *k*-means clustering algorithm. How to Choose the right number of Clusters in *k*-means Clustering. Devise an algorithm (in pseudo code) that performs the *k*-means clustering.	13	K3	CO4
		(OR)			

b)	i.	What is the philosophy of Logistic regression? What kind of model it is? What does logistic Regression predict?	6	K3	CO4
	ii.	Given the following dataset of employee, Using regression analysis, find the expected salary of an employee if the age is 45.	7	K3	CO4

Age	Salary
54	67000
42	43000
49	55000
57	71000
35	25000

15. a)		List down the various types of plot functions in Data Analytics domain. Explain briefly about each type with a suitable example.	13	K2	CO5
		(OR)			
b)		Explain about data visualization in the field of data science? Explain any four data visualization Techniques.	13	K2	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16. a)	i.	Determine the values of the range and the IQR for the following sets of data. Retirement ages : 60, 63, 45, 63, 65, 70, 55, 63, 60, 65, 63 Residence changes: 1, 3, 4, 1, 0, 2, 5, 8, 0, 2, 3, 4, 7, 11, 0, 2, 3, 4	5	K4	CO3
	ii.	During their first swim through a water maze, 15 laboratory rats made the following number of errors (blind alleyway entrances): 2, 17, 5, 3, 28, 7, 5, 8, 5, 6, 2, 12, 10, 4, 3 a. Find the mode, median, and mean for these data. b. Without constructing a frequency distribution or graph, would it be possible to characterize the shape of this distribution as balanced, positively skewed, or negatively skewed?	10	K4	CO3
		(OR)			
b)	i.	Indicate whether each of the following distributions is positively or negatively skewed. The distribution of a. Incomes of taxpayers have a mean of Rs: 48, 000/- and a median of Rs: 43, 000/-. b. GPAs for all students at some college have a mean of 7.01 and a median of 7.20.	5	K4	CO3

ii. First using words, then symbols, identify the null hypothesis for each of the following situations. a. A school administrator wishes to determine whether sixth-grade boys in her school district differ, on average, from the national norms of 10.2 pushups for sixth-grade boys. b. A consumer group investigates whether, on average, the true weights of packages of packed meat sold by a large supermarket chain differ from the specified 250 gms.	10	K4	CO3

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

Question Paper Code: 5023

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

Fourth Semester

Computer Science and Engineering

U19CS414 – WEB TECHNOLOGY

(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.	State the use of Internet Protocol.	2	K1	CO1
2.	List and explain any two HTML elements.	2	K1	CO1
3.	Infer the need for cascading style sheets.	2	K1	CO2
4.	Identify the need of literals in JavaScript.	2	K2	CO2
5.	Define host objects.	2	K1	CO3
6.	Compare Client Side Scripting and Server Side Scripting.	2	K2	CO3
7.	List the advantages of XPATH.	2	K1	CO4
8.	Give two basic differences between JSP and servlet.	2	K1	CO4
9.	Identify the advantages of AJAX.	2	K2	CO5
10.	List out any two disadvantages of Web Service.	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Illustrate the process flow between web client and web server.	13	K2	CO1
		(OR)			
	b)	Develop an interactive web page for student registration using HTML form elements.	13	K6	CO1

12.	a)	Apply CSS to a web page with the following requirements				
		i.	Paint the background gray	2	K3	CO2
		ii.	Paint the sidebar yellow	2		
		iii.	Set the artist h1 to be only uppercase	2		
		iv.	Set the title h2 to be uppercase-first letter	2		
		v.	Set a line spacing between the lines	2		
		vi.	Set letter spacing between the letters in each span of type instruction	3		
			(OR)			
	b)	i.	Explain the various JavaScript statements with their syntax.	9	K2	CO2
		ii.	What are the various JavaScript objects? Explain each with an example.	4		
13.	a)	Explain about DOM event handling. Also explain with an example of creating a context menu. [Note: A context menu is one that is shown when the user right-clicks anywhere in the document].		13	K3	CO3
			(OR)			
	b)	Build a Java Servlet to display net salary of employee, use JDBC connectivity to get employee details from database.		13	K3	CO3
14.	a)	i.	Write a client server JSP program to find simple interest and display the result in the client.	9	K2	CO4
		ii.	Outline the concept of JSP tag libraries.	4		
			(OR)			
	b)	i.	Explain the role of XML name spaces with examples.	7	K3	CO4
		ii.	Explain the features of XML path.	6		
15.	a)	Discuss the development of a web application to illustrate the basics of AJAX.		13	K6	CO5
			(OR)			
	b)	Discuss the creation of a Java Web Service in detail with an example.		13	K6	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Discuss the various aspects of Normal Flow Box Layout in the context of CSS with suitable example.	15	K5	CO2
		(OR)			
	b)	Get the students' details like name, register number and mark using form. Generate DTD for this XML document. Name Regno Mark XYZ 1000 90 ABC 1001 80 RST 1002 89 PQR 1003 87 Generate the collected information in the descending order of marks using XSLT. Results should be displayed in the above format. Write a source code and explain the same.	15	K6	CO4

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

Question Paper Code: 5022

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fifth Semester
Computer science and Engineering
U19CSV33 – FUNDAMENTALS OF DEEP 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.	What is the problem with overfitting and underfitting? How does it occur?	2	K2	CO1
2.	How stochastic gradient descent is different from standard gradient descent?	2	K2	CO1
3.	What is gradient based learning?	2	K1	CO2
4.	Write the working principle of back propagation algorithm.	2	K5	CO2
5.	What are the ways to augment a database?	2	K4	CO3
6.	How do we apply early stopping in a learning process?	2	K4	CO3
7.	Differentiate between recurrent neural network (RNN) and bidirectional RNN.	2	K1	CO4
8.	What is the purpose of Sequence-to-Sequence deep learning architecture?	2	K2	CO4
9.	What is convolution operation? How do we retain all the important information even after applying convolution operation?	2	K3	CO5
10.	Mention the different variants of the basic convolution function.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Let X1, X2, …, Xn be a random sample from a distribution with a parameter theta. Suppose that we have observed X1=x1, X2=x2,…,Xn=xn. Then derive the likelihood function for the same. Assume all Xi are discrete.	13	K1, K2	CO1

		(OR)			
	b)	What is the role of gradient descent in a learning algorithm? How does gradient descent update the values of weights and biases? How stochastic gradient descent differs from gradient descent?	13	K2	CO1
12.	a)	Design a simple neural network architecture for X-OR gate function. Also, discuss which type of neural network can not solve it.	13	K5	CO2
		(OR)			
	b)	Design any simple neural network architecture having one hidden layer only. Demonstrate gradient based learning in this architecture.	13	K2	CO2
13.	a)	What is parameter tying and parameter sharing in regularization? How do we perform parameter sharing in convolutional neural network?	13	K3	CO3
		(OR)			
	b)	What is the use of ensemble learning methods? Take any ensemble method of your choice and do bagging on this?	13	K3	CO3
14.	a)	Create a long short term memory (LSTM) model for text recognition problem. Briefly explain all parameters used in your architecture.	13	K3	CO4
		(OR)			
	b)	Where should one use encoder-decoder sequence-to-sequence model? Explain with the help of an example.	13	K2	CO4
15.	a)	Demonstrate all basic operations of a standard convolutional neural network (CNN).	13	K3	CO5
		(OR)			
	b)	What are the limitations of CNN architectures? Give at least one example in details and suggest other suitable deep learning model for your selected problem.	13	K4	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Consider any simple dataset. Explain how can one augment it and what are the benefits to augment a dataset? Develop a convolutional neural network architecture and apply on the augmented dataset.	15	K4	CO5
		(OR)			
	b)	Consider a large dataset. Describe any one technique to reduce the size of the dataset row-wise and column-wise. Develop a recurrent neural network and apply on this reduced dataset.	15	K6	CO4

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[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
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Question Paper Code: 5020

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fifth Semester
Computer Science and Engineering
U19CSV21– INFORMATION SECURITY
(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.	Differentiate threat agent and threat.	2	K1	CO1
2.	How to ensure authenticity of information?	2	K2	CO1
3.	Outline information extortion.	2	K2	CO2
4.	Write a brief note on Software assurance.	2	K1	CO2
5.	Mention the significance of risk management.	2	K2	CO3
6.	Who is responsible for risk management in an organization?	2	K1	CO3
7.	Where can a security administrator find information on established security frameworks?	2	K3	CO4
8.	Who is ultimately responsible for managing a technology?	2	K1	CO4
9.	State how to ensure common security system in an IDPS.	2	K1	CO5
10.	What is an open port?	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Consider a federal agency, and they are responsible for implementing and maintaining the security measures as per NSTISSC guidelines. The agency handles highly sensitive information related to national security. Recently there is an alert from intrusion detection system indicating a potential security breach. Explain how you would apply the NSTISSC security model to respond to and mitigate this incident.	13	K3	CO1
		(OR)			
	b)	i. Consider the information stored on a personal computer. Explain each of the terms listed, with suitable example: threat, threat agent, vulnerability, exposure, risk, attack, and exploit.	7	K3	CO1
		ii. Explain the critical characteristic of information.	6	K1	
12.	a)	Consider a multinational corporation that operates in various countries. The organization is currently considering implementing a new cybersecurity policy that involves extensive monitoring of employees' online activities and communications to enhance data protection. However, this policy raises concerns about legal compliance, ethical considerations, and professional standards. How to navigate this situation, explain the policy taking into account the legal, ethical, and professional issues in information security?	13	K3	CO2
		(OR)			
	b)	Describe in detail about Security Investigation with suitable example for threats and attacks.	13	K2	CO2
13.	a)	Consider a Information Security Manager of a medium-sized financial services company that recently experienced a security breach resulting in the exposure of customer data. The task is to improve the organization's risk control strategies to prevent such incidents in the future. Provide a detailed plan for enhancing risk control strategies within the organization.	13	K3	CO3
		(OR)			
	b)	Describe in detail the process of risk identification, including the various components involved. Provide concrete examples of how each component contributes to identifying and understanding potential risks.	13	K2	CO3
14.	a)	Elucidate in detail about NIST Security Models.	13	K2	CO4
		(OR)			
	b)	i. What are the inherent problems with ISO 17799? What are the recommended alternatives?	7	K2	CO4
		ii. What is contingency planning? What are the components of contingency planning?	6	K3	

15.	a)	Explain in detail about Access Control Devices with example.	13	K2	CO5
		(OR)			
	b)	Describe in detail about n cryptography and its security goals in detail.	13	K2	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Consider a healthcare organization, the task is to ensure that sensitive patient data is protected while also allowing authorized personnel to access it for patient care. Describe in detail how to balance information security and access control measures within the organization's information systems.	15	K3	CO1
		(OR)			
	b)	Consider an Information Security Manager at a medium-sized financial institution. The company has recently witnessed an increase in cyber security threats and is seeking to bolster its defenses. In this scenario, the manager is asked to create a comprehensive information security strategy. To illustrate the approach, explain how to weave together information security standards, best practices, and security models to protect the company's critical financial data and customer information.	15	K3	CO4

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VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
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Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 5024

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Sixth Semester
Computer Science and Engineering
U19CS626 - COMPILER DESIGN
(Common to Information Technology)
(Regulation2019)

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.	Describe some of the tasks that an interpreter needs to perform.	2	K2	CO1
2.	Which phase(s) of a compiler i. is/are considered as a "back end"? ii. do type checking?	2	K3	CO1
3.	Define lexeme, token and pattern.	2	K2	CO2
4.	Construct parse tree for $a^{+}b^{*}(a\|b)^{*}ab\#$.	2	K3	CO2
5.	What is meant by handle pruning?	2	K2	CO3
6.	Compute FIRST and FOLLOW from the following grammar G = ({S, A, B}, {a, b, ε}, {S-> AaAb | BbBa A->εB->ε}, S)	2	K3	CO3
7.	List dynamic storage allocation techniques.	2	K1	CO4
8.	Define a syntax-directed translation.	2	K1	CO4
9.	What is DAG?	2	K1	CO5
10.	What are the properties of optimizing compilers?	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	Elucidate in detail about various phases of compiler and describe the output in each phases for the input p = q + t * 40.	10	K2	CO1
		ii.	Write short notes on compiler construction tools.	3		
			(OR)			
	b)	i.	Explain various errors encountered in different phases of compiler.	7	K2	CO1
		ii.	What is the necessity of grouping phases?	6		
12.	a)		Construct DFA for the regular expression (a|b)* ab* a.	13	K3	CO2
			(OR)			
	b)	i.	Minimize the following DFA.	10	K3	CO2

StatesI	0	1
->A	B	F
B	G	C
*C	A	C
D	C	G
E	H	F
F	C	G
G	G	E
H	G	C

		ii.	Construct a regular expression to describe a language consists of strings made of even numbers of a and b.	3		
13.	a)	i.	What are the differences between top-down and bottom-up parser?	4	K3	CO3
		ii.	Consider the grammar S -> iCtSA | a A -> eS | ε C -> b whether it is LL(1) grammar.	9		
			(OR)			
	b)		Show that the following grammar S -> Aa | bAc | Bc | bBa A -> d B -> d is LR(1) but not LALR(1)	13	K3	CO3
14.	a)	i.	Explain about runtime storage management.	7	K2	CO4
		ii.	Explain in detail about parameter passing.	6		
			(OR)			
	b)		What are the different storage allocation strategies? Explain.	13	K2	CO4
15.	a)		Discuss the various issues in design of code generator.	13	K2	CO5

(OR)

b)	i.	Explain in detail about optimization of basic blocks.	8	K2	CO5
	ii.	Elucidate about principle sources of optimization.	5		

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16. a)	i.	Construct DAG for the following Basic Block. 1. t1 := 4*i 2. t2 := a[t1] 3. t3 := 4*i 4. t4 := b[t3] 5. t5 := t2*t4 6. t6 := prod + t5 7. prod := t6 8. t7 := i + 1 9. i := t7 10. if I < = 20 goto(1)	8	K3	CO5
	ii.	Discuss about Global Data Flow Analysis with necessary equations.	7		
		(OR)			
b)		Construct SLR parsing table for the following grammar R -> R' | 'R | RR | R* | (R) | a | b	15	K3	CO3

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

Question Paper Code: 5025

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fourth Semester
Computer Science and Engineering
U19CS410 – COMPUTER ORGANIZATION
(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 down the basic performance equation and explain its parameters.	2	K1	CO1
2.	Compare single bus structure and multiple bus structure.	2	K2	CO1
3.	What are the basic operations needed to execute CPU instructions?	2	K1	CO2
4.	Why is Wait for MFC step needed when reading from or writing to the main memory?	2	K2	CO2
5.	How compiler is used in Pipelining?	2	K2	CO3
6.	In a pipelined machine, the clock skew adds 5ns of overhead to each execution stage. What is the length of the pipelined stage?	2	K3	CO3
7.	The application program in a computer system with cache uses 1400ns instruction acquisition bus cycle from cache memory and 90ns from main memory. What is the hit rate?	2	K3	CO4
8.	Differentiate PROM and EPROM.	2	K2	CO4
9.	What is an interrupt?	2	K2	CO5
10.	Write the advantages of USB.	2	K3	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	Explain the various Functional units of a computer in detail?	7	K2	CO1
		ii.	Examine the connections between the processor and the memory in detail.	6		

		(OR)			
	b)	Explain the addressing modes for the modern processors, and how the Effective address or Offset is determined by adding any combination of three address elements.	13	K2	CO1
12.	a)	Sketch and explain the multiple bus organization in detail. What are the Benefits of using Multiple-Bus Architecture compared to Single-Bus Architecture?	13	K2	CO2
		(OR)			
	b)	Discuss about the Hardwired Control Unit with neat diagram, and what are all the combinational circuit used for generating the control signal?	13	K2	CO2
13.	a)	Elucidate Instruction Hazards which causes to stall and illustrate how the performance of the instruction pipeline can be improved.	13	K2	CO3
		(OR)			
	b)	The time delay for the 4 segments in pipeline are as follows: t1 = 50 ns, t2 = 30 ns, t3 = 95 ns and t4 = 45 ns. The interface register delay time tr = 5 ns. How long would it take to add 100 pairs of numbers in the pipeline and how can we reduce the total time to about one half of the time calculated.	13	K3	CO3
14.	a)	i. Examine the cache memory organization and the various techniques for improving cache performance in detail.	8	K2	CO4
		ii. Consider a two-level cache with access times of 5 ns and 80 ns respectively. If the hit rates are 95% and 75% respectively in the two caches and the memory access time is 250 ns, what is the average access time?	5	K3	
		(OR)			
	b)	i. Examine virtual memory with page translation technique.	8	K2	CO4
		ii. Explain the operation of memory hierarchy with block diagram.	5	K1	
15.	a)	i. What is DMA? Describe how DMA is used to transfer data from peripherals.	7	K1	CO5
		ii. Give comparison between memory mapped I/O and I/O mapped I/O.	6	K2	
		(OR)			
	b)	Describe the working principle of USB and SCSI.	13	K1	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.			Questions	Marks	KL	CO
16.	a)		List the steps needed to execute the machine instruction given below in terms of transfer between the components of processor, memory & some commands ADD LOCA, R0.	15	K3	CO1
			(OR)			
	b)	i.	Explain the control sequence for execution of given instruction Add (R3), R1.	8	K3	CO2
		ii.	Illustrate control sequence for an unconditional branch instruction with example.	7		

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Question Paper Code: 5026

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fourth Semester
Computer Science and Engineering
U19CS411- DESIGN AND ANALYSIS OF ALGORITHMS
(Common to Computer Science and Technology)
(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 order of growth and compare the order of growth of n(n-1)/2 and 2^n.	2	K2	CO1
2.	Differentiate Time Complexity and Space Complexity.	2	K2	CO1
3.	Derive the worst case Complexity of Binary Search.	2	K3	CO2
4.	Show the recurrence relation of merge sort.	2	K2	CO2
5.	How Dynamic Programming is used to solve 0/1 Knapsack Problem?	2	K3	CO3
6.	Write Floyd's Algorithm and outline the advantages.	2	K2	CO3
7.	List and explain the type of constraints used in backtracking problem.	2	K2	CO4
8.	What is the time complexity for Hamiltonian cycle?	2	K2	CO4
9.	Verify that vertex cover problem is NP-complete.	2	K3	CO5
10.	What is satisfiability problem?	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11. a)	i.	Elucidate asymptotic notations used for best case, average case and worst case analysis of algorithm.	8	K2	CO1
	ii.	List out the various steps to solve the non recursive equations with few basic formulas.	5	K2	

(OR)

b) Solve the following recurrence relation

i.	$x(n) = x(n-1) + 5$ for $n > 1$ $x(1) = 0$	3	K3	CO1
ii.	$x(n) = 3x(n-1)$ for $n > 1$ $x(1) = 4$	3		
iii.	$x(n) = x(n-1) + n$ for $n > 0$ $x(0) = 0$	3		
iv.	$x(n) = x(n/2) + n$ for $n > 1$ $x(1) = 1$ (solve for $n=2^k$)	4		

12. a) Apply binary search algorithm for the list containing following elements -15, -6, 0, 7, 9, 23, 54, 82, 101, 112, 125, 131, 142, 151 and search the following elements 151, -14, 9 in the given list. Write the algorithm and analyze the complexity. 13 K2 CO2

(OR)

b) Find the maximum and minimum for the following set of elements using divide and conquer technique. Show the procedure. Elements are: 22, 13, -5, -8, 15, 60, 17, 31, 47. 13 K3 CO2

13. a) Use function OBST to compute w(i, j), r(i, j) and c(i, j), where I = 0, j = 4 for the identifier set (a1, a2, a3, a4) = (Cout, float, if, while) P(1) = 1/20, P(2) = 1/5, P(3) = 1/10, P(4) = 1/20, q(0) = 1/5, q(1) = 1/10, q(2) = 1/5, q(3) = 1/20 and q(4) = 1/20 to construct the optimal binary search tree. 13 K3 CO3

(OR)

b) i. Write an algorithm for Multistage graph using forward approach and analyze time and space complexity. 7 K2 CO3

ii. Write the procedure & algorithm for All pair shortest path problem and analyze time complexity. 6 K2

14. a) i. Write the concept and procedure for Hamiltonian problem. 6 K2 CO4

ii. Solve the following instance of the 0/1 knapsack problem when the knapsack capacity is W = 5. 7 K3

ITEM	WEIGHT	VALUE
1	4	10
2	3	20
3	2	15
4	5	25

(OR)

b) i. Describe the backtracking solution to solve 8-queens' problem with proper reasoning. Show the state space tree for each move. 6 K3 CO4

ii. Briefly explain the FIFO branch and bound solution with example. 7

15. a) Compare and contrast Deterministic and Non-Deterministic algorithms. Detail the methods for establishing Lower Bounds. 13 K2 CO5

(OR)

b) Describe in detail about Approximation Algorithms for NP hard problems. Give any five undecidable problems and explain the famous halting problem. 13 K2 CO5

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Question Paper Code: 5030

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fourth Semester
Computer Science and Engineering
U19CS412 – OPEN SOURCE SOFTWARE
(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 any two advantages of open source.	2	K1	CO1
2.	When the user mode is switched to kernel mode?	2	K2	CO1
3.	Classify the functions available to read a file in PHP.	2	K1	CO2
4.	Write the PHP code to validate your email.	2	K2	CO2
5.	Show MySQL commands to display the table structure and empty the table.	2	K2	CO3
6.	How is a form connected to a database?	2	K2	CO3
7.	What is regular expression in PERL?	2	K2	CO4
8.	Differentiate Next and Last control statements in Perl.	2	K3	CO4
9.	What is meant by DBI in PERL?	2	K1	CO5
10.	What is the difference between CGI and FastCGI?	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Explain process management in LINUX with suitable system calls.	13	K2	CO1

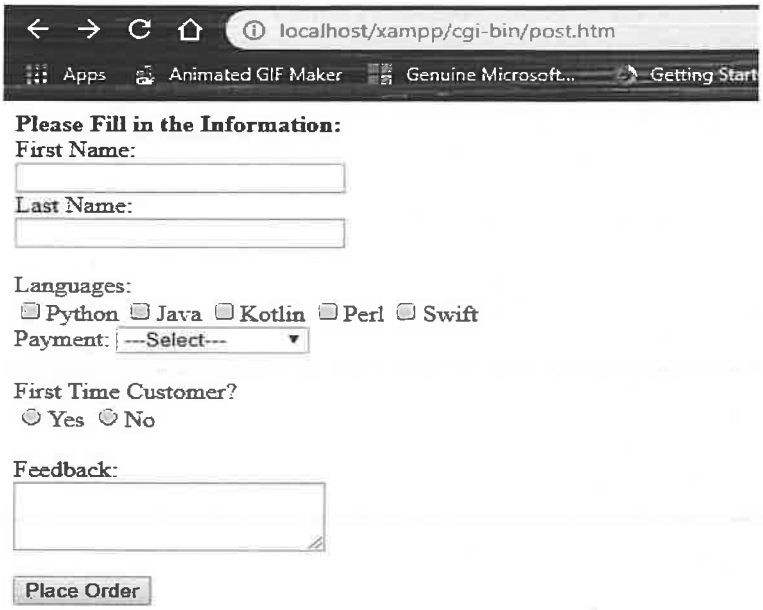
(OR)

	b)	i.	Summarize the various types of FOSS Licenses.	8	K2	CO1
		ii.	Explain Kernel mode and User mode of operations in Linux Environment.	5		
12.	a)	Write a PHP script to get two number from user and find the following				
		i.	if both numbers are even, find the LCM and GCD of the numbers.	4	K3	CO2
		ii.	if both numbers are odd, find the product of two numbers.	4		
		iii.	if one number is odd and another one is even then find the sum of two numbers.	5		
			(OR)			
	b)	i.	Write a php program to print the area and perimeter of the square. Get the side from the user.	6	K2	CO2
		ii.	Outline PHP shorthand assignment operator with an example.	7		
13.	a)	Analyze how to create, access and delete a cookie in PHP with the help of an example. Also differentiate between a session and cookie.		13	K4	CO3
			(OR)			
	b)	i.	Explain in detail about the steps to connect MySQL from PHP.	8	K2	CO3
		ii.	Discuss the PHP file permissions.	5		
14.	a)	Explain in detail about looping and control statements in PERL with an example of each construct.		13	K1	CO4
			(OR)			
	b)	i.	Illustrate how to create and access subroutines and modules in perl.	7	K2	CO4
		ii.	Write a perl to get the number and check if the number is Armstrong or not.	6		
15.	a)	Develop a Perl program to create a table in MYSQL database and explain the function associated with it.		13	K3	CO5
			(OR)			
	b)	Assess PERL-CGI program for a simple database creation and access. with an example.		13	K5	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Create a below form using PERL CGI programming:	15	K6	CO5



(OR)

	b)	Explain the process to generate database dump of MySQL database in Linux? Show the process using an example that includes creating database and creating tables in a database. Dump the data as backup for restoring purposes.	15	K6	CO3

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Question Paper Code: 5029

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fourth Semester
Computer Science and Engineering
U19CS413 - OPERATING SYSTEMS
(Regulation 2019)

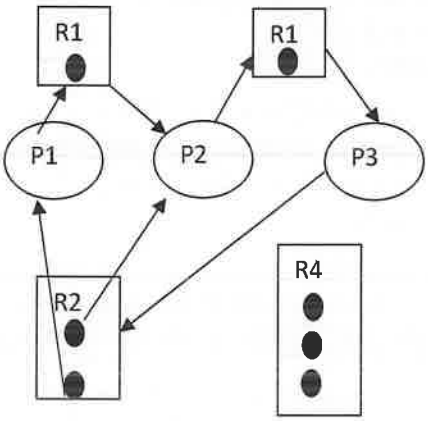
Time : Three Hours | Maximum : 100 Marks

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.	Compare multiprogramming and multiprocessing.	2	K2	CO1
2.	Can traps be generated intentionally by user program? Justify.	2	K2	CO1
3.	What is the concept behind strong semaphore and spinlock?	2	K1	CO2
4.	Name two hardware instructions and their definitions which can be used for implementing mutual exclusion.	2	K1	CO2
5.	 Does this graph have deadlock?	2	K3	CO3
6.	Define roll in and roll out.	2	K1	CO3
7.	What is Optimal Page Replacement?	2	K1	CO4
8.	Define Disk Formatting.	2	K1	CO4
9.	List the two distinct parts of file system.	2	K1	CO5
10.	Write the formula for calculating the block numbers?	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	Explain the various structures of an operating system.	6	K2	CO1
		ii.	Describe system calls and system programs in detail with neat sketch.	7		
			(OR)			
	b)		Discuss the Process Scheduling with the following terms.			
		i.	Scheduling queues	5	K2	CO1
		ii.	Schedulers	4		
		iii.	Context Switch	4		
12.	a)		Consider the following set of processes, with the length of the CPU-burst time given in milliseconds:			

Process	Burst Time	Priority
P1	11	4
P2	2	2
P3	3	4
P4	2	3
P5	5	1

The processes are assumed to have arrived in the order P1, P2, P3, P4, P5 all at time 0.

		i.	Draw four gantt charts illustrating the execution of these processes using FCFS, SJF, a non-preemptive priority, RR quantum = 2 scheduling.	5	K3	CO2
		ii.	What is the turnaround time of each process for each of the scheduling algorithm in part a?	4		
		iii.	What is the waiting time of each process for each of the scheduling algorithms in part a?	4		
			(OR)			
	b)		The first known correct software solution to the critical – section problem for two processes. The two processes, P0 and P1, share the following variables: Boolean flag[2];/* initially false */ int turn; The structure of process Pi (i==0 or 1), with Pj (j==1 or 0). Prove that the algorithm satisfies all three requirements for the critical section problem.	13	K3	CO2

13. a) Consider the following snapshot of a system: 13 K3 CO3

Process	Allocation A B C D	Max A B C D	Available A B C D
P0	0 0 1 2	0 0 1 2	1 5 2 0
P1	1 0 0 0	1 7 5 0	
P2	1 3 5 4	2 3 5 6	
P3	0 6 3 2	0 6 5 2	
P4	0 0 1 4	0 6 5 6	

Answer the following questions using the banker's algorithm:

i. What is the content of the matrix Need?
ii. Is the system in a safe state?
iii. If the request from process P1 arrives for (0, 4, 2, 0) can the request be granted immediately?

(OR)

b) i. Consider the following segment table: 10 K3 CO3

Segment	Base	Length
0	219	600
1	2300	14
2	90	100
3	1327	580
4	1952	96

what are Physical address for the following logical addresses?

a. 0430
b. 110
c. 2500
d. 3400
e. 4112

ii. Define Physical address and Logical Address. 3

14. a) What is the cause of Thrashing? How does the system detect thrashing? Once it detects thrashing, what can the system do to eliminate this problem? 13 K2 CO4

(OR)

b) Explain working principle of DMA? And explain how does it complicate the hardware design? 13 K2 CO4

15. a) Discuss the file system interface protection system and access methods. 13 K6 CO5

(OR)

b) Elaborate in detail about Free space management and recovery of file system. 13 K6 CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Can a system detect that some of its processes are starving for resources? If you answer "Yes", explain how it can. If "No", explain how the system can deal with the starvation problem.	15	K3	CO1
		(OR)			
	b)	Suppose that a disk drive has 5,000 cylinders, numbered 0 to 4999.Thedrive is currently serving a request at cylinder 143, and the previous request was at cylinder 125. The queue of pending request in FIFO order is 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130 Starting from the current head position, what is the total distance that the disk arm moves to satisfy all the pending request for each of the following disk scheduling algorithms?			
		i. FCFS	3	K3	CO5
		ii. SSTF	3		
		iii. SCAN	3		
		iv. LOOK	3		
		v. C-SCAN	3		

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Question Paper Code: 5028

B.E. / B.Tech DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Sixth Semester
Computer Science and Engineering
U19CSE08 – DATA SCIENCE AND 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 Data Science and point out the components of Data Science?	2	K2	CO1
2.	What are the facets of big data in data science?	2	K2	CO1
3.	Compare and contrast traditional databases with massive parallel processing.	2	K2	CO2
4.	What is the relationship between sampling distribution and resampling?	2	K2	CO2
5.	What is Linear Regression? What are the major drawbacks of the linear model?	2	K2	CO3
6.	How is competitive learning algorithm used in solving optimization tasks?	2	K2	CO3
7.	Why do you think data stream management is relevant and required in data mining?	2	K2	CO4
8.	Can Data Science be used in Stock Market Analysis? Justify your answer.	2	K3	CO4
9.	Which tool is widely used for data visualization and why?	2	K1	CO5
10.	Define Egonets in big data and give an example of ego network.	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	Describe the exploratory data analysis types, tools and process.	8	K2	CO1
		ii.	Give a brief summary about the challenges faced in processing big data.	5		
			(OR)			
	b)		Elucidate the life cycle of Data Science with a neat diagram and how the process is interrelated with its components.	13	K2	CO1
12.	a)	i.	Demonstrate the Evolution of Analytic Scalability and Analytic Processes with neat Sketch.	8	K2	CO2
		ii.	Write in detail about sampling distributions.	5		
			(OR)			
	b)		The rise of social networks has completely altered how people Socialize .Meta engineers can rifle through users' birthday party invite lists. Friendship, acquaintanceship and coworker-ship all leave extensive online data trails. Analyze the data analytic tools and methods for social networks.	13	K3	CO2
13.	a)		Explain the Support vector and kernel methods with necessary examples and how the SVM handles linearly separable and non-separable cases.	13	K2	CO3
			(OR)			
	b)		Construct a decision tree for the following data: Explain various path in the tree that leads to various decisions.	13	K3	CO3

Day	Outlook	Temp	Humidity	Wind	Tennis?
1	Sunny	Hot	High	Weak	No
2	Sunny	Hot	High	Strong	No
3	Overcast	Hot	High	Weak	Yes
4	Rain	Mild	High	Weak	Yes
5	Rain	Cool	Normal	Weak	Yes
6	Rain	Cool	Normal	Strong	No
7	Overcast	Cool	Normal	Strong	Yes
8	Sunny	Mild	High	Weak	No
9	Sunny	Cool	Normal	Weak	Yes
10	Rain	Mild	Normal	Weak	Yes
11	Sunny	Mild	Normal	Strong	Yes
12	Overcast	Mild	High	Strong	Yes
13	Overcast	Hot	Normal	Weak	Yes
14	Rain	Mild	High	Strong	No

14.	a)	i.	Explain in detail the sampling data in a Stream.	8	K2	CO4
		ii.	Identify the major issues in data stream Query Processing.	5		
			(OR)			

b)	i.	Illustrate the Filtering streams in detail.	8	K2	CO4
	ii.	Write a short note on Decaying Window Algorithm.	5		
15. a)	i.	Explain in detail about various tools used for visualization.	8	K2	CO5
	ii.	Develop a bar chart for the following data. movies = ["Annie Hall", "Ben-Hur", "Casablanca", "Gandhi", "West Side Story"] num_oscars = [5, 11, 3, 8, 10].	5	K3	
		(OR)			
b)		Illustrate Social Network Analysis (SNA) using EgoNet with a neat Sketch.	13	K3	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16. a)		Develop a case study for Sentiment Analysis in Twitter. Sentiment analysis or opinion mining refers to identifying as well as classifying the sentiments that are expressed in the text source. Justify how reliable the results of the sentiment analysis were and the factors influenced the accuracy?	15	K6	CO4
		(OR)			
b)		Explain the case study on Stock Market Prediction with following requirements:			
	i.	Briefly introduce about Stock market and its prediction	5	K3	CO4
	ii.	The Solution Path of the stock Market Prediction.	5		
	iii.	Do the Empirical Study of the Stock Market Prediction.	5		

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: 5027

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Sixth Semester
Computer Science and Engineering
U19CSE07 - CRYPTOGRAPHY AND NETWORK SECURITY
(Common to Information Technology)
(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 meant by Denial of Service attack? Is it Active Attack or Passive Attack?	2	K1	CO1
2.	Let message = "Anna", and k = 3, find the ciphertext using Caesar cipher.	2	K2	CO1
3.	Give the five modes of operation of block cipher.	2	K1	CO2
4.	For p = 11 and q = 19 and choose d = 17. Apply RSA algorithm where Cipher message = 80. Find the plain text.	2	K1	CO2
5.	List out the attacks during the communication across the network.	2	K1	CO3
6.	Compare Message Authentication Code and Hash function.	2	K2	CO3
7.	Identity the role of Ticket Granting Server in inter realm operations of Kerberos.	2	K2	CO4
8.	What are the ways of Key Distribution available in symmetric encryption?	2	K1	CO4
9.	Differentiate between SSL version 3 and TLS.	2	K2	CO5
10.	What are the common techniques used to protect a password file?	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Encrypt the message "meet me at the usual place at ten rather than eight o clock" using the Hill cipher with the key $\begin{pmatrix} 7 & 3 \\ 2 & 5 \end{pmatrix}$. Show your calculations and the result.	13	K3	CO1
		(OR)			
	b)	i. Explain the OSI security architecture with neat sketch.	9	K2	CO1
		ii. What is monoalphabetic cipher? Examine how it differs from Caesar cipher.	4		
12.	a)	Analyze the structure of AES and describe the steps in AES encryption process.	13	K4	CO2
		(OR)			
	b)	i. Illustrate the structure of DES algorithm and explain its strength and weakness.	9	K2	CO2
		ii. Compare stream cipher and block cipher with an example.	4		
13.	a)	i. Illustrate the Digital Signature Algorithm with neat sketch.	7	K2	CO3
		ii. How the X.509 certificate provide the authentication to the message? Explain in detail.	6		
		(OR)			
	b)	i. Describe about Secure Hash Algorithm (SHA) with a neat sketch.	7	K2	CO3
		ii. Explain in detail about Kerberos authentication protocol with a neat sketch.	6		
14.	a)	Illustrate the Secret Key Distribution works using Asymmetric encryption to achieve Confidentiality and Authentication explain in detail.	13	K3	CO4
		(OR)			
	b)	Assess the Remote user authentication using Asymmetric Encryption with neat sketch.	13	K5	CO4
15.	a)	i. Compare the features of host based IDS and network based IDS.	7	K2	CO5
		ii. Write and explain TLS functions and alert codes of Transport Layer Security.	6		
		(OR)			
	b)	Outline the following:		K2	CO5
		i. Firewall Configurations	7		
		ii. Trusted Systems	6		

PART – C

(1 x 15 = 15 Marks)

Q.No.			Questions	Marks	KL	CO
16.	a)	i.	Illustrate the rules to perform encryption using play fair cipher and encrypt 'snowshooos' using 'monarchy' I and J count as one letter and x is the filler letter.	8	K2	CO1
		ii.	Using Vigenere cipher, encrypt the word "explanation" using the Key "leg"	7		
			(OR)			
	b)		Elaborate how secure electronic transaction (SET) protocol enables transactions. Explain the components involved in it.	15	K6	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.			Questions	Marks	KL	CO
16.	a)	i.	Given the recursive algorithm for finding the number of binary digits is n's binary representation, where n is a positive decimal integer. Find the recurrence relation and determine complexity.	8	K3	CO1
		ii.	Show how to implement a stack using two queues. Analyze the running time of the stack operations.	7		
			(OR)			
	b)	i.	Provide separate answers for the following: a. List represented as arrays b. List represented as linked lists Compare the time complexities involved in the analysis of both the executions.	8	K4	CO1
		ii.	Suppose W satisfies the following recurrence equation and base case is given as (where c is constant): $W(n) = c.n + W(n/2)$ and $W(1) = 1$. Determine the asymptotic order of w(n).	7		

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Question Paper Code: 13001

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Seventh Semester
Computer Science and Technology
U19CT716 – INTERNET OF THINGS
(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 two challenges in IoT.	2	K2	CO1
2.	What are called actuators?	2	K1	CO1
3.	What is a constrained node?	2	K1	CO2
4.	Define System on chip.	2	K1	CO2
5.	Name some of the IoT supported hardware platform.	2	K2	CO3
6.	What is Real Time embedded system?	2	K1	CO3
7.	Define Data at rest.	2	K2	CO4
8.	How the data acquired from IoT/M2M devices can be stored?	2	K3	CO4
9.	Name some of the common IoT devices.	2	K2	CO5
10.	What is the concept of smart refrigerator working?	2	K3	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11. a)	i.	Differentiate between IoT & M2M Communications.	5	K2	CO1
	ii.	Describe the 4 layers of core IoT functional stack along with a detailed diagram.	8	K1	

(OR)

	b)	i.	What are the features that should be there in a smart object?	6	K1	CO1
		ii.	Explain the hierarchy of fog edge and cloud in IoT using a diagram.	7	K4	
12.	a)	i.	Explain the various physical layer in IoT network technologies.	6	K1	CO2
		ii.	What are the classes of constrained node? What is the building blocks of a constrained node?	(3+4)	K3	
			(OR)			
	b)	i.	Write short note on: a. SCADA b. CoAP c. MQTT	(3X3=9)	K1	CO2
		ii.	What are the advantage and disadvantages of 6LoWPAN?	4	K2	
13.	a)	i.	What are the applications and challenges of embedded system in IoT?	7	K2	CO3
		ii.	How to choose the best micro controller for an IoT application?	6	K4	
			(OR)			
	b)		Discuss about Raspberry pi & Arduino Board.	(6+7)	K1	CO3
14.	a)	i.	What are the key challenges of IoT data analytics?	6	K2	CO4
		ii.	What are the benefits and functions of IoT cloud?	7	K4	
			(OR)			
	b)	i.	Explain the various example of Everything as a service (XaaS)	8	K1	CO4
		ii.	How to protect data in motion vs data at rest?	5	K3	
15.	a)	i.	How IoT can be used in the following home automation services: a. Lighting b. Home appliances c. Intrusion Detection	(3X3=9)	K3	CO5
		ii.	What are the basic components of a smart building?	4	K5	
			(OR)			
	b)	i.	Explain the Basic capabilities / requirements needed to implement IoT in industries.	7	K1	CO5
		ii.	Briefly Describe about Industry 4.0 concept.	6	K2	

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16. a)	i.	What are the advantage of IoT functional blocks	5	K2	CO3
	ii.	You are a member of the plant information systems group for a small manufacturer of all-natural ingredient cosmetics. Your firm promotes itself as adhering to the highest standards of compliance and quality. Manufacturing is rigorously monitored via sensors and computer controls throughout the entire process, and automated temperature controls ensure complete stability in the manufacturing environment. Sensor tracking is performed from the moment that raw materials enter your facility, throughout the manufacturing process, packaging, and on to distribution. The sensors and computer controls were installed when the plant was built in the 1990s and use proprietary communications protocols and are not Internet enabled. Data from these sensors is monitored by a group of three technicians in the computer control room. Twelve workers are required to staff the control room 24/7, including weekends and most holidays. Your company has just purchased a plant previously owned by one of your competitors in a nearby state. Your group has been asked to look at the feasibility of upgrading the sensors used in both plants to Internet-enabled sensors connected to the Internet of Things. This would make it possible for technicians in one control room to monitor the operation of both plants. Plant staffing could be reduced by 12 workers saving $1.2 million in labour expenses per year. It is estimated that the cost of replacing the existing sensors and converting to the Internet of Things is in the vicinity of $1.5 million. Why is it necessary to replace the existing sensors to implement an IoT network? What additional benefits may arise from converting the plants to the Internet of Things? What new risks are raised by placing the new system of sensors on the Internet of Things? What actions could be taken to reduce these risks?	10	K4	CO5
		(OR)			
b)	i.	Differentiate between Systen on Chip (SoC) & Micro Controller Unit (MCU).	7	K3	CO3
	ii.	How IoT is reshaping smart building automation?	8	K4	CO5

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[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 6007

M.E. / M.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Third Semester
Computer Science and Engineering
P19ITOE5 – BLOCK CHAIN TECHNOLOGY
(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 can we define Byzantine Generals' problem in Blockchain?	2	K1	CO1
2.	List out the differences between distributed database and Blockchain.	2	K1	CO1
3.	What is the first step of building up a network in blockchain?	2	K1	CO2
4.	Name the common type of ledgers that can be considered by users in Blockchain.	2	K1	CO2
5.	What are the key characteristics of merkle tree in Blockchain?	2	K1	CO3
6.	Highlight two differences between soft fork and hard fork.	2	K1	CO3
7.	Proof of stake is commonly used consensus nowadays. How does it differ from proof of work?	2	K1	CO4
8.	Is difficulty level security for Blockchain. Justify your answer with an example.	2	K1	CO4
9.	List various types of digital coins available in market.	2	K2	CO5
10.	What do you mean by (a) Self-execution (b) Self-enforcing in the context of smart contracts?	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	Define zero-knowledge proofs. Interpret the need of zero-knowledge proofs in Blockchain.	6	K2	CO1
		ii.	Explain the working of zero-knowledge proofs work. Also, discuss about various types of zero-knowledge proofs in detail.	7	K2	CO1
			(OR)			
	b)	i.	Explain the working of Elliptic Curve Digital Signature Algorithm (ECDSA) in detail.	5	K2	CO1
		ii.	Define and explain ASIC-Resistant Cryptocurrencies. Illustrate with an example that utilizes ASICs to mine Proof of Work cryptos than using a general-purpose hardware like a GPU card.	8	K2	CO1
12.	a)		Outline the architecture of blockchain by discussing the working of each of the layers. List the functional benefits of blockchain as a storage element.	13	K2	CO2
			(OR)			
	b)	i.	What makes Blockchain Secure: Key Characteristics & Security Architecture? List the layers in Security Architecture of Blockchain Technology.	6	K2	CO2
		ii.	A distributed digital ledger is used for recording transaction in Blockchain. What does the system rely on for maintaining digital ladger? Justify your answer with a case.	7	K2	CO2
13.	a)	i.	Discuss the role of Merkle trees in Blockchain? How important are Merkle trees in Blockchains.	7	K2	CO3
		ii.	Demonstrate the process of building private / public blockchain for a real time scenario.	6	K3	CO3
			(OR)			
	b)		Demonstrate the process of mining in blockchain. How does the block is created and validated by the miners?	13	K2	CO3
			(OR)			
14.		i.	Describe proof of work consensus algorithm and discuss disadvantages of proof of work consensus mechanism.	8	K2	CO4
		ii.	Define Consensus algorithm. Discuss the various types of Consensus algorithms.	5	K2	CO4
			(OR)			
	b)		Write a short note on following consensus algorithms with a case study i. Proof of Stake (PoS) ii. Proof of Burn (PoB)	13	K3	CO4

15.	a)	Develop a Smart contract to calculate greater of two numbers using a public sum() function, How will you migrate it to Ethereum network and return the calculated sum.	13	K3	CO5
		(OR)			
	b)	Ethereum is a popular Blockchain network? List various factors that makes Ethereum so promising? Explain the significance of signature and how it is useful in Ethereum Network? Highlight the type of Ethereum network that exist.	13	K2	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	i. How Blockchain is useful in Fair trade. Consider the following problem statement and suggest solution using Blockchain. ii. Discuss the pros and cons of integrating Blockchain for stakeholders including suppliers, producers, and workers. iii. Discuss the cryptography primitives and protocols used in Blockchain for Fair trade. Name them and discuss their features briefly. Case Study: Fair Trade guaranteed means the firm complies with the ten principles of Fair Trade and to reassure the firm's compliance they need to conduct peer evaluations, independent audits and self-assessment reports. One of the ten principles of World Fair Trade Organization (WFTO) is transparency and accountability which require their members to involve employees, producers and members in their management process. This principle ensures all relevant information is shared among stakeholders to guarantee transparent supply chains. The guarantee process of transparency is established through disclosing information such as production sites, suppliers and workers' salaries.	15	K3	CO5
		(OR)			
	b)	Write solidity-based smart contract fulfilling the requirements of following use case: Millions of dollars are spent every year on processing claims in the insurance industry. Even more money is wasted due to fraudulent claims. Smart contracts strengthen claim processing through frequent error checks, helping administer policies from individuals or organizations. Shorter processing times will result in lower costs for consumers – including premium rates. For example, Lloyd's of London confirms that insurance companies will also be able to fill in the gaps in coverage that come with the underwriting process, as they will be able to manage risks from corporate buyers much better. Write smart contract for insurance industry and provide maximum security using cryptography primitives and protocols.	15	K3	CO5

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[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 5001

M.E. / M.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Third Semester
Computer Science and Engineering
P19CSE21 – DEEP LEARNING TECHNIQUES
(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.	Suppose we have a single perceptron with sign activation function. The perceptron is represented by a weight vector [0.4 -0.3 0.1] and a bias theta = 0. If the input vector is X = [0.2 0.6 0.5] then what will be the output of the perceptron?	2	K3	CO1
2.	How do deep learning techniques perform automatic feature selection?	2	K2	CO1
3.	What is learning rate in a learning algorithm? Why should not the learning rate be high?	2	K2	CO2
4.	What is the Baye's rule? Define each and every term used in this formula.	2	K1	CO2
5.	How can a multilayer perceptron model overcome the limitations of single layer perceptron model?	2	K4	CO3
6.	How can one decide the number of hidden layers in a network for a particular problem?	2	K6	CO3
7.	What are the benefits of a Convolutional Neural Network (CNN) over simple artificial neural network?	2	K4	CO4
8.	How is a fully connected layer in a CNN useful?	2	K5	CO4
9.	What is the purpose of Restricted Boltzmann machine?	2	K4	CO5
10.	What is a local search method?	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Consider a problem and show that the problem cannot be solved using single layer perceptron model. Then design a multiplayer perceptron model to solve the problem.	13	K4	CO1
		(OR)			
	b)	Consider a problem and choose any deep learning model to solve it. Show how the designed model is capable to perform feature selection automatically.	13	K4	CO1
12.	a)	Calculate the regression coefficient and line of regression for the following data.	13	K3	CO2

X	1	2	3	4	5	6	7	8
Y	9	8	10	12	11	13	14	16

		(OR)						
	b)	Which type of problems can be efficiently solved using expectation maximization algorithm? Take a problem and apply EM algorithm to solve it.	13	K3	CO2
13.	a)	What is the working principle of Widrow Hoff algorithm? Take any problem and apply Widrow Hoff algorithm to solve it.	13	K3	CO3
		(OR)			
	b)	How does the back propagation method update weights and biases in multiplayer perceptron? Demonstrate with the help of an example.	13	K3	CO3
14.	a)	Consider a grayscale image of size 4x4 with any pixel values. Apply a simple Convolutional Neural Network and show the benefits of CNN for this example.	13	K4	CO4
		(OR)			
	b)	What are the limitations of Recurrent Neural Network (RNN)? Explain how Long Short Term Memory (LSTM) model can handle these RNN issues.	13	K1	CO4
15.	a)	What is the working principle of an autoencoder? Consider any problem and demonstrate how to apply autoencoder to this problem.	13	K4	CO5
		(OR)			
	b)	Explain the working of a Deep Belief Network in detail with the help of an example.	13	K2	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Consider digit classification problem. Suppose we have a training dataset of 10,000 images of size 4x4. Output classes are 10 (0 to 9 digits). Design a complete convolutional neural network model for digit classification. Explain each and every parameter used.	15	K4	CO4
		(OR)			
	b)	What is machine learning? What are the different types of machine learning algorithms? Highlight the salient features of each algorithm with examples.	15	K2	CO2

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Question Paper Code: 5002

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Seventh Semester
Computer Science and Engineering
U19CS731 – MOBILE COMPUTING
(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.	Distinguish between mobile computing and wireless networking.	2	K2	CO1
2.	What is MAC?	2	K1	CO1
3.	What is the use of SYN packet?	2	K1	CO2
4.	Show the pictorial representation of the indirect TCP model.	2	K2	CO2
5.	State the functions of HLR and VLR.	2	K2	CO3
6.	List the categories of GPRS services.	2	K2	CO3
7.	Identify the issues that are addressed by routing protocol in MANET?	2	K2	CO4
8.	Compare MANET Vs VANET.	2	K2	CO4
9.	Show the different versions of Android.	2	K2	CO5
10.	What are the issues in the context of the design of mobile operating system?	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11. a)	i.	Summarize the issues in the Wireless MAC Protocols.	4	K2	CO1
	ii.	Explain in detail the fixed and random assignment schemes. Discuss the scenario in which the former is preferred over later.	9		

(OR)

	b)	i.	Describe the architecture of Mobile Computing Environment.	6	K2	CO1
		ii.	Discuss the various Reservation Based schemes.	7		
12.	a)	i.	Explain the operation of mobile IP with the help of a suitable schematic diagram and by suitable examples.	7	K2	CO2
		ii.	Explain the agent advertisement procedure of mobile IP.	6		
			(OR)			
	b)	i.	Explain the adaptation process in TCP.	7	K2	CO2
		ii.	Explain the working of selective acknowledgement protocol.	6		
13.	a)	i.	Do mobile phones affect the human body negatively? Explain your answer.	4	K3	CO3
		ii.	Explain in detail about UMTS architecture.	9	K2	
			(OR)			
	b)	i.	Discuss the services of GPRS.	7	K1	CO3
		ii.	What are the advantages of GPRS over GSM?	6	K2	
14.	a)	Write short notes on:				CO4
		i.	Ad Hoc On-demand Distance Vector(AODV).	7	K1	
		ii.	Zone Routing Protocol.	6	K2	
			(OR)			
	b)	i.	How is an Ad hoc Network set up without the infrastructure support?	7	K2	CO4
		ii.	Why is Routing in a MANET a complex Task?	6		
15.	a)	i.	Describe microkernel operating system.	6	K1	CO5
		ii.	Why microkernel based design is being preferred for developing a mobile OS?	7	K3	
			(OR)			
	b)	i.	Describe the principle functions of the operating system of a mobile device.	6	K2	CO5
		ii.	Explain how an application can be developed using the Android SDK.	7	K3	

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	A major task of the designer of a wireless sensor network is prolonging the life of the network. Explain how this is achieved while designing a MANET.	15	K2	CO4
		(OR)			
	b)	Using at least one suitable example, explain the flexibilities that a user would be required to sacrifice when a single tasking operating system is used in the mobile device.	15	K3	CO5

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[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 5007

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fifth Semester
Computer Science and Engineering
U19CS520 – COMPUTER 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.	A 40 Kbps satellite link has a propagation delay of 400 milliseconds. The transmitter employs Go Back N ARQ with window size 10. Assuming that each frame is 100 bytes long, Calculate the efficiency of the channel.	2	K3	CO1
2.	The message 11001001 is to be transmitted using the CRC polynomial $x^3 + x + 1$ to detect errors. Identify the original message that was transmitted.	2	K3	CO1
3.	A and B are the only two stations on an Ethernet. Each has a steady queue of frames to send. Both A and B attempt to transmit a frame, and the frames are getting collide, and A wins the first backoff race. At the end of this successful transmission by A, both A and B attempt to transmit and the data frames are getting collide. Compute the probability of 'A' winning the second backoff race.	2	K3	CO2
4.	"Practically entre is a limitation in the number of hosts in a single Ethernet link" Reason out.	2	K2	CO2
5.	In a link state routing, when a link is down, how does a node broadcasts this information to all other nodes?	2	K2	CO3
6.	Identify the network address of the IP address 155.79.128.197 under network mask 255.248.0.0.	2	K2	CO3

7.	What happens if a host sends large number of TCP connection requests to server from unreachable port numbers? Provide a solution to control this problem.	2	K3	CO4
8.	Mention the role of Slow Start Phase in TCP Congestion control.	2	K2	CO4
9.	Write are the underlying Transport Layer protocols for FTP and SMTP?	2	K2	CO5
10.	Differentiate between Persistent and Non-persistent HTTP Implementation in terms of delay and QoS.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

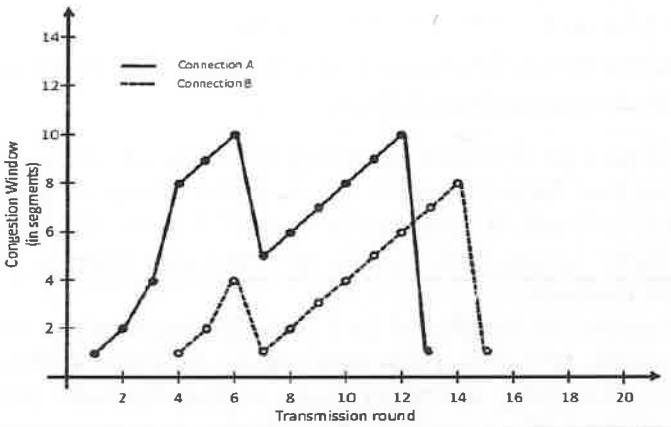
Q.No.		Questions	Marks	KL	CO
11. a)	i.	Depict the functions of Data Link Layer and Network Layer in networked environment. Differentiate between Packet Switching and Circuit Switching.	6 7	K3	CO1
	ii.	What is Bandwidth Delay Product? Consider two hosts X and Y are connected by a single direct link of rate 10^6 bits/sec. The distance between two hosts is 10000 km and the Propagation of the link is 2×10^8 m/s. Host X sends a file of 50 Kb to host Y. Compute the Transmission and propagation delay.		K4	
		(OR)			
b)	i.	Consider a scenario: Alice sends an email to Bob. While Bob receive the email, name the protocols used by Bob's network and mention the reason also.	6 7	K2 K3	CO1
	ii.	Defend the functioning of Layer 2 Switch and Router. Calculate the roundtrip delay of transmitting a packet of size 10KB across a link of 1Mbps is (assume one-way propagation delay is 20 msec).			
12. a)	i.	Two parties uses the Go-back-4 ARQ for reliable transmission of frames. Frames are of size F bytes and transmission rate is R Mbps. Size of an acknowledgement (ACK) is 10 bytes and the one-way propagation delay is T microseconds. Assuming no frame is lost, calculate the channel utilization. If every alternate frame is lost identify the channel utilization. F = 1600, R = 100, T = 10.	6 7	K5 K4	CO2
	ii.	Illustrate problem with Hidden Terminal Problem. Develop a plan to control hidden terminal RTS-CTS scheme in MACAW protocol. Derive Maximum throughput of Slotted ALOHA protocol.			
		(OR)			

b)	i.	Two parties uses the Selective Repeat ARQ for reliable transmission of frames. Frames are of size F bytes and transmission rate is R Mbps. Size of an acknowledgement (ACK) is 10 bytes and the one-way propagation delay is T microseconds. Assuming no frame is lost, calculate the channel utilization. If every alternate frame is lost calculate the channel utilization. F = 1600, R = 100, T = 10.	6 7	K5 K3	CO2
	ii.	Sketch the CSMA Protocol. Derive Maximum Throughput for Slotted non-persistent CSMA.			
13. a)	i.	Suppose an IP Packet containing 256 bytes of data is divided into four fragments, each containing 64 bytes of data. The header length is measured in units of 4 bytes. Calculate the Header Length, Total Length, MF and Offset fields for 1st and last fragments.	5	K5	CO3
	ii.	Illustrate the function of Link State Routing Protocol with an example how does a link state routing algorithm differs from distance vector routing in terms of fault tolerance and fast convergence?	8	K3	
		(OR)	(OR)		
b)	i.	A router has the following (CIDR) entries in its routing table:	5	K3	CO3

Address/mask	Next hop
135.46.56.0/22	Interface 0
135.46.60.0/22	Interface 1
192.53.40.0/23	Router 1
default	Router 2

		State the forwarding of IP packets with following destination IP. 135.46.63.10, 135.46.57.14, and 192.53.40.7	8		
	ii.	Describe the working concept of Distance Vector Routing with an Example. Mention the purpose of TTL and Sequence Number fields in a LSP.			
14. a)	i.	Consider an instance of TCP slow start algorithm where window size at the start of the slow start phase is 2 MSS (Maximum Segment Size) and the threshold at the start of the first transmission is 8 MSS. Assume that timeout happens during fifth transmission. What will be the size of congestion window at the end of the 9th transmission?	5	K4	CO4
	ii.	Criticize the slow-start and avoidance based TCP congestion control process with receiver window size (RWND = 20) and Maximum segment size = 50 Bytes. With a neat graph, depict the variation in the transmit rate against the data transfer in both the phase considering packet drops.	8	K5	
		(OR)			

b) Consider the plot shown below of TCP congestion window size as a function of time for two TCP connections A and B. In this problem we will suppose that both TCP senders are sending large files. We also assume that the packet loss events are independent in connection A and B. CO4



i. Calculate the values of the Threshold parameter between the 1st and the 14th transmission rounds for each connection? At the 12th transmission round for connection A, determine whether there is a segment loss detected by a triple duplicate ACK or by timeout. 5 K4 / 8 K5

ii. Sketch the change in the congestion window for both connections up to the 20th transmission round, considering that there is no segment loss based on timeout or duplicate ACK for any of the connections. Assume that the segment size is 1460 bytes and a total of 87600 bytes have been successfully transmitted over connection A before the 13th transmission round. At which transmission round the cumulative amount of the successful transmitted data is equal to 163520 bytes? Consider that there is no segment loss after the 13th transmission round.

15. a) i. A user is accessing the url:"www.goole.com" while using the above link hoe does the DNS play a vital role? Explicate the purpose of NAT with an example. What is Recursive DNS lookup? 8 K2 CO5

ii. Write the sequence of steps while fetching a webpage specified by the URL www.csi.vcew.ac.in/qp.html.. What is the purpose of Web Caching? 5 K3

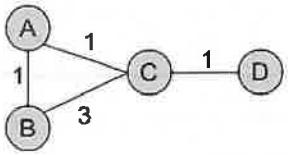
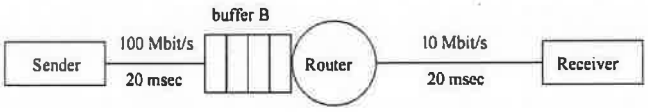
(OR)

b) i. Explain the working of a mail transfer and mail access. What are the protocols used for these functions? 8 K3 CO5

ii. Write the applications and the functions of SMTP and POP3 protocol. How the security is ensured in POP3 protocol. 5 K3

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16. a)	i.	A large block of IP addresses starting at 198.16.0.0 is to be assigned to four organizations, A, B, C, and D request with 4000, 2000, 4000, and 8000 addresses, respectively (in order). Determine the first IP address, last IP address, and the subnet mask for each. State the use of DHCP and ARP protocols.	9	K4	CO2
	ii.	Based on the network shown below, state a sequence of events that will cause a count-to-infinity problem in Distance Vector Routing. Devise your own solution to this problem. If there is no link failure, what will be the distance routing table of Node B? 	6	K5	CO3
		(OR)			
b)	i.	State the principle of VLAN design. In the network shown below we would like to establish a TCP connection to fully utilize the bottleneck link. What should be the size of buffer B? Assume that the advertised receiver window is very large. The one-way link latencies (propagation delays) are given in the figure. 	8	K3	CO3
	ii.	A reliable byte-stream protocol is to be designed using a sliding window. This protocol is to be used in a network with 1 Gbps. The RTT of the network is 140 ms, and the maximum segment lifetime is 60 seconds. How many bits would you include in the advertised window and sequence number fields of your protocol header? Explain why congestion avoidance is necessary for providing QoS when TCP can control congestion?	7	K4	CO4

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: 6007

M.E. / M.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Third Semester
Computer Science and Engineering
P19ITOE5 – BLOCK CHAIN TECHNOLOGY
(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 can we define Byzantine Generals' problem in Blockchain?	2	K1	CO1
2.	List out the differences between distributed database and Blockchain.	2	K1	CO1
3.	What is the first step of building up a network in blockchain?	2	K1	CO2
4.	Name the common type of ledgers that can be considered by users in Blockchain.	2	K1	CO2
5.	What are the key characteristics of merkle tree in Blockchain?	2	K1	CO3
6.	Highlight two differences between soft fork and hard fork.	2	K1	CO3
7.	Proof of stake is commonly used consensus nowadays. How does it differ from proof of work?	2	K1	CO4
8.	Is difficulty level security for Blockchain. Justify your answer with an example.	2	K1	CO4
9.	List various types of digital coins available in market.	2	K2	CO5
10.	What do you mean by (a) Self-execution (b) Self-enforcing in the context of smart contracts?	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	Define zero-knowledge proofs. Interpret the need of zero-knowledge proofs in Blockchain.	6	K2	CO1
		ii.	Explain the working of zero-knowledge proofs work. Also, discuss about various types of zero-knowledge proofs in detail.	7	K2	CO1
			(OR)			
	b)	i.	Explain the working of Elliptic Curve Digital Signature Algorithm (ECDSA) in detail.	5	K2	CO1
		ii.	Define and explain ASIC-Resistant Cryptocurrencies. Illustrate with an example that utilizes ASICs to mine Proof of Work cryptos than using a general-purpose hardware like a GPU card.	8	K2	CO1
12.	a)		Outline the architecture of blockchain by discussing the working of each of the layers. List the functional benefits of blockchain as a storage element.	13	K2	CO2
			(OR)			
	b)	i.	What makes Blockchain Secure: Key Characteristics & Security Architecture? List the layers in Security Architecture of Blockchain Technology.	6	K2	CO2
		ii.	A distributed digital ledger is used for recording transaction in Blockchain. What does the system rely on for maintaining digital ladger? Justify your answer with a case.	7	K2	CO2
13.	a)	i.	Discuss the role of Merkle trees in Blockchain? How important are Merkle trees in Blockchains.	7	K2	CO3
		ii.	Demonstrate the process of building private / public blockchain for a real time scenario.	6	K3	CO3
			(OR)			
	b)		Demonstrate the process of mining in blockchain. How does the block is created and validated by the miners?	13	K2	CO3
			(OR)			
14.		i.	Describe proof of work consensus algorithm and discuss disadvantages of proof of work consensus mechanism.	8	K2	CO4
		ii.	Define Consensus algorithm. Discuss the various types of Consensus algorithms.	5	K2	CO4
			(OR)			
	b)		Write a short note on following consensus algorithms with a case study i. Proof of Stake (PoS) ii. Proof of Burn (PoB)	13	K3	CO4

15.	a)	Develop a Smart contract to calculate greater of two numbers using a public sum() function, How will you migrate it to Ethereum network and return the calculated sum.	13	K3	CO5
		(OR)			
	b)	Ethereum is a popular Blockchain network? List various factors that makes Ethereum so promising? Explain the significance of signature and how it is useful in Ethereum Network? Highlight the type of Ethereum network that exist.	13	K2	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	i. How Blockchain is useful in Fair trade. Consider the following problem statement and suggest solution using Blockchain. ii. Discuss the pros and cons of integrating Blockchain for stakeholders including suppliers, producers, and workers. iii. Discuss the cryptography primitives and protocols used in Blockchain for Fair trade. Name them and discuss their features briefly. Case Study: Fair Trade guaranteed means the firm complies with the ten principles of Fair Trade and to reassure the firm's compliance they need to conduct peer evaluations, independent audits and self-assessment reports. One of the ten principles of World Fair Trade Organization (WFTO) is transparency and accountability which require their members to involve employees, producers and members in their management process. This principle ensures all relevant information is shared among stakeholders to guarantee transparent supply chains. The guarantee process of transparency is established through disclosing information such as production sites, suppliers and workers' salaries.	15	K3	CO5
		(OR)			
	b)	Write solidity-based smart contract fulfilling the requirements of following use case: Millions of dollars are spent every year on processing claims in the insurance industry. Even more money is wasted due to fraudulent claims. Smart contracts strengthen claim processing through frequent error checks, helping administer policies from individuals or organizations. Shorter processing times will result in lower costs for consumers – including premium rates. For example, Lloyd's of London confirms that insurance companies will also be able to fill in the gaps in coverage that come with the underwriting process, as they will be able to manage risks from corporate buyers much better. Write smart contract for insurance industry and provide maximum security using cryptography primitives and protocols.	15	K3	CO5

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Question Paper Code: 5007

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fifth Semester
Computer Science and Engineering
U19CS520 – COMPUTER 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.	A 40 Kbps satellite link has a propagation delay of 400 milliseconds. The transmitter employs Go Back N ARQ with window size 10. Assuming that each frame is 100 bytes long, Calculate the efficiency of the channel.	2	K3	CO1
2.	The message 11001001 is to be transmitted using the CRC polynomial $x^3 + x + 1$ to detect errors. Identify the original message that was transmitted.	2	K3	CO1
3.	A and B are the only two stations on an Ethernet. Each has a steady queue of frames to send. Both A and B attempt to transmit a frame, and the frames are getting collide, and A wins the first backoff race. At the end of this successful transmission by A, both A and B attempt to transmit and the data frames are getting collide. Compute the probability of 'A' winning the second backoff race.	2	K3	CO2
4.	"Practically entre is a limitation in the number of hosts in a single Ethernet link" Reason out.	2	K2	CO2
5.	In a link state routing, when a link is down, how does a node broadcasts this information to all other nodes?	2	K2	CO3
6.	Identify the network address of the IP address 155.79.128.197 under network mask 255.248.0.0.	2	K2	CO3

7.	What happens if a host sends large number of TCP connection requests to server from unreachable port numbers? Provide a solution to control this problem.	2	K3	CO4
8.	Mention the role of Slow Start Phase in TCP Congestion control.	2	K2	CO4
9.	Write are the underlying Transport Layer protocols for FTP and SMTP?	2	K2	CO5
10.	Differentiate between Persistent and Non-persistent HTTP Implementation in terms of delay and QoS.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

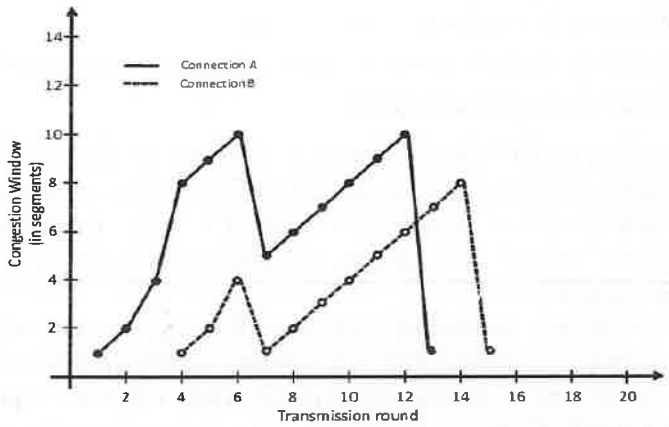
Q.No.		Questions	Marks	KL	CO
11. a)	i.	Depict the functions of Data Link Layer and Network Layer in networked environment. Differentiate between Packet Switching and Circuit Switching.	6	K3	CO1
	ii.	What is Bandwidth Delay Product? Consider two hosts X and Y are connected by a single direct link of rate 10^6 bits/sec. The distance between two hosts is 10000 km and the Propagation of the link is 2×10^8 m/s. Host X sends a file of 50 Kb to host Y. Compute the Transmission and propagation delay.	7	K4	
		(OR)			
b)	i.	Consider a scenario: Alice sends an email to Bob. While Bob receive the email, name the protocols used by Bob's network and mention the reason also.	6	K2	CO1
	ii.	Defend the functioning of Layer 2 Switch and Router. Calculate the roundtrip delay of transmitting a packet of size 10KB across a link of 1Mbps is (assume one-way propagation delay is 20 msec).	7	K3	
12. a)	i.	Two parties uses the Go-back-4 ARQ for reliable transmission of frames. Frames are of size F bytes and transmission rate is R Mbps. Size of an acknowledgement (ACK) is 10 bytes and the one-way propagation delay is T microseconds. Assuming no frame is lost, calculate the channel utilization. If every alternate frame is lost identify the channel utilization. F = 1600, R = 100, T = 10.	6	K5	CO2
	ii.	Illustrate problem with Hidden Terminal Problem. Develop a plan to control hidden terminal RTS-CTS scheme in MACAW protocol. Derive Maximum throughput of Slotted ALOHA protocol.	7	K4	
		(OR)			

b)	i.	Two parties uses the Selective Repeat ARQ for reliable transmission of frames. Frames are of size F bytes and transmission rate is R Mbps. Size of an acknowledgement (ACK) is 10 bytes and the one-way propagation delay is T microseconds. Assuming no frame is lost, calculate the channel utilization. If every alternate frame is lost calculate the channel utilization. F = 1600, R = 100, T = 10.	6 7	K5 K3	CO2
	ii.	Sketch the CSMA Protocol. Derive Maximum Throughput for Slotted non-persistent CSMA.			
13. a)	i.	Suppose an IP Packet containing 256 bytes of data is divided into four fragments, each containing 64 bytes of data. The header length is measured in units of 4 bytes. Calculate the Header Length, Total Length, MF and Offset fields for 1st and last fragments.	5	K5	CO3
	ii.	Illustrate the function of Link State Routing Protocol with an example how does a link state routing algorithm differs from distance vector routing in terms of fault tolerance and fast convergence?	8	K3	
		(OR)	(OR)		
b)	i.	A router has the following (CIDR) entries in its routing table:	5	K3	CO3

Address/mask	Next hop
135.46.56.0/22	Interface 0
135.46.60.0/22	Interface 1
192.53.40.0/23	Router 1
default	Router 2

		State the forwarding of IP packets with following destination IP. 135.46.63.10, 135.46.57.14, and 192.53.40.7	8		
	ii.	Describe the working concept of Distance Vector Routing with an Example. Mention the purpose of TTL and Sequence Number fields in a LSP.			
14. a)	i.	Consider an instance of TCP slow start algorithm where window size at the start of the slow start phase is 2 MSS (Maximum Segment Size) and the threshold at the start of the first transmission is 8 MSS. Assume that timeout happens during fifth transmission. What will be the size of congestion window at the end of the 9th transmission?	5	K4	CO4
	ii.	Criticize the slow-start and avoidance based TCP congestion control process with receiver window size (RWND = 20) and Maximum segment size = 50 Bytes. With a neat graph, depict the variation in the transmit rate against the data transfer in both the phase considering packet drops.	8	K5	
		(OR)			

b) Consider the plot shown below of TCP congestion window size as a function of time for two TCP connections A and B. In this problem we will suppose that both TCP senders are sending large files. We also assume that the packet loss events are independent in connection A and B. CO4



i. Calculate the values of the Threshold parameter between the 1st and the 14th transmission rounds for each connection? At the 12th transmission round for connection A, determine whether there is a segment loss detected by a triple duplicate ACK or by timeout. 5 K4 / 8 K5

ii. Sketch the change in the congestion window for both connections up to the 20th transmission round, considering that there is no segment loss based on timeout or duplicate ACK for any of the connections. Assume that the segment size is 1460 bytes and a total of 87600 bytes have been successfully transmitted over connection A before the 13th transmission round. At which transmission round the cumulative amount of the successful transmitted data is equal to 163520 bytes? Consider that there is no segment loss after the 13th transmission round.

15. a) i. A user is accessing the url:"www.goole.com" while using the above link hoe does the DNS play a vital role? Explicate the purpose of NAT with an example. What is Recursive DNS lookup? 8 K2 CO5

ii. Write the sequence of steps while fetching a webpage specified by the URL www.csi.vcew.ac.in/qp.html.. What is the purpose of Web Caching? 5 K3

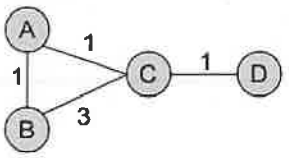
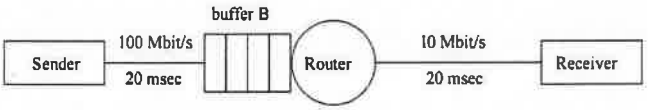
(OR)

b) i. Explain the working of a mail transfer and mail access. What are the protocols used for these functions? 8 K3 CO5

ii. Write the applications and the functions of SMTP and POP3 protocol. How the security is ensured in POP3 protocol. 5 K3

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16. a)	i.	A large block of IP addresses starting at 198.16.0.0 is to be assigned to four organizations, A, B, C, and D request with 4000, 2000, 4000, and 8000 addresses, respectively (in order). Determine the first IP address, last IP address, and the subnet mask for each. State the use of DHCP and ARP protocols.	9	K4	CO2
	ii.	Based on the network shown below, state a sequence of events that will cause a count-to-infinity problem in Distance Vector Routing. Devise your own solution to this problem. If there is no link failure, what will be the distance routing table of Node B? 	6	K5	CO3
		(OR)			
b)	i.	State the principle of VLAN design. In the network shown below we would like to establish a TCP connection to fully utilize the bottleneck link. What should be the size of buffer B? Assume that the advertised receiver window is very large. The one-way link latencies (propagation delays) are given in the figure. 	8	K3	CO3
	ii.	A reliable byte-stream protocol is to be designed using a sliding window. This protocol is to be used in a network with 1 Gbps. The RTT of the network is 140 ms, and the maximum segment lifetime is 60 seconds. How many bits would you include in the advertised window and sequence number fields of your protocol header? Explain why congestion avoidance is necessary for providing QoS when TCP can control congestion?	7	K4	CO4

Reg.No.:												

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

Question Paper Code: 5015

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fifth Semester
Computer Science and Engineering
U19CS519 - ARTIFICIAL INTELLIGENCE
(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.	Depth-first search will always expand more nodes than breath-first search- Justify your answer.	2	K2	CO1
2.	What do you mean by completeness of a search?	2	K2	CO1
3.	State First-order Inference Rule.	2	K1	CO2
4.	Define a well-formed formula (wff).	2	K1	CO2
5.	What is fuzzy logic? What is its use?	2	K2	CO3
6.	Define means-end analysis.	2	K2	CO3
7.	What is Ensemble learning?	2	K2	CO4
8.	What are Intelligent Agents? What are its use?	2	K2	CO4
9.	List the characteristic features of a expert system.	2	K2	CO5
10.	Mention role of inference engine in expert system.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	Explain Water Jug Problem using state space search. Generate Production rules for this problem.	7	K2	CO1
		ii.	What are the loopholes of the Hill Climbing search technique?	6		
			(OR)			
	b)	i.	Explain AO* algorithm with a suitable example. State the limitations in the algorithm.	7	K2	CO1
		ii.	What is Greedy Best First Search? Explain with an example.	6		
12.	a)	i.	What is skolemization? Give an example in conjunctive normal form.	5	K3	CO2
		ii.	Translate the following FOL into English: a. $\forall x$ (Student(x) $\Rightarrow \exists y$ (Course(y) $\wedge$ Takes(x,y))) b. $\neg \exists x$ (Student(x) $\wedge \forall y$ (Student(y) $\wedge \neg$(x=y) $\Rightarrow$ Fools(x,y))) c. ((R$\vee$Q)$\wedge$(P$\vee\neg$Q)) d. $\neg \exists x$ (Student(x) $\wedge$ Failed(x,Chemistry)) $\wedge \exists x$ (Student(x) $\wedge$ Failed (x,History))	8		
			(OR)			
	b)	i.	Show that $(p \rightarrow (q \rightarrow r)) \rightarrow ((p \rightarrow q) \rightarrow (p \rightarrow r))$ is a tautology.	5	K3	CO2
		ii.	Every traffic chases some driver. Every driver who horns is smart. No traffic catches any smart driver. Any traffic who chases some driver but does not catch him is frustated. Use resolution algorithm to draw a conclusion that "If all drivers horn, then all traffics are frustated".	8		
13.	a)		Explain Backward and Forward Chaining with example in logic representation. Also mention advantages and disadvantages of both the algorithms.	8+5	K2	CO3
			(OR)			
	b)	i.	What are fuzzy membership functions?	3	K2	CO3
		ii.	Explain Dempster-Shafer theory with an example.	10		
14.	a)	i.	What is learning by induction? Explain inductive learning process with example.	7	K2	CO4
		ii.	Explain Goal Stack Planning.	6		
			(OR)			

	b)	i.	Explain the application of k-strips in natural language processing.	6	K3	CO4
		ii.	What is back propagation? Explain all the steps involved in the back propagation with an example.	7		
15.	a)	i.	With neat sketch explain the architecture, characteristic features and roles of expert system.	7	K2	CO5
		ii.	Explain knowledge engineering with a block diagram.	6		
			(OR)			
	b)		What is expert system shell? Design an expert system for Travel recommendation and discuss its roles.	3+10	K4	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.			Questions	Marks	KL	CO
16.	a)		How an algorithm's performance is evaluated? Compare different uninformed search strategies in terms of the four evaluation criteria.	15	K2	CO1
			(OR)			
	b)	i.	Discuss about constraint satisfaction problem with a algorithm for solving a cryptarithmetic Problem.	10	K3	CO4
		ii.	Write the PEAS description of the following agent: a. Taxi Driver b. Medical Diagnosis c. ATM (Automated Teller Machine) d. BANK e. Robot Soccer Player	5		

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VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN

[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]

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

Question Paper Code: 5016

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

Fifth Semester

Computer Science and Engineering

U19CSV22 – CYBER SECURITY

(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.	Differentiate between cyber Space, cyber-crime and cyber-attack.	2	K2	CO1
2.	Articulate the concept of "need-to-know" in the context of confidentiality.	2	K2	CO1
3.	Compare and contrast: active attack and passive attack.	2	K2	CO2
4.	Correct concept of "defense-in-depth" in cyber security architecture.	2	K2	CO2
5.	Mention is the significance of security audit in an organization.	2	K1	CO3
6.	Differentiate between cyber-security standard and cyber-security control.	2	K2	CO3
7.	How does public-key cryptography differs from symmetric-key cryptography?	2	K2	CO4
8.	Mention the various types of firewalls available.	2	K2	CO4
9.	Write the significance of public awareness campaigns and educational initiatives in preventing investment frauds.	2	K2	CO5
10.	Identify the role of an ethical hacker (white hat hacker) in an organization's security strategy.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Consider that you are working as a security analyst in a large corporation. A colleague received an email that appears to be a phishing attempt. Describe the sequence of steps you would take to analyse and respond to this mail.	13	K4	CO1
		(OR)			
	b)	Discuss the potential consequences of a successful cyber-attack in a business organization. What sort of counter measures that can be implemented to mitigate these cyber-attacks?	13	K4	CO1
12.	a)	Your company's website has recently experienced a significant increase in traffic, which is slowing down the performance of the server. Identify and write the potential reasons for this sudden surge in the network traffic and the associated security risks. What kind of security measures can be taken to mitigate these risks?	13	K4	CO2
		(OR)			
	b)	Provide the various categories of security attacks, with suitable examples. Explain how to defend against these attacks.	13	K2	CO2
13.	a)	Explain the importance of data privacy for individuals and the potential consequences of privacy invasion due to cyber-attacks.	13	K2	CO3
		(OR)			
	b)	Mention the importance of implementing cyber security controls in protecting sensitive data and preventing cyber-attacks. Provide relevant real-world incidents where controls could have made a difference.	13	K3	CO3
14.	a)	What is the purpose of vulnerability scanning tools? How do they contribute to cyber security? Differentiate between the hardware firewall and software firewall.	13	K3	CO4
		(OR)			
	b)	Describe the challenges and best practices associated with securing remote work environments, especially in light of the increased remote work trends seen in recent years.	13	K3	CO4
15.	a)	Compare and contrast the roles of intrusion detection systems (IDS) and intrusion prevention systems (IPS) in cyber security. Explain how they work together to enhance security.	13	K3	CO5
		(OR)			

	b)	Imagine that you are a digital forensics investigator, assigned to examine the suspect's computer for evidence of cybercrimes. Outline the steps you would take in the examination process, from acquiring the evidence to presenting findings in court.	13	K4	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Design and develop a basic incident response plan for a small business. Outline the key steps and considerations in responding to a cyber-security incident.	15	K4	CO5
		(OR)			
	b)	Analyze the role of leadership and management in fostering a strong cyber security culture within an organization and ensuring policy adherence.	15	K4	CO5

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[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 5017

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fifth Semester
Computer Science and Engineering
U19CSV31 – DATA WAREHOUSING AND DATA MINING
(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 down the key components of a data warehouse.	2	K1	CO1
2.	Mention the significance of ETL in data warehousing.	2	K2	CO1
3.	Why is OLAP important in business analysis?	2	K2	CO2
4.	What is a multi-dimensional data model?	2	K2	CO2
5.	Briefly describe four types of data in data mining.	2	K1	CO3
6.	Briefly describe any two measures of interestingness.	2	K1	CO3
7.	How associations differ from correlations?	2	K2	CO4
8.	Differentiate between prediction and classification methods.	2	K2	CO4
9.	With suitable examples, describe any two categories of clustering methods.	2	K1	CO5
10.	Why is outlier analysis important in data mining?	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a) i.	Explain the different steps involved in mapping the data warehouse to a multiprocessor architecture.	7	K1	CO1
	ii.	Discuss the various steps involved in building a data warehouse.	6	K1	CO1

(OR)

	b)	i.	Define Metadata. Explain metadata generated in data warehouse.	7	K1	CO1
		ii.	Describe in detail about DBMS schemas for decision support in a data warehouse.	6	K1	CO1
12.	a)	i.	Discuss the different reporting and query tools available in a data warehouse.	7	K1	CO2
		ii.	Consider slowly changing dimensions problem, and write the solution for the problem.	6	K2	CO2
			(OR)			
	b)	i.	Explain top-down and bottom-up approaches for building a data warehouse. Describe the merits and demerits of both these approaches.	7	K2	CO2
		ii.	Explain Drill-down and Roll-up with the help of suitable examples and diagrams.	6	K1	CO2
13.	a)	i.	Eleven students were asked to measure their pulses for 30 seconds and multiply by two to get their one minute pulse rates. The measurement results were: 62, 32, 60, 66, 70, 72, 74, 74, 78, 80, 84. Create five-number summary for the pulse rates and draw boxplot.	7	K3	CO3
		ii.	Consider the set of data below: 5, 10, 11, 13, 15, 35, 50, 55, 72, 150, 204, 215. Partition the data into two bins using equal-width partitioning and perform smoothing by bin boundary.	6	K3	CO3
			(OR)			
	b)	i.	Given the following marks scored by a student in two subjects, compute z-scores to find out in which subject the student has done comparatively better.	7	K3	CO3

	Marks obtained	Mean marks of class	Standard deviation
Subject 1	70	60	15
Subject 2	65	60	6

		ii.	Explain data mining task primitives.	6	K3	CO3
14.	a)	i.	Assume we have an association rule *If Drink_Tea and Drink_Coffee then Smoke* having a Lift of 2. What does say about the relationship between smoking, drinking coffee, and drinking tea? Moreover, if the support of the above association rule is 1%, what does this mean?	7	K4	CO4

ii. Given the following transactions with minimum support = 50 % and minimum confidence = 80%, list all frequent item sets using FP-growth. 6 K3 CO4

TID Item_bought (in the form of brand-item_category)

T100 Venkys-Chicken, Amul-Milk, Nestle-Cheese, Britannia-Bread

T200 Britannia-Cheese, Nestle-Milk, Himalaya-Apple, Parle-Biscuit, Modern-Bread

T300 Fuji-Apple, Nestle-Milk, Modern-Bread, Parle-Biscuit

T400 Modern-Bread, Amul-Milk, Nestle-Cheese

(OR)

b) For the given dataset apply the Decision Tree classification to classify the label buys-computer: 13 K3 CO4

age	income	student	credit_rating	buys_computer
<=30	high	no	fair	no
<=30	high	no	excellent	no
31...40	high	no	fair	yes
>40	medium	no	fair	yes
>40	low	yes	fair	yes
>40	low	yes	excellent	no
31...40	low	yes	excellent	yes
<=30	medium	no	fair	no
<=30	low	yes	fair	yes
>40	medium	yes	fair	yes
<=30	medium	yes	excellent	yes
31...40	medium	no	excellent	yes
31...40	high	yes	fair	yes
>40	medium	no	excellent	no

15. a) i. Four individuals have the following values for two compatible variables (columns under X, Y are coordinates of points on a plane). We initially cluster T with A, and K with S. We use k-means clustering after this initialization with k = 2 and the following rules: We use Euclidean distance to compute distances. Whenever there isa tie between distance of a point from its own cluster's centroid and from another cluster's centroid, the point moves to the other cluster. Show the clusters and their points after each step of k-means. 7 K3 CO5

Individual	X	Y
T	5	4
A	4	7
K	7	5
S	3	7

ii. You are given a database of five documents – A, B, C, D and E. The following table shows the inter-document distance matrix. Show step by step working of an agglomerative hierarchical clustering algorithm using complete link, and draw the dendrogram. 6 K3 CO5

Document	A	B	C	D	E
A	0	1	2	2	3
B	1	0	2	4	3
C	2	2	0	1	5
D	2	4	1	0	3
E	3	3	5	3	0

(OR)

b) Cluster the following eight points (with (x, y) representing locations) into three 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 function is Euclidean distance. Suppose initially we assign A1, B1, and C1as the center of each cluster, respectively. Use the k-means algorithm to identify

i. The three cluster centers after the first round execution 10 K2 CO5

ii. The final three clusters 3

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	You have been hired by a social media networking startup. Your first task is to create a data warehouse and data mining infrastructure for the company. Discuss in detail what all things you would plan and how?	15	K3	CO2
		(OR)			
	b)	Elon Musk has hired you to classify 1 million tweets from competitors into one of the four categories A, B, Cand D. Explain how you would proceed with the task using the algorithms you learned in this course.	15	K3	CO4

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

Question Paper Code: 5010

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fifth Semester
Computer Science and Engineering
U19CS521 – MICROPROCESSOR AND INTERFACING
(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.	i.	A=78h	2	K3	CO1
	ii.	A=A+67			
	iii.	HL=0x3453H			
		Convert the above given statements to 8085 (use immediate addressing mode).			
2.		Identify the functionality of the given program. LHLD 3500 H XCHG LHLD 3502 H ADD D SHLD 3504 H HLT	2	K3	CO1
3.		Mention the need for *'NOP'* instruction in the 8085 microprocessor, and when might it is to be used in a program.	2	K2	CO2
4.		Under what circumstances HLT instruction in the Machine Control Group of the 8085 processor's instruction set, is used?	2	K2	CO2

5.		MOV BX,[4523H]
		MOV BL,[DX]
		MOV CL,[BX][DI]
		MOV 15[BP][DI], DX
		Identify the addressing modes of the instructions given above.
			2	K3	CO3

6.	State the significance of the general-purpose registers, such as AX, BX, CX, and DX, in the register organization of the 8086 microprocessor. How are they used in various operations?	2	K3	CO3
7.	How is the stack used in managing interrupts, and what is the role of an Interrupt Service Routine in handling interrupt requests?	2	K2	CO4
8.	Calculate the Effective address for the instruction MOV AL ,2314H[DI] Assume DS = 1223H and DI = 0422H.	2	K3	CO4
9.	Write the use of FIFO RAM in 8279.	2	K2	CO5
10.	Mention the need for shift register inside the 8251.	2	K3	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Create a timing diagram for a simple instruction execution in an 8-bit microprocessor, illustrating the various stages of the fetch, decode, execute, and write-back cycles. Explain the timing parameters and their importance in microprocessor operation.	13	K2	CO1
		(OR)			
	b)	Draw the functional block diagram of 8085 and explain the following parts neatly. i. ALU ii. Control unit iii. Register set	13	K2	CO1
12	a)	You have to interface 8085 processor to two RAM chips, each of 1 Kbyte access. The address range of 1st chip has to be 2000 to 23FF and the second one is 2400 to 27FF. Design and develop the interface logic.	13	K3	CO2
		(OR)			
	b)	There is a string stored from location 2000H. The string is terminated with a NULL character (00H). Write a program to count the number of words in this string using 8085 instruction set. Two words in the string are separated by one blank character only (\b). The ASCII equivalent of blank character is 20H. The word count should be stored in register C. Provide comments for each statement. Depict the process with a flowchart.	13	K3	CO2
13	a)	Write a program that uses a loop to calculate the first seven values of the Fibonacci number sequence, described by the following formula: Fib(0) = 0, Fib(1) = 1, Fib(n) = Fib(n _1) +Fib(n _ 2). Write program in ALP of 8086.	13	K3	CO3
		(OR)			

	b)	Illustrate the following modes of operation of 8086 with architecture. i. Minimum Mode ii. Maximum Mode	13	K2	CO3
14	a)	Explain the process of handling hardware interrupts in an 8086-based system. Describe the role of the Interrupt Vector Table (IVT) and the steps involved in invoking and servicing an interrupt through an ISR.	13	K3	CO4
		(OR)			
	b)	Classify the instruction set of 8086 and explain any 5 instructions in each category.	13	K2	CO4
15	a)	Describe the configuration and programming of the 8254 to generate a square wave output of a specific frequency. Include details about the control registers and mode selection, and provide an example of a situation where such precise timing is required.	13	K3	CO5
		(OR)			
	b)	Illustrate 8255 block diagram with different modes of operations.	13	K2	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16	a)	Interface 8 LED's via Port A of 8255 in mode 0 and make it ON continuously.	15	K3	CO5
		(OR)			
	b)	i. Explain the role of the stack in assembly language programming for the 8086 processor. Provide examples of how the stack is used for subroutine calls and parameter passing.	8	K3	CO4
		ii. Consider a scenario that an electronic vending machine has to display the number of tea and coffee delivered to the customers over a period of 10 minutes. Write an assembly language program to calculate and display the total amount collected (Tea - Rs 20, Coffee - Rs 30, Milk – Rs 40).	7		

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

Question Paper Code: 5003

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fifth Semester
Computer Science and Engineering
U19CS522 – THEORY OF COMPUTATION
(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

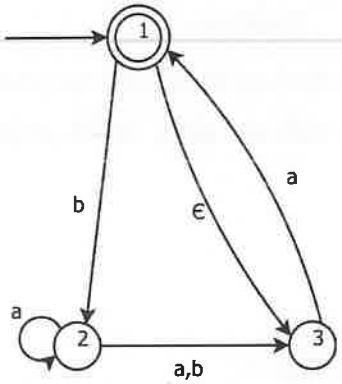
(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Differentiate a Turing Machine and Pushdown Automata.	2	K1	CO1
2.	Given the language L = {ab, aa, baa}, which of the following strings are in L*? S_1 = abaabaaabaa S_2 = aaaabaaaa S_3 = baaaaabaaaab S_4 = baaaaabaa	2	K3	CO1
3.	What is Є-closure of a any state q_0?	2	K1	CO2
4.	Find the minimum number of nodes in a DFA that recognizes strings over {a, b} with length mod 3 = 0.	2	K3	CO2
5.	The language which is generated by the grammar S-> aSa I bSb I a I b over the alphabet {a, b} can be formally written as?	2	K3	CO3
6.	Write a Regular Expression to denote a language L which accepts all the strings which begin or end with either 00 or 11.	2	K3	CO3
7.	What are the additional features in a Push Down Automata compared to NFA?	2	K1	CO4
8.	What is a two stack PDA?	2	K1	CO4
9.	Contrast multihead with multitape turing machines.	2	K2	CO5
10.	What is two way infinite tape Turing Machine?	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	Draw state diagram for DFA for $\{w \mid w$ contains baba$\}$ if the alphabet is in {a,b}	8 5	K3	CO1
		ii.	Prove by induction: if $n \geq 2$, then $n^3 - n$ is always divisible by 3.			
			(OR)			
	b)	i.	Define transition function for a DFA, NFA, and GNFA. Draw state diagram for NFA for the language $1^*\ (001^+)^*$ with three states.	8	K3	CO1
		ii.	Prove by induction that $5^n - 1$ is divisible by 4.	5		
12.	a)	i.	Write down the pumping lemma for Regular Languages.	6	K3	CO2
		ii.	Show L over alphabet $\Sigma = \{a, b, c\}$ is not regular . $L = \{a^n b^l c^{n+l} : n, l \geq 0\}$	7		
			(OR)			
	b)	i.	Write the formal definition of the following NFA.	4	K3	CO2
		ii.	Convert the following NFA into DFA. Show all steps.	9		



13.	a)	i.	What do you mean by Chomsky Normal form of a grammar? Reduce the following grammar in Chomsky Normal Form. S → ASA|aB A → B | S B → b| Є	9	K3	CO3
		ii.	Show the parse trees for the following four strings using grammar G1:	4		

a	a + a + a	a + a	((a))

G1: E → E + T | T
T → T * F | F
F → (E) | a

(OR)

b)	i.	Answer the following questions for context-free grammar G defined as: $R \rightarrow XSX \mid S \mid c$ $S \rightarrow aTb \mid bTa \mid cTc$ $T \rightarrow XRX \mid XT \mid \epsilon$ $X \rightarrow a \mid b \mid c$ - Write down the formal definition of this context free grammar (4-tuple definition). - Give any string of the grammar G of length at least 5. (show the derivation) - Make a parse tree for the string generated in part b.	8	K3	CO3
	ii.	For the two grammars shown below, show which one is ambiguous using an example. G1: $E \rightarrow E + T \mid T$ $T \rightarrow T * F \mid F$ $F \rightarrow (E) \mid a$ G2: $E \rightarrow E + E \mid E * E \mid (E) \mid a$ The terminals for both grammars are {a, +, *, (,) }	5		
14. a)	i.	Write down the formal definition of a Pushdown Automata.	5	K3	CO4
	ii.	For the Grammar G2, construct a Pushdown Automata. G2: $E \rightarrow E + T \mid T$ $T \rightarrow T * F \mid F$ $F \rightarrow (E) \mid a$	8		
		(OR)			
b)	i.	Write down the pumping lemma for Context Free Languages.	5	K3	CO4
	ii.	For the Grammar G3, construct a Pushdown Automata. G3: $R \rightarrow XRX \mid S$ $S \rightarrow aTb \mid bTa$ $T \rightarrow XTX \mid X \mid \epsilon$ $X \rightarrow a \mid b$	8		
15. a)	i.	Explain the Halting problem. Is it decidable or un-decidable problem? What is decidability?	6	K3	CO5
	ii.	If HALT = {<M, *w*> | M is a Turing Machine and M halts on *w*}. Prove that HALT is un-decidable.	7		
		(OR)			
b)	i.	What are deciders? Which configurations are known as the halting configurations for a Turing Machine?	6	K2	CO5
	ii.	What do you mean by tape compression, linear speed up and the reduction in the number of tapes?	7		

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16. a)	i.	Write down the definition of a Turing Machine. Name its variants. What comprises current state/configuration of a Turing Machine?	6	K3	CO5
	ii.	Design a TM *to compute the 2's complement of a binary string*. Show how a Turing Machine may proceed from one configuration to another. Explain what happens when the configuration changes and also give the transition function in general and explain using an example from the given problem.	9		
		(OR)			
b)	i.	What is a Turing machine? Give the specification of a Turing machine and explain its working in detail.	6	K3	CO5
	ii.	Design a TM to find the *sum of two numbers m and n*. Assume that initially the tape contains *m* number of 0s followed by # followed by *n* number of 0s.	9		

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

Question Paper Code: 5013

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Seventh Semester
Computer Science and Engineering
U19CSE13 – DESIGN THINKING
(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 the tools used for design thinking.	2	K1	CO1
2.	What are the importance of stakeholder mapping in the design thinking process?	2	K2	CO1
3.	Write the purpose of value chain analysis.	2	K2	CO2
4.	Is need finding necessary in visualization? Why?	2	K3	CO2
5.	Differentiate ideation and prototype.	2	K3	CO3
6.	What is concept development in design thinking?	2	K3	CO3
7.	Why is assumption testing important in design thinking?	2	K2	CO4
8.	What are the benefits of storyboarding?	2	K2	CO4
9.	Define customer co-creation in the context of design thinking.	2	K2	CO5
10.	What is the primary objective of concept synthesis?	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	What is design thinking and Why it is important? Also explain the phases of design thinking in detail.	13	K2	CO1

(OR)

	b)	Explain the steps involved in STEEP analysis. What are the advantages and limitations of STEEP analysis?	13	K2	CO1
12.	a)	Briefly explain about Mind Mapping process.	13	K3	CO2
		(OR)			
	b)	What do you mean by user personas? How they are created, and how they influence the design decisions and solutions.	13	K2	CO2
13.	a)	What is brainstorming? Discuss their fundamental concepts and effective techniques used in brainstorming.	13	K2	CO3
		(OR)			
	b)	How does the process of idea refinement contribute to the quality and feasibility of design solutions? Discuss techniques and approaches for refining ideas and concepts in design thinking.	13	K3	CO3
14.	a)	Discuss the advantages and challenges associated with rapid prototyping and explain how does it work.	13	K3	CO4
		(OR)			
	b)	Explain how storyboarding is used to visualize and communicate design ideas. Provide a step-by-step guide to creating a storyboard for a complex design solution.	13	K4	CO4
15.	a)	Explain how design thinking helps to identify and address strategic requirements? Give examples of how this has been applied in different industries.	13	K4	CO5
		(OR)			
	b)	What is quick wins? When to use quick wins? Explain planning and implementation of quick wins.	13	K3	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	You are supposed to design a protyping tool for the web applications and mobile applications. In this regard, identify the list of design principles involved while performing the same. Identify the alpha and beta releases of the design and specify its necessity.	15	K6	CO5
		(OR)			
	b)	Discuss how ethnography technique is related to brainstorming session in requirement elicitation for modeling a design. Discuss the same in perspective of Zoom Application.	15	K6	CO5

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

Question Paper Code: 5012

B. E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fifth semester
Computer Science and Engineering
U19CSV34 – ADVANCED DATABASE SYSTEMS
(Common to Information Technology)
(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 a Query tree?	2	K1	CO1
2.	What is Project operation in Relational algebra? Give example.	2	K1	CO1
3.	Differentiate static hashing and dynamic hashing.	2	K2	CO2
4.	What are the characteristics of deductive database?	2	K2	CO2
5.	Define Encapsulation. Give example.	2	K1	CO3
6.	Give detail about OQL.	2	K2	CO3
7.	List the database security issues.	2	K2	CO4
8.	Write the challenges of maintaining database security.	2	K2	CO4
9.	List the datatypes in MongoDB.	2	K2	CO5
10.	Write the alter query in NoSQL.	2	K3	CO5

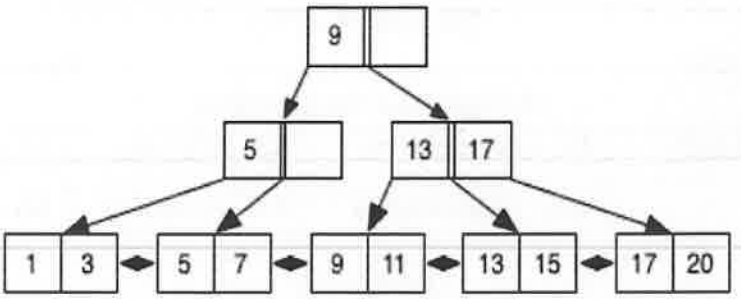
PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	What is heuristic rule in query optimization? Explain the various transformation rules.	13	K2	CO1

(OR)

	b)	Consider the schema R(a, b), S(b, c), T(b, d), U(b, e). For the following SQL query, give two equivalent logical plans in relational algebra such that one is likely to be more efficient than the other. Indicate which one is likely to be more efficient. Explain. SELECT R.a FROM R, S WHERE R.b = S.b AND S.c = 3.	13	K4	CO1
12.	a)	Discuss in detail about multimedia databases.	13	K1	CO2
		(OR)			
	b)	Consider the following B+ tree index of order 1:			



	i.	Circle all nodes (not index entries, but entire nodes) in the above figure that must be fetched to satisfy the query "Get all records with search key greater than or equal to 7 and less than 15".	4	K3	CO2
	ii.	Assume B+ tree is modified by adding the following keys in the following order: 27, 18, 30, 19. Construct the B+ tree for each modification.	9		
13.	a)	Explain object identity and reference types in Object Relational database with examples.	13	K1	CO3
		(OR)			
	b)	Discuss in detail about object structure, object classes and inheritance in Object oriented databases with respect to employee database.	13	K2	CO3
14.	a)	Elaborate about Mandatory Access Control and Role-Based Access Control for Multilevel Security.	13	K2	CO4
		(OR)			
	b)	Illustrate on Statistical Database Security.	13	K2	CO4
15.	a)	Explain in detail about MongoDB Atlas.	13	K1	CO5
		(OR)			
	b)	Discuss in detail about Apache Cassandra.	13	K2	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	A car-rental company maintains a vehicle database for all vehicles in its current fleet. For all vehicles, it includes the vehicle identification number, license number, manufacturer, model, date of purchase, and color. Special data are included for certain types of vehicles: • Trucks: cargo capacity • Sports cars: horsepower, renter age requirement • Vans: number of passengers • Off-road vehicles: ground clearance, drive train (four- or two-wheel drive). Construct an object-oriented database schema definition for this database. Use inheritance where appropriate.	15	K6	CO3
		(OR)			
	b)	For the given database schema, Student(sid, name, major, age) Class(cname, meets_at, room, facultyId) Enrolled(studentId, className) Faculty(fid, fname, deptid) Draw the logical query tree for the following query: SELECT name, major FROM Student, Enrolled, Class, Faculty WHERE facultyId = fid AND studentId = snum AND className = cname AND fname = 'Jones' Using relational algebra laws, perform heuristic optimization on the query tree. Explain the optimizations (laws) that you apply.	15	K3	CO1

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: 5011

B. E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Fifth Semester
Computer Science and Engineering
U19CSV25– SOCIAL NETWORK ANALYSIS
(Common to Information Technology)
(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 limitations of current web?	2	K2	CO1
2.	List the applications of social network analysis.	2	K2	CO1
3.	Define Ontology. Give example.	2	K1	CO2
4.	What are web ontology languages?	2	K1	CO2
5.	Mention the uses of community discovery.	2	K3	CO3
6.	Write the applications of community mining algorithms.	2	K2	CO3
7.	What is attack spectrum?	2	K1	CO4
8.	How trusts are derived in online environment?	2	K3	CO4
9.	What is clustering?	2	K1	CO5
10.	What is cover network?	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Elaborate on development of semantic web.	13	K1	CO1
		(OR)			
	b)	Explain different web-based networks.	13	K1	CO1
12.	a)	Discuss in detail about the modeling and aggregating social network data with example.	13	K1	CO2
		(OR)			
	b)	Demonstrate about Ontology-based knowledge Representation.	13	K3	CO2
13.	a)	Discuss the various core methods used for community detection and mining.	13	K2	CO3
		(OR)			
	b)	Discuss in detail about Multi-Relational characterization of dynamic social network communities.	13	K1	CO3
14.	a)	Explain the Trust models based on subjective logic.	13	K1	CO4
		(OR)			
	b)	Elaborate on privacy in online social networks.	13	K1	CO4
15.	a)	Explain the Node-edge diagrams to visualize social networks.	13	K2	CO5
		(OR)			
	b)	Discuss the various approaches to scale node-link diagrams to large networks with several thousand or millions of nodes.	13	K2	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	What is a web community? How will you extract the evolution of Web Community from a series of web archives?	15	K3	CO3
		(OR)			
	b)	Explain how to visualize social networks with matrix-based representation. Also discuss the pros and cons of matrix-based representation.	15	K3	CO5

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: 5014

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2023
Seventh Semester/ Eighth Semester
Computer Science and Engineering
U19CSE18 / U19CSV57 – PROFESSIONAL ETHICS IN ENGINEERING
(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 "moral autonomy" and explain its relevance to engineering ethics.	2	K1	CO1
2.	Outline Kohlberg's theory of moral development and its significance for engineering professionals.	2	K2	CO1
3.	Recall the meaning of "Engineering as Experimentation" and why are engineers considered responsible experimenters?	2	K1	CO2
4.	Label "Code of Ethics" in engineering, and give an example of one guiding principle from any engineering Code of Ethics.	2	K1	CO2
5.	Rephrase the concept of "Risk-Benefit Analysis" in the context of engineering projects.	2	K2	CO3
6.	Summarize safety assessment. When is it usually conducted?	2	K2	CO3
7.	Outline "collective bargaining" and how does it relate to the engineering profession?	2	K2	CO4
8.	Interpret "Intellectual Property Rights (IPR)" and why they are important for engineers?	2	K2	CO4
9.	Infer the term "Environmental Ethics".	2	K2	CO5
10.	Define Ethical Hacking in your own words.	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Explain in detail about types of inquiry.	13	K2	CO1
		(OR)			
	b)	Compare and contrast theories by Kohlberg and Gilligan. How do these theories apply to engineering decision-making? Provide examples.	13	K2	CO1
12.	a)	Summarize the "Challenger Case Study" in the context of a balanced outlook on law and ethics. What were the key ethical lapses and how could they have been avoided?	13	K2	CO2
		(OR)			
	b)	Explain in detail about the code of ethics with suitable narration.	13	K2	CO2
13.	a)	Organize the Chernobyl and Bhopal case studies focusing on the engineer's responsibility for safety. What went wrong and what could have been done to prevent these disasters?	13	K3	CO3
		(OR)			
	b)	"A thing is safe if its risks are judged to be acceptable". Interview the statement with suitable examples.	13	K3	CO3
14.	a)	Explain the significance of Intellectual Property Rights in engineering, particularly in terms of patents and trade secrets. Then, delve into the ethical considerations of temporarily lifting these rights for essential technologies like water purification systems in areas facing severe water scarcity.	13	K2	CO4
		(OR)			
	b)	Outline the ethical considerations surrounding "Conflicts of Interest" in the engineering profession. Provide real-life examples to elaborate.	13	K2	CO4
15.	a)	Identify the role of engineers in the context of "Environmental Ethics". How should multinational corporations in engineering adhere to environmental ethics?	13	K3	CO5
		(OR)			
	b)	Interview the concept of "moral leadership" within engineering. Discuss how engineers can act as moral leaders, both as managers and advisors, providing a sample code of conduct.	13	K3	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Organize the ethical challenges associated with designing autonomous vehicles that might have to make quick decisions in emergency situations, such as choosing between the safety of its passengers and the safety of pedestrians. Include in your discussion the ethical frameworks that could guide engineers, possible design features to mitigate these challenges, and the role of government regulators in ensuring ethical decision-making in these vehicles.	15	K3	CO5
		(OR)			
	b)	Imagine you are an engineer involved in a large dam project. The dam will provide renewable energy and control floods but will also displace local communities and harm local ecosystems. Discuss the ethical considerations involved in planning and executing this project. Outline a strategy to engage with all stakeholders, and explain how principles of sustainability could be integrated into the project's design.	15	K2	CO2