CSE 32

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: 5031

M.E. / M.Tech. DEGREE END-SEMESTER EXAMINATIONS – DEC.2022 / JAN. 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.	Distinguish between machine learning and deep learning.	2	K1	CO1
2.	List any 5 applications of deep learning.	2	K1	CO1
3.	State learning rate.	2	K1	CO2
4.	Compare supervised learning with unsupervised learning.	2	K1	CO2
5.	List limitation of single layer perceptron.	2	K1	CO3
6.	Define various layers of neural networks.	2	K1	CO3
7.	State the purpose of pooling layer.	2	K1	CO4
8.	Define a kernel function.	2	K1	CO4
9.	Recall the role of the decoder in the auto encoder.	2	K1	CO5
10.	Define variance.	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	i. Explain the workflow of deep learning with its neat architecture.	7	K1	CO1
		ii. Illustrate the basic concepts of deep learning.	6	K1	CO1

(OR)

	b)	i.	Explain the basic characteristics of RNN.	6	K2	CO1
		ii.	Justify why a single perceptron cannot solve the XOR gate problem.	7	K2	CO1
12.	a)		Compare linear regression with logistic regression.	13	K3	CO2
			(OR)			
	b)		Explain in detail the EM algorithm with a neat flow diagram.	13	K3	CO2
13.	a)		Discuss Widrow Hoff Algorithm with its limitation.	13	K3	CO3
			(OR)			
	b)		Illustrate the use of hidden layers and neurons in deep learning.	13	K3	CO3
14.	a)	i.	How can we improve the performance of high dimensional data analysis with convolutional neural network?	7	K4	CO4
		ii.	Write shorts on tuning parameters.	6		
			(OR)			
	b)		What is LSTM? Explain its architecture and list its applications.	13	K4	CO4
15.	a)		Illustrate Deep Belief Networks with a neat sketch.	13	K5	CO5
			(OR)			
	b)		Discuss various Feature/Variable Selection Techniques with an example.	13	K5	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Consider a bidirectional recurrent neural network, in which there is an input x_t, an output node o_t, and two hidden nodes h_{1t}, h_{2t} at each time step. Draw an equivalent feed-forward (non-recurrent) neural network representing three-time instances. Add weights to your feed-forward network, clearly indicating which weights are equal.	15	K6	CO4
		(OR)			
	b)	Consider a single LSTM cell whose inputs are the current input x_t, and h_{t-1} and c_{t-1} from the previous step, and the outputs are h_t and c_t. Assume the input dimension is D and the dimension of h_t is H. Sketch an LSTM cell showing the various gates inside the cell, including forget gate(f_t), input gate(i_t), o_t, c_t, and h_t. Also, write down the equations of the various gates for each of the weight parameters involved in the definition, and indicate their dimensions.	15	K6	CO4

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Question Paper Code: 6023

M.E./ M.Tech. DEGREE END-SEMESTER EXAMINATIONS – DEC.2022 / JAN. 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.	Define interoperability in the context of block chain implementation.	2	K1	CO1
2.	Discuss how problems with scaling and interoperability affect wider block chain utilization.	2	K2	CO2
3.	Describe two core components of block chain technology.	2	K3	CO2
4.	Identify two major properties of a block chain network.	2	K3	CO3
5.	Differentiate between a public/permission-less and a private/permissioned block chain.	2	K4	CO4
6.	Highlights the two differences between Hard Fork and Soft Fork.	2	K2	CO2
7.	Proof of Work (PoW) consensus protocols have been criticized due to their high and continuously increasing mining cost. Discuss how mining cost affects the tamper resistance attribute of public block chains.	2	K3	CO4
8.	What do you mean by Proof-of-Stake?	2	K1	CO1
9.	Discuss whether a public block chain requires issuing its own native crypto-currency to provide incentives to its validator network.	2	K3	CO4
10.	Define a cryptographic token.	2	K2	CO1

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	What do you mean by Byzantine generals problem? Also discuss Byzantine generals problem in a distributed system with an example.	07	K3	CO2
		ii.	What do you mean by Zero-Knowledge Proof? Also discuss the various advantages of Zero-Knowledge Proof?	06	K2	CO2
			(OR)			
	b)	i.	Blockchain is a distributed database. How does it differ from traditional databases?	5		
		ii.	Briefly discuss what are the different types of Block chains?	8	K2	CO1
12.	a)	i.	Identify five major benefits of using block chain in supply chain management.	05	K3	CO2
		ii.	Discuss Key characteristics of Consortium Blockchain in detail.	08	K2	CO4
			(OR)			
	b)	i.	Highlights the various types of consensus mechanism in block chain.	06	K3	CO2
		ii.	How can block chain help in asset management?	07	K4	CO4
13.	a)		Illustrate about consensus attacks with example and how can you change the consensus rules.	13	K3	CO3
			(OR)			
	b)	i.	Describe a public block chain and mention its five current applications.	06	K2	CO2
		ii.	Discuss the need for predefined mechanisms and rules to modify a public block chain's protocols.	07	K3	CO3
14.	a)	i.	Describe the process of PoW.	05	K1	CO1
		ii.	What is Nakamoto Consensus and how does it power Bitcoin?	08	K4	CO4
			(OR)			
	b)	i.	Discuss the various attacks of vectors and vulnerabilities that may be present in block chains.	07	K3	CO5
		ii.	Discuss the various ways to counter block chain's energy consumption pitfall.	06	K3	CO5

15.	a)	i.	Explain the difference between fungible and nonfungible tokens and identify the appropriate Ethereum token standards for each.	08	K3	CO2
		ii.	What is GHOST Protocol? Why it is required in block chain? Also discuss its pros and cons.	05	K2	CO3
			(OR)			
	b)	i.	Highlights the pros and cons of the Bitcoin Protocol.	05	K1	CO1
		ii.	Discuss the following terms: • Bitcoin Wallets • Bitcoin Addresses	08	K2	CO1

PART – C

(1 x 15 = 15Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	How block chain is used to control the execution of the process of a supply chain using smart contracts? Discuss with an example and necessary diagram (The AgriDigital Vision).	15	K6	CO5
		(OR)			
	b)	What are the use cases of block chain in finance? Discuss all in details.	15	K6	CO5

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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: 5029

B.E./ B.Tech. DEGREE END-SEMESTER EXAMINATIONS – DEC.2022 / JAN.2023

Third Semester

Computer Science and Engineering

U19CS306 – DIGITAL LOGIC DESIGN

(Regulation 2019)

Time: Three Hours | Maximum: 100 Marks

Answer ALL the questions

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

PART – A

(10 x 2 = 20 Marks)

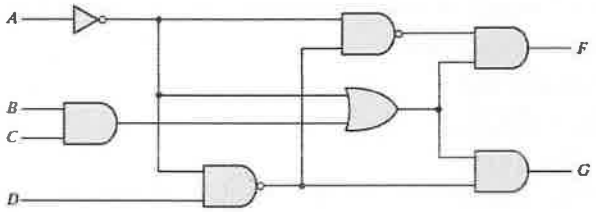
Q.No.	Questions	Marks	KL	CO
1.	What range of signed decimal values can be represented using 12 bits including the sign bits?	2	K3	CO1
2.	Find the value of x and y i. $(211)_x = (152)_8$ ii. $(AC.2)_{16} = (y)_2$	2	K3	CO1
3.	The minimized expression for the K-map shown in the given figure is,	2	K3	CO2
4.	What are prime implicants?	2	K1	CO2
5.	Construct an 8x1 MUX using 2x1 MUX.	2	K2	CO3
6.	What is HDL? Where is it used?	2	K1	CO3
7.	Draw the logic diagram of a Master Slave D Flipflop.	2	K1	CO4
8.	What is a sequential circuit?	2	K1	CO4
9.	Define Hazards.	2	K1	CO5
10.	What do you mean by race free state assignment?	2	K1	CO5

CD \ AB	00	01	11	10
00	1	0	0	1
01	1	1	1	1
11	0	0	0	0
10	1	0	0	1

PART – B

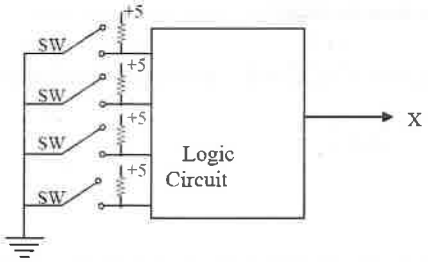
(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	Show that if XY=0, then X EX-OR Y = X + Y	3	K3	CO1
		ii.	Prove that AB+BC+ÃC = AB +ÃC	3		
		iii.	Simplify the following expressions using Boolean algebra	3		
			1. (A+C) (A+C) (A+B+CD)	4		
			2. AB (D+CD)+B (A+ACD)			
			(OR)			
	b)		Draw and explain the switching circuit to perform the following operations:			
		i.	AND operation	3	K1	CO1
		ii.	OR operation	3		
		iii.	NAND operation	3		
		iv.	NOR operation	4		
12.	a)		Construct the truth table and determine the Boolean functions for outputs F and G as a function of four inputs A, B, C, and D in the following figure. Also, use K-mapping to reduce the function and get the simplified expression.	13	K3	CO2



(OR)

	b)		Figure shows four switches that are part of control circuitry in a copy machine. The switches are at various points along the path of the copy paper as the paper passes through the machine. Each switch is normally open and as the paper passes over a switch the switch closes. It is impossible for switches SW1 and SW4 to be closed at the same time. Design the logic circuit to produce a high output whenever two or more switches are closed at the same time. Use K-mapping technique and take advantage of the don't care conditions.	13	K3	CO2



13.	a)	Specify the truth table of an octal to binary priority encoder. Provide an output V to indicate that at least one of the inputs is present. The input with the highest subscript number has the highest priority what will be the value of the four outputs if inputs D2 and D6 are 1 at the same time?	13	K3	CO3
		(OR)			
	b)	Design a combinational circuit that multiplies two 2-bit numbers a1a0 and b1b0 to produce a 4-bit product, C3C2C1C0.Use AND gates and half adders.	13	K3	CO3
14.	a)	Design Mod 5 counter using minimum hardware and explain its working.	13	K2	CO4
		(OR)			
	b)	Show how i. A JK flip flop is converted to a T flip flop ii. A D flip flop is converted to a T flip flop	7 6	K2	CO4
15.	a)	A sequential circuit with two D flipflops, A and B; two inputs x and y; and one output, z, is specified by the following next state and output equations: $A(t+1) = x\,y + x\,A,$ $B(t+1) = x\,B + x\,A,$ $z = B$ i. Draw the logic diagram of the circuit ii. Draw the state table.	 7 6	K3	CO5
		(OR)			
	b)	An asynchronous sequential circuit has two internal states and one output. The excitation and output functions describing the circuit are as follows: $Y_1 = x_1\,x_2 + x_1\bar{y_2} + \bar{x_2}\,y_1$ $Y_2 = x_2 + x_1\,\bar{y_1}\,y_2 + \bar{x_1}\,y_1$ $z = x_2 + y_1$ i. Draw the logic diagram of the circuit. ii. Derive the transition table and output map. iii. Obtain a flow table for the circuit.	 7 3 3	K3	CO5

PART – C

(1 x 15 = 15Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Four large tanks at a chemical plant contain different liquids being heated. Liquid level sensors are being used to detect whenever the level in tank A or tank B rises above predetermined level. Temperature sensors in tanks C and D detect when the temperature in either of these tanks drops below a prescribed temperature limit. Assume that the liquid level outputs A and B are LOW when level is satisfactory and HIGH when the level is too high. Also, temperature sensor outputs C and D are LOW when the temperature is satisfactory and HIGH when the temperature is too low. Design a logic circuit that will detect whenever the level in tank A or Tank B is too high at the same time that the temperature in either tank C or tank D is too low.	15	K5	CO2
		(OR)			
	b)	Design a code converter that converts a decimal digit from the 84-2-1 code to BCD code. Implement the circuit with universal gate.	15	K3	CO3

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Question Paper Code: 5027

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – DEC.2022 / JAN.2023
Third Semester
Computer Science and Engineering
U19CS305 – DATABASE MANAGEMENT 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.	What is a data model? List the types of data model used.	2	K1	CO1
2.	List any eight applications of DBMS.	2	K2	CO1
3.	Define the terms Entity set and Relationship set	2	K1	CO2
4.	Express in relational algebra, the division operation (/) using the project, Cartesian product and minus operation. Give a simple example.	2	K2	CO2
5.	Boyce-Codd normal form is found to be stricter than third normal form. Justify the statement	2	K3	CO3
6.	Outline the steps in query processing.	2	K2	CO3
7.	Name the properties that must be satisfied by a transaction.	2	K2	CO4
8.	What is the need for concurrency control?	2	K3	CO4
9.	Give examples of different query languages for Object Relational Databases.	2	K5	CO5
10.	What is persistence in object oriented databases?	2	K4	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)		Construct an E-R diagram for a car insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents. State any assumptions you make.	13	K3	CO1
			(OR)			
	b)	i.	Differentiate between foreign key constraints and referential integrity constraints with suitable example.	6	K2	CO1
		ii.	Distinguish between lossless-join decomposition and dependency preservation decomposition	7		
12.	a)		Consider the following relations: EMPLOYEE (ENO, ENAME, DOB, DESIGNATION, BASIC_PAY, DNO), DEPARTMENT (DNO, DNAME) The primary key is underlined. Write the SQL queries to perform the following:			
		i.	Display the employee number, name, department number and department name of all employees.	3	K3	CO2
		ii.	List the details of employees who earn less than the average basic pay of all employees.	4		
		iii.	List the department number and number of employees in each department.	4		
		iv.	List the details of the employees who work for DNO="CSE"	2		
			(OR)			
	b)		Explain the aggregate functions in SQL with an example.	13	K3	CO2
13.	a)		Give an example of a relation that is in 3NF but not in BCNF. How will you convert that relation into BCNF? Explain.	13	K3	CO3
			(OR)			
	b)	i.	Outline static hashing and dynamic hashing with examples.	8	K3	CO4
		ii.	Distinguish between primary index and secondary index. Give example.	5	K4	
14.	a)	i.	Differentiate between strict two phase locking protocol and rigorous two phase locking protocol	6	K3	C)4
		ii.	How are the timestamps implemented? Explain.	7		
			(OR)			
	b)		Explain the concepts of concurrency control and deadlock in relation to databases with examples.	13	K3	CO4

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Question Paper Code: 5026

B.E./B.Tech. DEGREE END-SEMESTER EXAMINATIONS – DEC.2022 / JAN.2023

Third Semester

Computer Science and Engineering

U19CS304 – DATA STRUCTURES

(Common to Electronics and Communication 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.	What is an abstract of data type?	2	K2	CO3
2.	List the limitations of singly linked lists.	2	K1	CO3
3.	How will you implement a priority queue using arrays?	2	K3	CO1
4.	List the applications of the binary search trees.	2	K2	CO3
5.	What are Binary Heaps?	2	K2	CO3
6.	What are the different types of traversal?	2	K3	CO1
7.	What are minimum spanning trees?	2	K2	CO3
8.	List the advantages of adjacency list representation of graphs over adjacency matrix representation.	2	K1	CO2
9.	Derive the worst case time complexity of insertion sort.	2	K5	CO3
10.	What are the advantages of hashing techniques?	2	K1	CO2

PART – B

(5 x 13 = 65 Marks)

Q. No.		Questions	Marks	KL	CO
11.	a)	Write a function to multiply two polynomials (of two variables) using linked lists.	13	K3	CO1

(OR)

	b)	Write an algorithm for deletion of an element in a circular linked list.	13	K3	CO1
12.	a)	Explain the process of evaluation of a postfix expression using stack data structure, with the help of a suitable example.	13	K2	CO2
		(OR)			
	b)	Write an algorithm for insertion of a new element in a circular queue.	13	K3	CO2
13.	a)	Write a recursive algorithm for the in-order traversal of a binary tree. Explain the method with the help of an example.	13	K3	CO4
		(OR)			
	b)	Discuss any one application of Heap data structure in detail.	13	K3	CO4
14.	a)	Explain the working of Prim's algorithm with the help of a suitable example.	13	K4	CO4
		(OR)			
	b)	Write recursive algorithm for Depth-First Traversal of a graph assuming that adjacency list representation of the graph is given as an input.	13	K5	CO4
15.	a)	Derive the best case and worst case time complexities of the Quick Sort algorithm.	13	K3	CO5
		(OR)			
	b)	What do you mean by Open Addressing and Closed Addressing? Explain.	13	K4	CO3

PART – C

(1 x 15 = 15Marks)

Q. No.		Questions	Marks	KL	CO
16.	a)	Topological sorting for Directed Acyclic Graph (DAG) is a linear ordering of vertices such that for every directed edge u v, vertex u comes before v in the ordering. Devise an efficient algorithm for the Topological sorting of a given DAG.	15	K6	CO4
		(OR)			
	b)	Given a boolean 2D matrix, write an efficient algorithm to find the number of islands. A group of connected 1s form an island. For example, the below matrix contains 5 islands. mat[][] = {{1, 1, 0, 0, 0}, {0, 1, 0, 0, 1}, {1, 0, 0, 1, 1}, {0, 0, 0, 0, 0}, {1, 0, 1, 0, 1}}	15	K6	CO5

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

Question Paper Code: 8030

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – DEC.2022 / JAN. 2023
Second Semester
Computer Science and Engineering

U19EE201 – BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to Electronics and Communication Engineering, Biomedical Engineering, Computer Science and Technology, Information Technology and Biotechnology)
(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 Kirchoff's voltage law.	2	K1	CO1
2.	Three resistors of 15 Ω resistance are connected in star to a 415 V, 50 Hz three-phase AC supply. Calculate the phase voltages.	2	K3	CO1
3.	State Fleming's left-hand rule.	2	K2	CO2
4.	What is the role of carbon brushes in DC motors?	2	K2	CO2
5.	What is the purpose of earthing the electrical appliances?	2	K2	CO3
6.	Define luminous flux and write its SI unit.	2	K1	CO3
7.	Draw the symbols of NPN and PNP transistors.	2	K2	CO4
8.	Differentiate PN junction and Zener diodes.	2	K3	CO4
9.	Convert the binary number $(1111)_2$ to its hexadecimal equivalent value.	2	K3	CO5
10.	What are universal logic gates? Why is called so?	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	The alternating voltage is given by V=230sin314t. Calculate i. maximum value of voltage, ii. average value of voltage, iii. RMS value of voltage, iv. Frequency.	13	K3	CO1
		(OR)			
	b)	A single-phase lagging load draws a current of 1 A when it is fed from 230 V, 50 Hz AC supply. The angle between voltage and current is found to be 45^0. Calculate i. power factor, ii. real power, iii. reactive power and iv. Apparent power.	13	K3	CO1
12.	a)	Explain the construction and working principle of a DC generator with a suitable sketch.	13	K2	CO2
		(OR)			
	b)	Explain the construction and operation of a Permanent Magnet Moving Coil instrument with a neat diagram.	13	K2	CO2
13.	a)	List and explain the different types of electrical wiring systems.	13	K2	CO3
		(OR)			
	b)	Draw and explain the layout of a power system with a single line diagram.	13	K2	CO3
14.	a)	Explain the construction and operation of SCR.	13	K2	CO4
		(OR)			
	b)	Draw and explain the input and output characteristics of a transistor in CE configuration.	13	K2	CO4
15.	a)	Convert the number $(122.23)_4$ to its equivalent in base 2, base 6, base 8, and base 10 number systems.	13	K3	CO5
		(OR)			
	b)	Simplify and implement the Boolean expression, $f(A,B,C) = ABC + AB\bar{C} + A\bar{B}C + A\bar{B}\bar{C}$ using suitable logic gate (s).	13	K3	CO5

PART – C

(1 x 15 = 15Marks)

Q.No.			Questions	Marks	KL	CO
16.	a)	i.	Analyze the importance of regulating the power factor in AC circuits.	7	K5	CO1
		ii.	How temperature impacts the operation of the PN junction diode?	8		
			(OR)			
	b)	i.	Construct the residential house wiring diagram using fuse, switch, indicator, lamp, water pump, 3 pin socket with switch and energy meter.	7	K5	CO3
		ii.	Why is it important to conserve energy? Also, list any seven conservation techniques to conserve household energy.	8		

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[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]

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Question Paper Code: 2007

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – DEC.2022 / JAN.2023

Third Semester

Computer Science and Engineering

U19MA304 – DISCRETE MATHEMATICS

(Common to Information Technology and 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.	Show that $((p \rightarrow q) \wedge \neg q) \rightarrow \neg p$ is a tautology	2	K2	CO1
2.	Write in symbolic form "The growth of crop will be good, if there is rain".	2	K2	CO1
3.	State the Free and Bound variables.	2	K1	CO2
4.	If $P(x): x = x^2$ is the statement, If the universe of discourse is the set of the integers , what are the truth values of $P(-1)$.	2	K3	CO2
5.	Prove that $A \cap B = B \cap A$, using Characteristic function .	2	K3	CO3
6.	Define an equivalence relation.	2	K1	CO3
7.	Check whether the function $f(x) = x^2 - 11$ $from\ R\ to\ R$ is one to one or onto or both? Justify.	2	K2	CO4
8.	Show that the function $f(x, y) = x + y$ is primitive recursive.	2	K2	CO4
9.	Give an example of semi group which is not monoid.	2	K3	CO5
10.	Define cosets with an example.	2	K1	CO5

PART – B

(5 x 16 = 80 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	Construct the truth table for the statement, $\neg(P \wedge Q) \leftrightarrow (\neg P \vee \neg Q)$	8	K3	CO1

		ii.	Obtain the Principal disjunctive normal form for $(Q \rightarrow P) \wedge (\neg P \wedge Q)$.	8	K2	CO1
			(OR)			
	b)	i.	Check the following proposition is tautology $((P \rightarrow Q) \rightarrow R) \vee \neg P$.	8	K3	CO1
		ii.	Obtain Principal conjunctive normal form of the formula given by $(\neg P \rightarrow R) \wedge (Q \leftrightarrow P)$	8	K4	CO1
12.	a)	i.	Write rules of inference and Implications.	8	K1	CO2
		ii.	Show that $(R \rightarrow \neg Q)$, $R \vee S$, $S \rightarrow \neg Q$, $P \rightarrow Q \Rightarrow \neg P$ are inconsistent.	8	K3	CO2
			(OR)			
	b)	i.	Explain Universal and Existential quantifiers with an example.	8	K1	CO2
		ii.	Prove that $(\exists x)(P(x) \wedge Q(x)) \Rightarrow (\exists x)P(x) \wedge (\exists x)Q(x)$, is its converse true ? Justify.	8	K2	CO2
13.	a)	i.	For any three sets A,B and C. Prove that $A \times (B \cup C) = (A \times B) \cup (A \times C)$	8	K2	CO3
		ii.	Consider the set A = {4, 5, 6, 7}. Let R be the relation $\leq$ on A. Find the relation R, draw the directed graph and the Hasse diagram of R.	8	K4	CO3
			(OR)			
	b)	i.	Let R denote a relation on the set of all ordered pairs of positive integers, by $(x, y)R(u, v)$ if and only if $xv = yu$, show that R is an equivalence relation.	8	K2	CO3
		ii.	Let $(L, V, \wedge\ )$ be distributive lattice under "$\leq$" for any $a, b, c \in L$ *if* $a \wedge b = a \wedge c$ *and* $a \vee b = a \vee c$, then prove that $b = c$.	8	K4	CO3
14.	a)	i.	If $f: R \rightarrow R$ *and* $g: R \rightarrow R$ are bijection, Prove that $(g \circ f)^{-1} = f^{-1} \circ g^{-1}$.	8	K2	CO4
		ii.	Prove Demorgan's law using characteristic function.	8	K1	CO4
			(OR)			
	b)	i.	Can you find the inverse function of $f: R \rightarrow R$ such that $f(x) = x^2 + 100$ and justify your answer.	8	K4	CO4
		ii.	Show that the function $f(x, y) = x^y$ is primitive recursive function.	8	K2	CO4
15.	a)	i.	State and prove Lagrange's theorem.	8	K1	CO5
		ii.	Prove that if $f: G \rightarrow G'$ is a homomorphism, then $ker(f) = \{e\}$ if and only if f is one to one.	8	K2	CO5
			(OR)			
	b)	i.	If (G,*) is an abelian group, show that $(a * b)^n = b^n * a^n$, *for all* $a, b \in G$ where n is positive integer.	8	K3	CO5
		ii.	Prove that the intersection of any two normal subgroups of a group is a normal subgroup.	8	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: 4001

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – DEC.2022 / JAN. 2023
Second Semester
Computer Science and Engineering
U19CH207– ENGINEERING CHEMISTRY
(Common to Computer Science and Technology, Information Technology and Biotechnology)
(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 sample of water contains 73 mgL^{-1} of $Mg(HCO_3)_2$ (Mol.wt. = 146), 165 mgL^{-1} of $Ca(HCO_3)_2$ (Mol.wt. = 162), 139 mgL^{-1} of $CaSO_4$ (Mol.wt. = 136) and 60 mgL^{-1} of NaCl(Mol.wt. = 58.5). Calculate the temporary and permanent hardness of the water sample.	2	K3	CO1
2.	Furnish the chemical equations of hardness removal using Calgon.	2	K1	CO1
3.	Define Tacticity.	2	K2	CO2
4.	List any two properties of polymers.	2	K1	CO2
5.	State any two difference between nanowire and nanotube.	2	K1	CO3
6.	Give an account of size dependent properties of materials.	2	K4	CO3
7.	List any two importance of solar cells.	2	K2	CO4
8.	State any two difference between barrage and non-barrage tidal power systems.	2	K2	CO4
9.	Apply Pilling – Bedworth rule in corrosion of iron.	2	K3	CO5
10.	Mention the steps involved in the pre-treatment of surfaces for electroplating.	2	K1	CO5

PART – B

(5 x 16 = 80 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	Explain the principle and estimation of hardness of water by EDTA method.	10	K3	CO1
		ii.	Discuss the carbonate and phosphate conditioning of boiler feed water.	6	K4	CO1
			(OR)			
	b)	i.	Discuss in detail the Ion Exchange method of external conditioning of water.	10	K1	CO1
		ii.	Discuss the reverse osmosis method of purifying water with neat diagram.	6	K4	CO1
12.	a)	i.	Explain the mechanism of cationic polymerization.	10	K1	CO2
		ii.	Elaborate the structure based classification of polymers.	6	K2	CO2
			(OR)			
	b)	i.	Explain the addition and Co-polymerization with examples.	10	K3	CO2
		ii.	Determine the molecular weight of polymer by weight average method.	6	K1	CO2
13.	a)	i.	Explain the preparation of nano particles by chemical vapour deposition and laser ablation technique.	10	K3	CO3
		ii.	Distinguish between molecules, nanoparticle and bulk materials.	6	K4	CO3
			(OR)			
	b)	i.	Explain the different types of nanoparticles and their characteristics.	10	K1	CO3
		ii.	Highlight the application of nanoparticles in medical and electronic devices	6	K5	CO3
14.	a)	i.	Explain the types of wind power plants with their working principle.	10	K1	CO4
		ii.	Discuss the working principle of Ni-Cd battery with relevant chemical reactions.	6	K3	CO4
			(OR)			
	b)	i.	With a neat sketch, explain the working mechanism of H_2-O_2 fuel cell.	10	K4	CO4
		ii.	Explain the working mechanism of photovoltaic cell with its importance.	6	K3	CO4
15.	a)	i.	Discuss the mechanisms of electrochemical corrosion under all the conditions.	10	K1	CO5
		ii.	Explain the method of electroless plating of nickel.	6	K3	CO5
			(OR)			
	b)	i.	Explain the types of corrosion experienced by the wire fence, pipelines, pitting and crevice.	10	K4	CO5
		ii.	Discuss the constituents of paints and their functions in detail with examples.	6	K1	CO5

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

Question Paper Code: 5032

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – DEC.2022 / JAN. 2023

Second Semester

Computer Science and Engineering

U19CS203 – PYTHON PROGRAMMING

(Common to Electrical and Electronics Engineering and
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.	State the significance of pass keyword.	2	K2	CO1
2.	Write the syntax of while loop.	2	K1	CO1
3.	Write a snippet of code to create a tuple and add elements to it.	2	K3	CO2
4.	Differentiate shallow and deep copy.	2	K2	CO2
5.	What are local and formal parameters?	2	K2	CO3
6.	Trace the output of the following code: L = ['a','b','c','d'] print("".join(L))	2	K5	CO3
7.	Write the inbuilt function to write header to a csv file.	2	K3	CO4
8.	State the purpose of finally keyword.	2	K2	CO4
9.	Display today's time using datetime package.	2	K3	CO5
10.	How to create a 2-D array using numpy?	2	K3	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Discuss the datatypes and operators supported in Python. Write a program to find the sum of digits of the given number.	13	K3	CO1
		(OR)			
	b)	Write the syntax of control constructs. Write a program to get the string from the user and replace all vowels with't'.	13	K3	CO1
12.	a)	Given a dictionary that contains the words in English language as key and Spanish words as value. Write a program to convert the given text in English to Spanish.	13	K3	CO2
		(OR)			
	b)	Write a python program to simulate insertion sort. The data elements are maintained in the list.	13	K3	CO2
13.	a)	A number is said to be Disarium if the sum of its *digits raised to their respective positions* is the number itself. Create a function that determines whether a number is a Disarium or not. Example: is_disarium(135) → True # 1^1 + 3^2 + 5^3 = 1 + 9 + 125 = 135	13	K2	CO3
		(OR)			
	b)	Define a function "secondMax" to find the second maximum element in the given array.	13	K2	CO3
14.	a)	Write the functions used for processing text file. Write a program to find the most repeated word in a text file.	13	K2	CO4
		(OR)			
	b)	Create a csv file with the following header: rollno, name and cgpa. Receive 'n' records from the user and store it in csv file. Write a function to find the average cgpa of all students.	13	K2	CO4
15.	a)	Write a program to tokenize the words in a file and remove the stop words like "a, am, I, the, you" and write the rest of the text to another file.	13	K3	CO5
		(OR)			
	b)	A csv file stores the organization name and the number of employees and their salary. Represent the number of employees and the organization using piechart for further analysis using appropriate labels and title.	13	K3	CO5

PART – C

(1 x 15 = 15Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Create a classes NLP and StringProcess. The NLP class consists of the following member functions: count – to find the number of characters of the given word. Tokenizer – to split the given string into words The StringProcessing class consists of the following functions: isPalindrome – to check whether the given word is a palindrome. toLowerCase - converts the given string into lower case letter stopWordRemoval – this function checks for the strop words and remove it. Check for the following stop words: [is,of,are,was, were, the] The StringProcessing function inherits the class NLP. The application should receive a sentence [in upper case letter] from the user as input, convert that into lowercase, remove the stop word, tokenizes the sentence into words and display the words that are palindrome. It should also display the number of characters in the palindrome.	15	K6	CO5
		(OR)			
	b)	Design a class CustomQueue consisting of functions PUSH and Mod_POP to insert and deleteelements in the queue. PUSH functions inserts the elements to the end of the list. Mod_POP function returns the element from the end of the list. Design a class TinyURL consisting of the following functions: i. Extract – to extract the last 5 digits of the given url ii. short_url_encode – generate the tiny url using the extracted 5 digits. Short url contains only these characters "a-zA-Z0-9". Convert the extracted digit to a base 62number and the character corresponding to the conversion is concatenated to form a string and reverse that to get the tiny url. Id_decode : convert the tiny string to url digits. Extract the last three character of theshortened url. Convert the characters to decimal representation using its ASCII value. The TinyURL class inherits the CustomQueue class and uses the functions for performing the giventask. Example: Input: https://academics.com/attendance/12345 12345%62 = 7 => h num = 12345/62 = 199 199%62 = 13 => n num = 199/62 = 3 3%62 = 3 =>d Reversed values : dnh Now the tiny url is : http://tinyurl.com/dnh	15	K6	CO3

Reg.No.:								

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

Question Paper Code: 5028

M.E. / M.Tech. DEGREE END-SEMESTER EXAMINATIONS – DEC.2022 / JAN. 2023

Third Semester

Computer Science and Engineering

P19CSE24 / P19CSOE1 – BUSINESS ANALYTICS

(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 the role of business analyst?	2	K1	CO1
2.	How do you handle stakeholder conflicts?	2	K2	CO1
3.	What are the stages in a system development life cycle?	2	K2	CO2
4.	What is the need for a requirement life cycle?	2	K3	CO2
5.	What are the types of requirements?	2	K1	CO3
6.	What are the common requirements documents?	2	K1	CO3
7.	What is the use of BPMN notation?	2	K3	CO4
8.	What is meant by gap analysis? Why its required?	2	K3	CO4
9.	What do you mean by socializing requirements?	2	K2	CO5
10.	What is visual data recovery?	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Explicate the concepts of project team and its management in business analysis.	13	K2	CO1
		(OR)			
	b)	Explicate about how to handle the stakeholder conflicts in business.	13	K2	CO1
12.	a)	Explain about project life cycle in detail.	13	K1	CO2
		(OR)			
	b)	Explain about product life cycle in detail.	13	K1	CO2
13.	a)	What are forming requirements? What are the attributes of good requirements? Explain in detail	13	K3	CO3
		(OR)			
	b)	What are requirement sources? How requirements are gathered from stakeholders?	13	K3	CO3
14.	a)	Write notes on decomposition analysis and additive/subtractive analysis in detail.	13	K1	CO4
		(OR)			
	b)	Write notes on Data flow diagrams and use case modeling.	13	K1	CO4
15.	a)	How are the requirements assets managed? Explain in detail about change control and requirement tools used in managing assets.	13	K3	CO5
		(OR)			
	b)	What are the recent trends in embedded and collaborative business intelligence? Explain in detail.	13	K3	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Summarize the project life cycle phases with neat illustrations. Assume that you are going to start a business (Take any one product) and give your order for a automation software for improving your business. List the various steps involved in developing a project.	15	K3	CO4
		(OR)			
	b)	Discuss about recent trends in data storytelling and data journalism.	15	K4	CO5