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Total Number of Pages: 02

COURSE: M.Tech  
Sub Code:P2CTCC01

2<sup>nd</sup>Semester Regular / Back Examination: 2023-24

SUB: COMPUTER GRAPHICS

BRANCH: COMPUTER SCIENCE AND ENGG, COMPUTER SCIENCE AND TECH

MAX MARKS: 100

TIME: 3 HOURS

Q Code:P218

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right-hand margin indicate marks.

Part- I

Q1 Answer the following questions:

(2x10)

- Consider a raster system with resolution of 640 by 524. What is the size of framebuffer to store 12 bits per pixel in bytes?
- Derive the general form of scaling matrix about a fixed point  $(x_f, y_f)$
- What is isometric projection?
- What are normalized device coordinates and why is it necessary in transformations?
- What is the difference between DDA and Bresenham's Line drawing algorithm?
- Explain the concept of Ray tracing methods.
- Write down the conditions for point clipping in window.
- State the basic principle of radiosity computation.
- Write down the concept of Bi-cubic splines.
- Why is Fractal modeling used?

Part- II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)

(06x08)

- What is the role of display controller in raster scan display system?
- Using Bresenham's circle drawing algorithm plot one quadrant of a circle of radius 7 pixels with origin as center.
- Illustrate the concept of Window-to-Viewport transformation with a suitable diagram as well as the mathematical derivation of the expressions.
- Explain in detail on any two basic 2-D geometric transformations.
- Find the matrix that represents the rotation of an object by  $45^\circ$  about origin. What are the new co-ordinates of the point P (2, -4) after rotation?
- Define Computer Animation. Compare and contrast different types of animation control methods.
- What are the advantages of B-spline over Bezier curves?
- List the operating characteristics for the following display technologies: raster refresh system, vector refresh system.
- Find the pixel positions for the octant from  $x = 0$  to  $x = y$  of a circle centered at (3, 0) with radius 16 using the midpoint circle algorithm.
- Describe Gouraud Shading algorithm with its advantages and disadvantage.
- Explain the purpose and working of ray tracing method with suitable diagram.
- Differentiate between Perspective and parallel projections.

### Part-III

#### Only Long Answer Type Questions (Answer Any Two out of Four)

- Q3** A rectangle ABCD whose coordinates are A (1,1), B (4,1), C (4,4), D (1,4) and the window coordinates are (2,2), (5,2), (5,5), (2,5) and the given viewport location is (0.5,0), (1,0), (1,0.5), (0.5,0.5). Calculate the viewing transformation matrix. **(16)**
- Q4** Define perspective projection in 3D space. Derive and discuss the general and special cases associated. **(16)**
- Q5** Explain about composite transformation in general and explain the following with matrix representations: **(16)**
- Two successive translations
  - Two successive rotations
  - Two successive scaling
  - General pivot point rotation
- Q6** Analyze the painter's algorithm for hidden surface removal. Enumerate the advantages and drawbacks of this algorithm. **(16)**

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Course: M.Tech  
Sub\_Code: P2CTCC02

2<sup>nd</sup> Semester Regular/Back Examination: 2023-24

SUBJECT: Software Engineering

BRANCH(S): COMPUTER SCIENCE AND ENGG, COMPUTER SCIENCE AND TECH.

Time: 3 Hour

Max Marks: 100

Q.Code: P389

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right-hand margin indicate marks.

**Part-I**

Q1 Answer the following questions: (2 x 10)

- a) What problems are likely to occur if a module has low cohesion?
- b) What are the main advantages of using an object-oriented approach to software design over a function-oriented approach?
- c) Briefly explain the design concepts – Abstraction, Modularity, and Refactoring.
- d) What are the different types of Cohesion?
- e) What is software architecture? What is its importance?
- f) What is the importance of stub and driver in unit testing?
- g) What is the advantage of adhering to life cycle models for software?
- h) What problems are likely to arise if two modules have high coupling?
- i) Distinguish between alpha, beta, and acceptance testing.
- j) Briefly highlight the difference between code inspection and code walkthrough.

**Part-II**

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (6 x 8)

- a) What do you understand by the term software life cycle? Why is it necessary to model software life cycle and to document it?
- b) Describe integration testing strategies.
- c) What are the main advantages of using an object-oriented approach to software design over a function-oriented approach?
- d) Both the prototyping models as well as the spiral model have been designed to handle risks. Identify how exactly risk is handled in each. How do these two models can be compared with respect to their risk handling capabilities?
- e) How is the activity diagram useful during system development? What are the important ways in which an activity diagram differs from a flow chart?
- f) What do you understand by the term software development life cycle model (What are the importances of 4 P's in software project management?)

- g) Discuss the advantages and disadvantages of adopting an object-oriented style of software development.
- h) Why spiral model is more powerful than other models explain?
- i) Define Function Point Metric. Consider a project with the following functional units: Number of user inputs = 50, Number of user outputs = 40, Number of user enquiries = 35, Number of user files = 06, Number of external interfaces = 04. Assume all complexity adjustment factors and weighting factors are average. Compute the function point for the project.
- j) What is the difference between a use case and a scenario? Identify at least three scenarios of the withdraw cash use case of a bank ATM.
- k) With the help of a suitable example explain how polymorphism helps in developing easily maintainable and intuitively appealing code.
- l) Explain briefly how the principles of decomposition and abstraction are used in the object-oriented paradigm.

### Part-III

#### Only Long Answer Type Questions (Answer Any Two out of Four)

- Q3 Draw a class diagram using the UML syntax to represent the fact that an order Register consists of many orders. Each order consists of up to ten order items. Each order item contains the name of the item, its quantity and the date by which it is required. Each order item is described by an item order specification object having details of an order item such as its unit price, name and address of the manufacturer, and the warranty period and terms of warranty. (16)
- Q4 Design Use case, Sequence, Class and Activity diagram of Railway Reservation System. (16)
- Q5 Write down the major differences between Basic COCOMO and COCOMO-II. Suppose that a project was estimated to be 400 KLOC. Calculate the effort and development time for each of the three modes i.e., organic, semidetached, and embedded. (16)
- Q6 What is Object-Oriented Testing? What is the difference between Object-Oriented Testing and Conventional Testing? Explain about different types of testing in Object Oriented Testing. (16)

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Course: M.Tech  
Sub\_Code: P2CTCC03

2<sup>nd</sup> SEMESTER REGULAR/BACK Examination: 2023-24

SUBJECT: Distributed Database System

BRANCH(S): CSE, CS & T

Time: 3 Hour

Max Marks: 100

Q.Code: P292

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right hand margin indicate marks.

Part-I

Q1 Answer the following questions: (2 x 10)

- What are the components of DDMS?
- What is meant by parallel database?
- Are there different types of distributed databases? If yes, then which ones have you worked with?
- What is vertical Fragmentation?
- How can you implement ACID compliance in a distributed database?
- What's your understanding of consistency in the context of distributed databases?
- What is a load balancer? What is its role in a distributed database?
- What is horizontal scaling? Why is it important in the context of distributed databases?
- Name two MPMD DDBMS types.
- What is meant by hybrid fragmentation?

Part-II

Q2 Only Focused-Short Answer Type Questions - (Answer Any Eight out of Twelve) (6 x 8)

- What is meant by query decomposition explain with example.
- What is meant by R\* algorithm.
- Explain briefly about heterogeneous distributed database.
- What are the objectives of Distributed Query Processing?
- Explain the basic Timestamp Ordering Algorithm.
- Explain the phases of query processing in distributed database.
- What do you mean by semi join in distributed db?
- Name some concepts and mechanisms that are necessary to govern transaction transparency.
- Define two-phase commit protocol.
- What does Data Fragmentation refer to?
- What are the classifications of currency control?
- What is a NoSQL database? Do they fall under the umbrella of distributed databases?

### Part-III

#### Only Long Answer Type Questions (Answer Any Two out of Four)

- Q3** Explain briefly about query decomposition and data localization with example (16)
- Q4** What are the various concurrency control techniques? Compare Lock based Concurrency Control strategies in detail. (16)
- Q5** Explain Views in centralized DDBMS with examples. (16)
- Q6** Compare Distributed Deadlock prevention to Distributed Deadlock Avoidance. Explain one scheme of Distributed deadlock Detection and Recovery. (16)

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Course: M.Tech  
Sub\_Code: P2CTCC07

2<sup>nd</sup> Semester Regular/Back Examination: 2023-24

SUBJECT: Data Ware Housing & Data Mining

BRANCH(S): COMPUTER SCIENCE AND ENGG, COMPUTER SCIENCE AND TECH.

Time: 3 Hours

Max Marks: 100

Q.Code: P567

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right hand margin indicate marks.

**Part-I**

**Q1 Answer the following questions: (2x10)**

- Differentiate between ROLAP and HOLAP.
- How to compute confidence for an association rule  $X \rightarrow Y$ ?
- What is an Outlier?
- Define terms Sensitivity and Specificity used in classifier evaluation?
- Define Kohonen feature map.
- Difference between CART and CHAID.
- Define terms likelihood, prior probability in Bayes classification model.
- From the following confusion matrix of a classifier calculate accuracy:

	Positive	Negative
True	100	10
False	20	110

- Define F-score.
- Define clustering. What are the objectives of clustering?

**Part-II**

**Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (6x8)**

- What is a classification problem? What are the disadvantages of the decision tree over other classification techniques?
- Differentiate between supervised and unsupervised learning method.
- Define outlier. State at least two applications of outlier mining.
- Given two objects represented by the tuples (22, 1, 42, 10) and (20, 0, 36, 8). Compute the Euclidian and Manhattan distance between the two objects.
- List two advantages of feature reduction. How dimensionality reduction is achieved using Principal Component Analysis (PCA)?
- What is a schema of a data warehouse? Explain Galaxy schema of data warehouse with suitable example.
- Explain Server H/W Architecture RISC verses CISC
- Explain different steps may be followed in data pre-processing before loading the data into data warehouse.
- Define the difference, Business & Data Warehouse.
- Explain with example, Parallel Processors and Cluster Systems.
- What do you mean by Distributed Memory Architecture explain briefly.
- Write short notes on (I) Decision Tree (II) Growing the Tree.

**Part-III**

**Only Long Answer Type Questions (Answer Any Two out of Four)**

**Q3** Discuss  $k$ -Means and  $k$ -Medoids algorithm. Illustrate the strength and weakness of  $k$ -Means in comparison with the  $k$ -Medoids algorithm. **(16)**

- Q4 a)** Given the following set for classification problem into two classes yes and no. There are four attributes age, income, student and credit rating. Find the information gain of each attribute and splitting on which attribute in the root of a decision tree will lead to highest information gain? **(8x2)**

RID	age	income	student	credit_rating	Class: buys_computer
1	youth	high	no	fair	no
2	youth	high	no	excellent	no
3	middle_aged	high	no	fair	yes
4	senior	medium	no	fair	yes
5	senior	low	yes	fair	yes
6	senior	low	yes	excellent	no
7	middle_aged	low	yes	excellent	yes
8	youth	medium	no	fair	no
9	youth	low	yes	fair	yes
10	senior	medium	yes	fair	yes
11	youth	medium	yes	excellent	yes
12	middle_aged	medium	no	excellent	yes
13	middle_aged	high	yes	fair	yes
14	senior	medium	no	excellent	no

- b) Explain how to evaluate the performance of a classifier using Confusion Matrix.

- Q5 a)** Why do we need a K-NN Algorithm? How does K-NN work? Consider a binary classification problem with two classes True and false. Class labels of four other training instances are given. How will a  $k = 3$  nearest neighbor classifier classify data point (3, 7)? **(8x2)**

P1	7	7	3	1	3
P2	7	4	4	4	7
Class	False	False	True	True	?

- b) Given the transactional Data for an all Electronics branch. Find all the frequent item sets and strong association rules using apriori algorithm. (minimum support count = 2, minimum confidence threshold = 70%)

TID	List Of item_IDS
T100	I1, I2, I5
T200	I2, I4
T300	I2, I3
T400	I1, I2, I4
T500	I1, I3
T600	I2, I3
T700	I1, I3
T800	I1, I2, I3, I5
T900	I1, I2, I3

- Q6 a)** Consider a set of five 2-dimensional points  $p_1 = (0, 0)$ ,  $p_2 = (5, 0)$ ,  $p_3 = (5, 1)$ ,  $p_4 = (0, 1)$ , and  $p_5 = (0, 0.5)$ . Euclidean distance is the distance function. Use single linkage clustering algorithm to cluster the points into two clusters. **(8x2)**

- b) Consider the following distance matrix and draw the dendrogram using complete linkage technique.

	P1	P2	P3	P4	P5
P1	0				
P2	9	0			
P3	3	7	0		
P4	6	5	9	0	
P5	11	10	2	8	0



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Total Number of Pages: 02

Course: M.Tech  
Sub\_Code: P2CTCC11

2<sup>nd</sup> Semester Regular/Back Examination: 2023-24

SUBJECT: Mobile Computing

BRANCH(S): CSE

Time: 3 Hour

Max Marks: 100

Q.Code: P473

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right hand margin indicate marks.

**Part-I**

**Q1 Answer the following questions: (2 x 10)**

- a) MAC protocol designed for infrastructure based wireless network may not work Satisfactory in infrastructure-less environment." - Justify.
- b) Differentiate between hard hand-off and soft hand-off.
- c) Write the significance of GPRS tunneling protocol.
- d) How windows phone operating system is different from android phone operating system?
- e) Illustrate the parameters that are used to control the movements of pilot in a CDMA system?
- f) How a scatter net does differ from a piconet in Bluetooth?
- g) Distinguish between proactive and reactive protocols with suitable examples.
- h) Compare between WCDMA and CDMA-2000.
- i) What are the requirements of SNDCP in GPRS?
- j) Enlist all the final methods implemented by Secure Servlet that provide the information need by the Security Policy as basis for decision in pervasive web application.

**Part-II**

**Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (6 x 8)**

- a) How are the calls set up takes place between the mobile users and the wire line users in PCS network?
- b) What are the primary goals of the WAP Forum efforts and how are they reflected in the initial WAP protocol architecture?
- c) Explain how tunneling works in mobile IP? Describe the pros and cons of all the methods involved in tunneling.
- d) Enumerate the advantages and disadvantages of using CDMA for a cellular network.
- e) What are the characteristics of a wireless LAN that possess unique security challenges those are not found in wired LANs.

- f) Describe the interaction between authentication servlet and application servlet via the session object in pervasive web application.
- g) Write the advantages and problems of forwarding mechanisms in Bluetooth network regarding security, power saving, and network stability.
- h) Enlist and explain all the logical channels used in WCDMA.
- i) Distinguish between network architecture for Global star System and network architecture for Iridium System using suitable figures.
- j) Enumerate the transmission protocols in the Um interface in GPRS Networking Protocol.
- k) Explain the Issues that concern M-commerce in terms of security and privacy.
- l) What is Inter-BS link Transfer? Explain using suitable diagrams. How it is differ from Inter System Handoff?

### Part-III

#### Only Long Answer Type Questions (Answer Any Two out of Four)

- Q3 How does mobile IP works? What are the challenges with mobile IP with respect to high speed mobility vehicles? How does Cellular IP overcome these issues? (16)
- Q4 List-out the main elements of GSM system architecture and describe their functions. How is localization, location update, roaming, etc. done in GSM and reflected in the data base? (16)
- Q5 Create an e-business application that can be accessed from different devices using suitable example presentation. (16)
- Q6 Write short answer on any Two: (8x2)
  - a) WLAN
  - b) Global Mobile Satellite Systems
  - c) GPRS