

# CBCS SCHEME

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21CD51

## Fifth Semester B.E. Degree Examination, June/July 2024 Object Oriented Modelling and Design

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. Explain Association End concept with example. Describe the properties of Associated end. (10 Marks)  
b. Describe multiple inheritance and its types with examples. (10 Marks)

OR

- 2 a. Describe the following :  
i) Aggregation Vs Association (10 Marks)  
ii) Aggregation Vs Composition (10 Marks)  
b. Define Event. Explain different kinds of events with suitable example. (06 Marks)  
c. Explain the following terms with example.  
i) Metadata ii) Reification. (04 Marks)

### Module-2

- 3 a. List and explain the rules of developing the statecharts (10 Marks)  
b. Define use case diagram, explain the notations used in usecase diagram with example. (10 Marks)

OR

- 4 a. Define SSD. Explain briefly the steps to develop SSD based on activity diagram. (10 Marks)  
b. Write the simplified activity of diagram of telephone order scenario. (10 Marks)

### Module-3

- 5 a. Describe the different stages of software development process. (10 Marks)  
b. List and explain the steps to construct a domain state model. (10 Marks)

OR

- 6 a. Explain the following :  
i) Waterfall and iterative development life cycle (10 Marks)  
ii) Data dictionaries for an ATM  
b. List and explain the different criteria's to eliminate unnecessary and incorrect attributes. (10 Marks)

### Module-4

- 7 a. Describe the primary responsibility of view layer and data access layer. (10 Marks)  
b. Explain the steps to be followed in developing first cut sequence diagram. (10 Marks)

OR

- 8 a. Describe the process of designing with communication diagram. Draw a communication diagram for lookup item availability. (10 Marks)  
b. Explain three layer design for RMO. Give the most common issues found in the three layer design. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg,  $42+8=50$ , will be treated as malpractice.

**Module-5**

- 9 a. Explain how to use design pattern. (10 Marks)  
b. Explain the following :  
i) How to select a design pattern  
ii) Creational and structural pattern. (10 Marks)

**OR**

- 10 a. Describe the applicability structures, benefits and liabilities of abstract factory system. (10 Marks)  
b. Write note on :  
i) Prototype and Singleton  
ii) Design class notation and symbols. (10 Marks)

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21CS52

## Fifth Semester B.E. Degree Examination, June/July 2024 Computer Networks

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. With a neat sketch, explain two types of wide area network in use. (04 Marks)  
b. Explain the functionalities of OSI reference model layers with neat diagram. (08 Marks)  
c. Explain the following:  
i) Direct sequence spread spectrum and frequency hopping spread spectrum. (08 Marks)  
ii) Fiber optics and copper wire. (08 Marks)

OR

- 2 a. List out 6 different types of services provided under connection-oriented and connection less services. (04 Marks)  
b. Explain TCP/IP protocol suite of computer network with a neat diagram. Also represent the protocols used in each layer of the model. (08 Marks)  
c. What is path loss? Explain different types of frequency bands in radio transmission with necessary diagram. (08 Marks)

### Module-2

- 3 a. Write the steps for computing CRC. Find the codeword for the message frame 1101011111 and generator polynomial  $G(x) = x^4 + x + 1$  using CRC. (08 Marks)  
b. With a neat diagram, demonstrate the working of GO-BACK-N protocol. (08 Marks)  
c. Describe pure ALOHA and slotted ALOHA. (04 Marks)

OR

- 4 a. Explain error detection and correction using hamming code with 7 databits and 4 check bits. (08 Marks)  
b. Explain the working of stop and wait protocol for a noiseless channel. (08 Marks)  
c. With a neat diagram, explain the working of CSMA/CD protocol. (04 Marks)

### Module-3

- 5 a. Explain the routing process within datagram network and virtual circuit network with a neat diagram. (08 Marks)  
b. Explain distance vector routing algorithm with an example. (08 Marks)  
c. Bring out the Leaky Bucket mechanism for traffic policing. (04 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
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OR

- 6 a. Explain different types of packet scheduling algorithm with neat diagrams. (08 Marks)  
 b. Write the Dijkstra's algorithm and apply it to the following graph (Refer Fig.Q.6(b)) with source node 'u' to find shortest path to all other nodes.

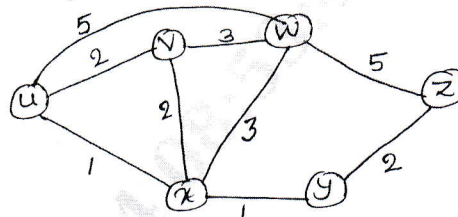


Fig.Q.6(b)

- c. Describe two major differences between the ECN and RED method of congestion avoidance. (04 Marks)

**Module-4**

- 7 a. List and explain the primitives for a simple transport service. (06 Marks)  
 b. Explain connection establishment between server and the client using TCP. (08 Marks)  
 c. With general format, explain the various fields of UDP and explain how checksum is calculated. (06 Marks)

OR

- 8 a. With a neat diagram, explain each field of TCP header. (08 Marks)  
 b. Write a note on Max-Min fairness. (06 Marks)  
 c. Explain the steps in making a remote procedure call with a neat diagram. (06 Marks)

**Module-5**

- 9 a. What are the 2 different architectures used in modern network application? Explain each architecture with neat diagram. (08 Marks)  
 b. Explain the HTTP request message format in detail. (08 Marks)  
 c. Explain the use of cookie in web application. (04 Marks)

OR

- 10 a. Illustrate the socket communication between two processes that communicate over the internet with a suitable diagram. (04 Marks)  
 b. With a neat diagram, explain how SMTP can be used for transmitting mails from sender to receiver. (08 Marks)  
 c. Explain the various services provided by DNS and problems associated with centralized design. (08 Marks)

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21CS53

## Fifth Semester B.E. Degree Examination, June/July 2024 Database Management Systems

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. Define DBMS. Explain main characteristics of database approach. (08 Marks)
- b. Explain advantages of Database Management system. (08 Marks)
- c. Define data model. Explain the different types of user friendly interfaces. (04 Marks)

### OR

- 2 a. Define Entity and attributes. Explain all the types of attributes along with notations. (10 Marks)
- b. Explain Cardinality ratios for binary relationship and write a ER diagram for movie database (minimum 4 entities). (10 Marks)

### Module-2

- 3 a. Explain relational model constraints. (06 Marks)
- b. Explain different types of update operations and show an example of a violation of the referential and entity integrity in each of update operation. (08 Marks)
- c. Define the following with example : (06 Marks)
  - (i) Primary key
  - (ii) Foreign key
  - (iii) Super key
  - (iv) Candidate key

### OR

- 4 a. Briefly explain the ER to relational mapping algorithm with suitable example for each step. (10 Marks)
- b. Explain following relational algebra operators with example : (10 Marks)
  - (i) Select
  - (ii) Project
  - (iii) Intersection
  - (iv) Cartesian product

### Module-3

- 5 a. Explain insert, delete, update, alter and drop statement in SQL. (10 Marks)
- b. Consider the following schema for order database :  
SALESMAN (Salesman\_Id, Name, City, Commision)  
CUSTOMER (Customer\_Id, Cust\_name, City, Grade, Salesman\_id)  
ORDERS (Ord\_No, Purchase\_amt, Ord\_Date, Customer\_id, Salesman\_id)  
Write SQL queries to,
  - (i) Find the name and numbers of all salesman who had more than due customer.
  - (ii) List all the salesman and indicates those who have and don't have customer in their cities (use union).
  - (iii) Create that view finds the salesman who has the customers with the higher order. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
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OR

- 6 a. Write a note on for following :
- (i) Assertion and action trigger. (10 Marks)
  - (ii) Views in SQL. (05 Marks)
- b. Explain stored procedures in SQL. (05 Marks)
- c. Briefly explain JDBC classes. (05 Marks)

**Module-4**

- 7 a. Explain informal guidelines to determine the quality of relation scheme design with example. (08 Marks)
- b. Explain Armstrong inference rule. (06 Marks)
- c. Discuss insertion and deletion anomalies. (06 Marks)

OR

- 8 a. Define normal form. Explain 2NF, 3NF and BCNF with suitable example. (10 Marks)
- b. Consider 2 sets of FDs, F and G,  $F = \{A \rightarrow B, B \rightarrow C, AC \rightarrow D\}$  and  $G = \{A \rightarrow B, B \rightarrow C, A \rightarrow D\}$  Are F and G equivalent? (05 Marks)
- c. Consider set of FD's be  $E : \{B \rightarrow A, D \rightarrow A, AB \rightarrow D\}$ , find the minimal cover of E. (05 Marks)

**Module-5**

- 9 a. Why concurrency control needed. Explain types of problems that may occur when 2 simple transaction run concurrently. (10 Marks)
- b. Explain why recovery needed and Acid properties. (10 Marks)

OR

- 10 a. Briefly discuss Two-phase locking techniques for concurrency control. (08 Marks)
- b. Explain ARIES recovery algorithm with example. (08 Marks)
- c. Write a note on Deadlock prevention protocol. (04 Marks)

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21CS54

## Fifth Semester B.E. Degree Examination, June/July 2024 Artificial Intelligence and Machine Learning

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. Define the terms :  
 i) Artificial Intelligence    ii) Turing Test    iii) Total Turing Test  
 Summarize the capabilities required by computer to pass the turing test and total turing test. (10 Marks)
- b. Outline the following phases with respect to history of AI:  
 i) The birth of Artificial Intelligence (10 Marks)  
 ii) AI Winter

OR

- 2 a. Explain Simple-Problem-Solving-Agent with an algorithm. Also state the assumptions done in the process of agent design. (10 Marks)
- b. Illustrate the component of well-defined problems by formulating "Vacuum World" Toy problem. (10 Marks)

### Module-2

- 3 a. Infer the conditions for optimality of A\* algorithm. Given the following graph with initial state S, Identify the Goal state and solve for A\* algorithm. [Refer Fig.Q3(a)]

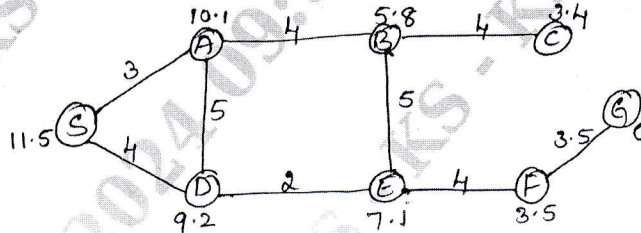


Fig.Q3(a)

- b. Define Machine Learning. Explain in detail the different types of machine learning with example. (10 Marks)

OR

- 4 a. What is dispersion of Data? Explain the different measures of data dispersion. (10 Marks)
- b. Explain PCA. Write the PCA algorithm. (05 Marks)
- c. Consider the following data of ML course registration. There are 50 boys and 50 girls in the class. Apply Chi-square test and find out whether any difference exists between boys and girls for course registration. [Assume :  $P = 0.0412$ ]

Gender	Registered	Not Registered	Total
Boys	35	15	50
Girls	25	25	50
Total	60	40	100

(05 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
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**Module-3**

- 5 a. Generate version space for the given dataset using candidate elimination algorithm.

CGPA	Interactiveness	Practical Knowledge	Communication skills	Logical Thinking	Interest	Job Offer
$\geq 9$	Yes	Excellent	Good	Fast	Yes	Yes
$\geq 9$	Yes	Good	Good	Fast	Yes	Yes
$\geq 8$	No	Good	Good	Fast	No	No
$\geq 9$	Yes	Good	Good	Slow	No	Yes

(10 Marks)

- b. Demonstrate the steps of Learning System Design. (05 Marks)
- c. Differentiate between Instance based learning and model-based learning. (05 Marks)

**OR**

- 6 a. List the different validation techniques of Regression methods. Explain any 4 techniques in detail. (10 Marks)
- b. Consider the following dataset:

S.No.	CGPA	Assessment	Project Submitted	Result
1	9.2	85	8	Pass
2	8	80	7	Pass
3	8.5	81	8	Pass
4	6	45	5	Fail
5	6.5	50	4	Fail
6	8.2	72	7	Pass
7	5.8	38	5	Fail
8	8.9	91	9	Pass

Assuming  $K = 3$ , Classify the new instance (6.1, 40, 5) using KNN algorithm. (10 Marks)**Module-4**

- 7 a. Illustrate the structure of Decision Tree, with its advantages and disadvantages. (10 Marks)
- b. Define the following terms:
- i) Entropy                      ii) Information gain                      iii) GINI Index
- iv) Pre-pruning                      v) Post-pruning (05 Marks)
- c. Define Regression Tree. Write the algorithm for constructing Regression Trees. (05 Marks)

**OR**

- 8 a. State Bayes Theorem. Define MAP hypothesis and maximum likelihood. (06 Marks)
- b. Consider a boy who has a volleyball tournament on the next day, but he feels sick today. It is unusual that there is only a 40% chance he would fall sick since he is a healthy boy. Now, find the probability of the boy participating in the tournament. The boy is very much interested in volley ball, so there is 90% probability that he would participate and 20% that he will fall sick given that he participates in the tournament. (04 Marks)



- c. Classify the given test data using Naïve Bayes algorithm. Apply Laplace correction if zero probability problem occurs.

Test data : [Assessment = Average, Assignment = 'Yes', Project = No and seminar = Good]  
Given dataset :

S.No.	Assessment	Assignment	Project	Seminar	Result
1	Good	Yes	Yes	Good	Pass
2	Average	Yes	No	Poor	Fail
3	Good	No	Yes	Good	Pass
4	Average	No	No	Poor	Fail
5	Average	No	Yes	Good	Pass
6	Good	No	No	Poor	Pass
7	Average	Yes	Yes	Good	Fail
8	Good	Yes	Yes	Poor	Pass

(10 Marks)

**Module-5**

- 9 a. Illustrate Meculloch and Pitts Neuron Mathematical model. Which are the different activation functions used in ANN? (10 Marks)
- b. Explain the different types of ANN. (04 Marks)
- c. Explain the architecture of Radial Basis Function Neural Network (RBFNN) along with algorithm. (06 Marks)

**OR**

- 10 a. Differentiate between clustering and classification. (04 Marks)
- b. Write K-means algorithm. Give the cluster table after iteration 1 for the given data using K means algorithm with initial value of objects 2 and 5 with the coordinate values (4, 6) and (12, 4) as initial seed.

Objects	X Coordinate	Y Coordinate
1	2	4
2	4	6
3	6	8
4	10	4
5	12	4

(06 Marks)

- c. Explain the different Cluster Evaluation methods. (10 Marks)

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21RMI56

Fifth Semester B.E. Degree Examination, June/July 2024

## Research Methodology and Intellectual Property Rights

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. Identify the meaning of Research and brief out the objectives and motivation in Engineering Research. (10 Marks)  
b. Identify the steps to find the "Solve a worthwhile problem". (10 Marks)

OR

- 2 a. Identify the types of Engineering Research and briefly explain them. (10 Marks)  
b. Identify the ethical issues related to authorship and brief out them. (10 Marks)

### Module-2

- 3 a. Identify the essence of new and existing knowledge and explain briefly. (10 Marks)  
b. Identify how search operators are used to narrow down the search results. (10 Marks)

OR

- 4 a. Identify the impacts of title and keywords on citation. (10 Marks)  
b. Identify acknowledgement and attributions in research process and briefly explain. (10 Marks)

### Module-3

- 5 a. Define Intellectual Property (IP). Explain the major types of IP. (10 Marks)  
b. Identify the process of patenting. Briefly explain. (10 Marks)

OR

- 6 a. Explain briefly the Commercialization of a patent. (10 Marks)  
b. What are the exclusions (product and processes) that cannot be patented? Explain. (10 Marks)

### Module-4

- 7 a. Explain the classes or types of copyrights. (10 Marks)  
b. What is a Trademark? Explain the symbols in TM. (10 Marks)

OR

- 8 a. What are the advantages "the registration of a trademark provides to the proprietor"? (10 Marks)  
b. Identify process of Trademark registration and explain briefly the classification of TM. (10 Marks)

### Module-5

- 9 a. Define Industrial design. Briefly explain acts and laws to govern Industrial design. (10 Marks)  
b. Identify procedure for registration of Industrial design by taking example of Aple Inc Vs Samsung Electronics Co. (10 Marks)

OR

- 10 a. Define Geographical Identification (GI) and briefly explain acts, laws and rules pertaining to GI. (10 Marks)  
b. Identify IP Organizations in INDIA. Explain schemes and programs for Intellectual Property Rights. (10 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
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# CBCS SCHEME

21CIV57

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Question Paper Version : A

## Fifth Semester B.E./B.Tech. Degree Examination, June/July 2024 Environmental Studies

Time: 1 hr.]

[Max. Marks: 50

### INSTRUCTIONS TO THE CANDIDATES

1. Answer all the **fifty** questions, each question carries one mark.
2. Use only **Black ball point pen** for writing / darkening the circles.
3. **For each question, after selecting your answer, darken the appropriate circle corresponding to the same question number on the OMR sheet.**
4. Darkening two circles for the same question makes the answer invalid.
5. **Damaging/overwriting, using whiteners** on the **OMR** sheets are strictly prohibited.

- 
1. In an ecosystem, the flow of energy is \_\_\_\_\_.  
a) Biodirectional      b) Cyclic      c) Unidirectional      d) Multidirectional
  2. Which of the following is a biotic component of an ecosystem?  
a) Fungi      b) Solar light      c) Temperature      d) Humidity
  3. Which pyramid is always upright?  
a) Energy      b) Biomass      c) Numbers      d) Food chain
  4. The largest reservoir of nitrogen in our planet is,  
a) Oceans      b) Atmosphere      c) Biosphere      d) Fossil fuels
  5. Abiotic components include,  
a) Soil      b) Temperature      c) Water      d) All of these
  6. Primary consumer is,  
a) Herbivores      b) Carnivores      c) Macro consumers      d) Omnivores
  7. The word "Environment" is derived from \_\_\_\_\_.  
a) Greek      b) French      c) Spanish      d) English
  8. Mineral is,  
a) Organic matter      b) Naturally occurring inorganic substance  
c) Synthesis compound      d) None of these



9. The term ecosystem was first proposed by,  
 a) Jacob Van Verkul      b) A.G. Transley      c) Costraza      d) Marrie Gibbs
10. Gold occur in,  
 a) Sedimentary Deposits      b) Places deposits  
 c) Hydrothermal deposits      d) None of these
11. Fluorosis is caused due to,  
 a) No fluoride intake      b) Low fluoride intake  
 c) Excessive fluoride intake      d) None of these
12. Decrease of oxygen level in water mainly causes,  
 a) Fluorosis      b) Death of aquatic life  
 c) Water pollution      d) Both (b) and (c)
13. Mineral resource are,  
 a) Renewable      b) Non-Renewable      c) Equally distributed      d) None of these
14. Deforestation can,  
 a) Increase the rainfall      b) Increase Soil fertility  
 c) Introduce silt in rivers      d) None of these
15. Plants use \_\_\_\_\_ gas for photosynthesis.  
 a) Oxygen      b) Methane      c) Nitrogen      d) Carbon dioxide
16. Forests prevent soil erosion by binding soil particles in their,  
 a) Stems      b) Roots      c) Leaves      d) Buds
17. Nitrogen fixing bacteria exists in \_\_\_\_\_ of plants?  
 a) Leaf      b) Roots      c) Steam      d) Flower
18. Which of the following is the source of ground water?  
 a) Oceans      b) Springs      c) Rivers      d) All of these
19. The effluents from urban areas contain,  
 a) Oil and greases      b) Detergents  
 c) Nutrients      d) All of these
20. Maximum dissolved oxygen is required by,  
 a) Fish      b) Bacteria      c) Vegetables      d) All of these
21. Which of the following is not a component of soil?  
 a) Mineral matter      b) Organic matter      c) Ozone      d) Soil air
22. Definition of Noise is,  
 a) Loud sound      b) Unwanted sound      c) Constant sound      d) Sound of high frequency
23. The Noise is measured in,  
 a) Decibels      b) Joules      c) PPM      d) NTU



39. Which of the following is a source of  $\text{SO}_2$  in atmosphere?  
a) Volcanoes  
b) Thermal power plants  
c)  $\text{H}_2\text{SO}_4$  manufacturing  
d) All of these
40. Atmospheric oxidation of  $\text{SO}_2$  to  $\text{SO}_3$  is influenced by,  
a) Sunlight  
b) Humidity  
c) Presence of hydrocarbons  
d) All of these
41. Acid Rain effects \_\_\_\_\_.  
a) Materials  
b) Plants  
c) Soil  
d) All of these
42. Ozone layer is present in,  
a) Troposphere  
b) Stratosphere  
c) Mesosphere  
d) Thermosphere
43. Which of the following is the unit for measuring the thickness of ozone layer?  
a) Decibels  
b) Dobson unit  
c) Centimeter  
d) None of these
44. CFC's have been used as,  
a) Solvents  
b) Refrigerants  
c) Blowing agents for polymer foams  
d) All of these
45. Ozone hole was first discovered over,  
a) Arctic  
b) Antarctica  
c) Tropical region  
d) Africa
46. The term acid rain was coined in the year,  
a) 1952  
b) 1852  
c) 1652  
d) 1752
47. Which of the following is not a source of  $\text{CO}_2$  in the atmosphere?  
a) Burning of fossil fuels  
b) Photosynthesis  
c) Volcanic Eruptions  
d) Animal and plant respiration and decay
48. Increase in Asthma attacks has been linked to high levels of,  
a) Oxygen  
b) Airborne dust particles  
c) Nitrogen  
d) All of these
49. Food chain is divided into \_\_\_\_\_ basic categories.  
a) Four  
b) Three  
c) Five  
d) Seven
50. About  $\frac{3}{4}$  of the country's coal deposits are found in,  
a) Karnataka  
b) Tamil Nadu  
c) Kashmir  
d) Bihar and Orissa.

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