

NARASARAOPETA ENGINEERING COLLEGE:NARASARAOPET  
(AUTONOMOUS)

II B.Tech I Semester Regular Examinations: December-2024  
(Branches: CSE, AI, IT, ME &CE)  
ENVIRONMENTAL STUDIES

Sub Code: R23CC21MC  
Time: 3 hours

Max. Marks: 5x14=70M  
Date: 23-12-2024

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks

**UNIT-1**

1. A) Define the environment? Why environmental studies considered as a multi-disciplinary subject?  
What is the scope of environmental education? (CO1 K2 14M)

OR

B) Write notes on Environmental effecting of extracting and using mineral resources?  
(CO1 K3 14M)

**UNIT-II**

2. A) What are ecological pyramids? Explain why some of these pyramids are upright while others are inverted in different ecosystems? (CO2 K2 14M)

OR

B) Explain various values in biodiversity? Explain about India as a mega-diversity nation.  
(CO2 K2 14 M)

**UNIT-III**

3. A) Discuss adverse effects and control of water pollution?

(CO3 K2 14M)

OR

B) Classified solid waste? What adverse effects can solid waste cause? How can the solid waste be managed?  
(CO3 K1&K2 14 M)

**UNIT-IV**

4. A) Discuss the salient features of (a) wildlife protection act 1972 (b) forest conservation act 1980.

(CO4 K2 14M)

OR

B) What is a watershed? Critically Discuss the objectives and practices of watershed Management.  
(CO4 K2 14M)

**UNIT-V**

5. A) Discuss the environmental and social impacts of growing population. With a neat diagram, Explain the variation in population growth among various nations (CO5 K2 14M)

OR

B) Explain the role of information technology in environment and human health.

(CO5 K2 14M)

## II B.Tech I Semester Regular Examinations, December-2024

R23

Sub Code: R23CC2101

**DISCRETE MATHEMATICS & GRAPH THEORY**

Time: 3 hours

(CSE, IT, CSE(AIML), AI, AIML,DS, CYS)

Max. Marks: 70

Note: Question Paper consists of Two parts (Part-A and Part-B)

### PART-A

Answering all the questions from Part-A is compulsory (10 x 2M = 20M)

Q.No	Questions	KL	CO	M
1	a Define tautology.	1	1	2M
	b Show that $P \wedge (Q \wedge R)$ and $(P \wedge Q) \wedge R$ are logically equivalent.	1	1	2M
	c Define about finite and infinite sets.	1	2	2M
	d Define Power set. If $S = \{a, b, c\}$ then $P(S)$ is?	1	2	2M
	e In how many ways can 20 similar books be placed on 5 different shelves	2	3	2M
	f Explain general solution and particular solution of recurrence relation	2	3	2M
	g Illustrate the advantages of Matrix representation of graph.	2	4	2M
	h Explain Hamiltonian graph with example	2	4	2M
	i Explain multi graph with example	2	5	2M
	j Define planar graphs with examples	1	5	2M

### PART-B

Answer either 'a' or 'b' from each question of PART-B (5 x 10M = 50M)

Q.No	Questions	KL	CO	M	
2	Unit-I				
	a	i) Check whether the following statements is a tautology or not $(\sim P \wedge (P \wedge Q)) \rightarrow \sim Q$	3	1	5M
		ii) Write each of the following statements in symbolic form	3	1	5M
		*) Anil & Sunil are rich. *) Neither Ramu nor Raju is poor. *) It is not true that Ravi & Raju are both rich.			
	OR				
b	i) Prove or disprove the validity of the following arguments using the rules of inference. *) All men are fallible *) All kings are men *) Therefore, all kings are fallible	3	1	5M	
	ii) Obtain PDNF of following: $(\sim P) \vee Q$	3	1	5M	
3	Unit-II				
	a	i) Draw the Hasse diagram for the partial ordering $\{(A,B)   A \subseteq B\}$ on the power set $P(S)$ , where $S = \{a,b,c\}$ .	2	2	5M
ii) If $A = \{1,2,3,4\}$ and $R, S$ are relations on $A$ defined by $R = \{(1,2), (1,3), (2,4), (4,4)\}$ $S = \{(1,1), (1,2), (1,3), (1,4), (2,3), (2,4)\}$ find $R \circ S, S \circ R, R \circ R, S \circ S$ , write down there matrices.		2	2	5M	

OR					
b	i) Verify the following relation R on $X = \{1, 2, 3, 4\}$ is an equivalence relation or not? Given $R = \{(1, 1), (1, 4), (4, 1), (2, 2), (2, 3), (3, 4), (3, 3), (3, 2), (4, 3), (4, 4)\}$ .	2	2	5M	
	ii) Let $X = \{1, 2, 3, 4\}$ and a mapping $f: X \rightarrow X$ be given by $f = \{(1, 2), (2, 3), (3, 4), (4, 1)\}$ . Find the composition function $f^2, f^3$ and $f^4$ . Where $f^2 = f \circ f$	2	2	5M	
Unit-III					
4	a	i) In how many ways can four students be selected out of twelve students if two particular students are not included at all?	2	3	5M
	b	ii) Define Generating function and explain the operations on generating functions?	2	3	5M
OR					
b	i) A women has 20 close relatives and she wishes to invite 7 of them to dinner. In how many ways she can invite Two particular persons will not attend together.	2	3	5M	
	ii) Find the particular solution of the recurrence relation $a_{n+2} - 4a_{n+1} + 4a_n = 2^n$ .	2	3	5M	
Unit-IV					
5	a	i) Define isomorphism? And explain isomorphism with suitable example.	2	4	5M
	b	ii) Define Eulerian circuit and Hamiltonian circuit, give an example of graph that has neither an Eulerian circuit nor Hamiltonian circuit.	3	4	5M
OR					
b	i) Explain properties of adjacency matrix by taking suitable graph with minimum 4 nodes 6 edges.	2	4	5M	
	ii) Define Walk, Trail, Paths and circuit? Explain with suitable graphs examples.	2	4	5M	
Unit-V					
6	a	i) Explain in brief about Eulers Theorem with Example?	2	5	5M
	b	ii) Define spanning tree of a graph, and explain DFS algorithm to find spanning tree of a graph with suitable example?	2	5	5M
OR					
b	i) Show that in a connected planar graph G with n vertices and m edges has regions $r = m - n + 2$ in every one of its diagram?	3	5	5M	
	ii) Explain kruskal's algorithm to find minimal spanning tree of the graph with suitable example?	2	5	5M	

KL: Blooms Taxonomy Knowledge Level

CO: Course Outcome

M: Marks

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## II B.Tech I Semester Regular Examinations, December-2024

R23

Sub Code: R23CC2102

**UNIVERSAL HUMAN VALUES**

Time: 3 hours.

(COMMON TO ALL BRANCHES)

Max. Marks: 70

Note: Question Paper consists of Two parts (Part-A and Part-B)

### PART-A

Answering all the questions from Part-A is compulsory (10 x 2M = 20M)

Q.No	Questions	KL	CO	M
1	a Describe the value education.	2	1	2M
	b Differentiate between happiness and prosperity.	2	1	2M
	c Define the concept of harmony in the human being.	1	2	2M
	d Interpret the harmony in the self.	2	2	2M
	e Describe the harmony in the family.	2	3	2M
	f Differentiate between 'trust' and 'respect'.	2	3	2M
	g List the four orders of nature.	2	4	2M
	h Interpret the interconnectedness in nature	2	4	2M
	i Define the term definitiveness of ethical human conduct.	1	5	2M
	j Describe the natural acceptance.	2	5	2M

### PART-B

Answer either 'a' or 'b' from each question of PART-B (5 x 10M = 50M)

Q.No	Questions	KL	CO	M	
2	Unit-I				
	a	i) Explain the role of education in achieving holistic development.	2	1	5M
		ii) Outline the method to fulfill basic human aspirations.	2	1	5M
	OR				
	b	i) List the basic components of holistic development.	2	1	5M
		ii) Explain the current scenario concerning happiness and prosperity in society.	2	1	5M
3	Unit-II				
	a	i) Explain the co-existence of the self and the body.	2	2	5M
		ii) How do the needs of the self differ from the needs of the body?	2	2	5M
	OR				
	b	i) Briefly explain the role of health in ensuring harmony in the human being.	2	2	5M
		ii) Discuss the key components of a programme for self-regulation?	2	2	5M
4	Unit-III				
	a	i) Explain the significance of 'trust' as a foundational value in relationships.	2	3	5M
		ii) Explain why harmony in the family is considered the basic unit of human interaction.	2	3	5M

OR				
b	i) Explain the importance of harmony in society for the well-being of individuals.	2	3	5M
	ii) Mention two examples of other feelings that contribute to harmonious relationships.	2	3	5M
Unit-IV				
a	i) Explain the concept of self-regulation in the four orders of nature.	2	4	5M
	ii) Explain the relationship between interconnectedness and coexistence.	2	4	5M
OR				
b	i) Explain the significance of coexistence in realizing existence	2	4	5M
	ii) How does nature achieve self-regulation without external intervention?	2	4	5M
Unit-V				
a	i) Explain the significance of humanistic education in shaping individual behavior.	2	5	5M
	ii) Discuss the main features of value-based management models.	2	5	5M
OR				
b	i) Outline any one strategy for transitioning toward a value-based profession.	1	5	5M
	ii) How does a humanistic constitution contribute to a universal human order?	2	5	5M

KL: Blooms Taxonomy Knowledge Level

CO: Course Outcome

M: Marks

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**II B.Tech I Semester Regular Examinations, December-2024**

Sub Code: R23CC2106  
Time: 3 hours

**ARTIFICIAL INTELLIGENCE**  
(CSE(AIML), AI, AIML)

**R23**

Max. Marks: 70

Note: Question Paper consists of Two parts (Part-A and Part-B)

**PART-A**

Answering all the questions from Part-A is compulsory (10 x 2M = 20M)

Q.No	Questions	KL	CO	M
1	a Define Artificial Intelligence.	K2	1	2M
	b List any two components of problem-solving agents.	K2	1	2M
	c What is the difference between Breadth-First Search and Depth-First Search?	K3	2	2M
	d What is Alpha-Beta Pruning?	K3	2	2M
	e What is a semantic net?	K3	3	2M
	f What is constraint propagation?	K3	3	2M
	g What is forward chaining?	K3	4	2M
	h What is reinforcement learning?	K3	4	2M
	i Define meta-knowledge in the context of expert systems.	K4	5	2M
	j What is the role of heuristics in expert systems?	K4	5	2M

**PART-B**

Answer either 'a' or 'b' from each question of PART-B (5 x 10M = 50M)

Q.No	Questions	KL	CO	M
2	<b>Unit-I</b>			
	a i) Explain the role of environments in designing intelligent agents.	K2	1	5M
	ii) Write a short note on the history and foundation of AI.	K2	1	5M
	<b>OR</b>			
b i) Discuss the characteristics of a rational agent.	K2	1	5M	
ii) Explain the concept of rationality and how it applies to intelligent agents.	K2	1	5M	
3	<b>Unit-II</b>			
	a i) Compare searching with partial information and heuristic search strategies.	K3	2	5M
	ii) What are optimal decisions in multiplayer games? Illustrate with an example.	K3	2	5M
	<b>OR</b>			
b i) Explain the Minimax algorithm and its role in game playing.	K3	2	5M	
ii) Explain the A* algorithm and its advantages over other search strategies.	K3	2	5M	
4	<b>Unit-III</b>			
	a i) Describe predicate logic and its role in knowledge representation.	K3	3	5M
ii) Write a short note on frames and inheritance in AI.	K3	3	5M	

	<b>OR</b>			
	b i) Discuss the significance of reasoning under uncertainty in AI systems.	K3	3	5M
	ii) Explain Bayes' probabilistic inference with a suitable example.	K3	3	5M
5	<b>Unit-IV</b>			
	a i) Explain the differences between propositional inference and first-order logic inference.	K3	4	5M
	ii) Write a short note on statistical learning methods.	K3	4	5M
	<b>OR</b>			
b i) What is explanation-based learning? Provide a suitable example.	K3	4	5M	
ii) Describe how decision trees are used in inductive learning.	K3	4	5M	
6	<b>Unit-V</b>			
	a i) Discuss the roles and applications of expert systems in decision-making.	K4	5	5M
	ii) Compare expert systems with conventional problem-solving systems.	K4	5	5M
	<b>OR</b>			
b i) What are expert system shells? Provide examples and their significance.	K4	5	5M	
ii) Describe the role of expert systems in solving real-world problems.	K4	5	5M	

KL: Blooms Taxonomy Knowledge Level

CO: Course Outcome

M: Marks



# NARASARAOPETA ENGINEERING COLLEGE (AUTONOMOUS)

## II B.Tech I Semester Regular Examinations, December-2024

Sub Code: R23CC2104

ADVANCED DATA STRUCTURES & ALGORITHM ANALYSIS

Time: 3 hours

(CSE, IT, CSE(AIML), AI, AIML, DS, CYS)

Max. Marks: 70

Note: Question Paper consists of Two parts (Part-A and Part-B)

### PART-A

Answering all the questions from Part-A is compulsory (10 x 2M = 20M)

Q.No	Questions	KL	CO	M
1	a	1	1	2M
	b	1	1	2M
	c	1	2	2M
	d	2	2	2M
	e	1	3	2M
	f	1	3	2M
	g	1	4	2M
	h	2	4	2M
	i	1	5	2M
	j	1	5	2M

**PART-B:** Answer either 'a' or 'b' from each question of **PART-B** (5 x 10M = 50M)

Q.No	Questions	KL	CO	M	
2	Unit-I				
		i) How can we find the time complexity of an Algorithm? Explain with example?	2	1	5M
	a	ii) Suppose $T1(n)$ is $W(f(n))$ and $T2(n)$ is $W(g(n))$ . Which of the following statements are true?	3	1	5M
		i. $T1(n) + T2(n)$ is $W(\max(f(n), g(n)))$ . ii. $T1(n)T2(n)$ is $W(f(n)g(n))$ .  Some authors define big omega by saying $f(n)$ is $W(g(n))$ if there is some $n_0$ and $c > 0$ such that for all $n \geq n_0$ we have $f(n) \geq cg(n)$ .			
		OR			
b	i) Explain AVL tree and perform LL,RR,LR and RL rotations on sample data	2	1	10M	
3	Unit-II				
	a	(a) i) Explain the Properties of Min Heap and Max Heap	2	2	4M
		ii) Explain why there are no forward Non-tree edges with respect to a BFS tree constructed for a directed graph. Explain with one example graph.	2	2	6M
		OR			
	b	i) How quickly can you multiply a $kn \times n$ matrix by an $n \times kn$ matrix, using Strassen's algorithm as a subroutine? Answer the same question with the order of the input matrices reversed.	3	2	5M
ii) Apply Quick sort on a given sequence 7 11 14 6 9 4 3 12. What is the sequence after first phase, pivot is first element?		3	2	5M	

Unit-III

i) Construct job sequencing schedule for  $n=7$ ,  $(p_1, p_2, p_3, p_4, p_5, p_6, p_7) = (100, 10, 15, 27, 120, 55, 40)$  and deadlines  $(d_1, d_2, d_3, d_4) = (2, 1, 2, 1, 4, 3, 1)$ .

3

3

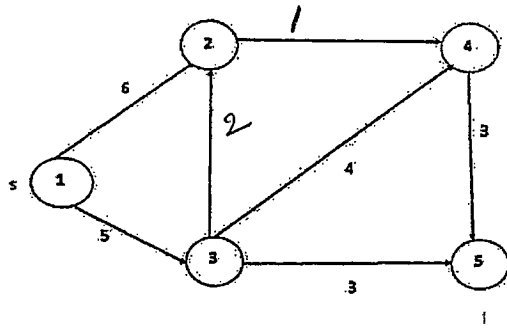
5M

ii) Find the below directed graph. Consider the node 0 as source node and find the single shortest paths to remaining vertices.

3

3

5M



OR

i) Explain how dynamic program is efficient than greedy method.

2

3

5M

ii) Plan the following instance of the 0/1, knapsack problem given the knapsack capacity in  $W=5$  using dynamic programming and explain it.

3

3

5M

Item	Weight	Value
1	4	10
2	3	20
3	2	15
4	5	25

Unit-IV

i) The N-queens problem is to place n-queens on an  $n \times n$  chess board. What are the constraints in placing n-queens? Explain how backtracking can be used to solve the problem.

3

4

5M

ii) Draw the state space tree for  $n=3$  and  $m=3$  colors.

3

4

5M

OR

i) Draw the portion of State space tree generated by LCBB for the knapsack problem of the instance  $N = 5$ ,  $(p_1, p_2, \dots, p_5) = (13, 15, 7, 2, 4)$ ,  $(w_1, w_2, \dots, w_5) = (4, 6, 3, 4, 2)$  and  $m = 12$  by using fixed tuple size information.

3

4

10M

Unit-V

i) Describe the Clique Decision Problem(CDP).

2

5

10M

OR

i) Explain about Non-deterministic algorithms. Provide the examples for P and NP algorithms.

2

5

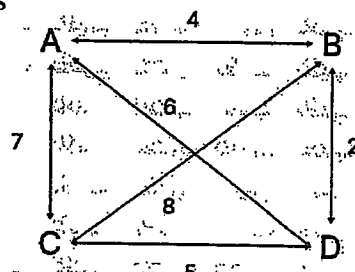
5M

ii) Solve the following Travelling Sales person problem.

3

5

5M



KL: Blooms Taxonomy Knowledge Level

CO: Course Outcome

M: Marks



## II B.Tech I Semester Regular Examinations, December-2024

Sub Code: R23CC2105

OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Time: 3 hours

(CSE, IT, CSE(AIML), AI, AIML,DS, CYS)

Max. Marks: 70

Note: Question Paper consists of Two parts (Part-A and Part-B)

### PART-A

Answering all the questions from Part-A is compulsory (10 x 2M = 20M)

Q.No	Questions	KL	CO	M
1	a Differentiate break and continue statements.	2	1	2M
	b Compare the Relational Operators and Boolean Logical Operators.	2	1	2M
	c What do you mean by Object? Define class.	1	2	2M
	d How is an argument passed to a method? Can the argument have the same name as its parameter?	1	2	2M
	e When is the memory allocated for an array?	1	3	2M
	f Define the keywords private and protected.	1	3	2M
	g What do you understand by inner class?	1	4	2M
	h Write the importance of finally block.	1	4	2M
	i List all File Stream classes	1	5	2M
	j What is Thread Life Cycle?	1	5	2M

### PART-B: Answer either 'a' or 'b' from each question of PART-B (5 x 10M = 50M)

Q.No	Questions	KL	CO	M	
2	Unit-I				
	a	i) Explain in detail about the different features of Object Oriented Programming.	1	1	5M
		ii) Explain and write Java Program to find the largest of three numbers using Ternary Operator and smallest of three numbers using Ternary Operator.	3	1	5M
	OR				
	b	i) List out the decision making statements available in Java. Explain with example.	1	1	5M
		ii) Write a program that reads an integer between 0 and 1000 and adds all the digits in the integer. For example, if an integer is 932, the sum of all its digits is 14.	3	1	5M
3	Unit-II				
	a	i) Explain how you can pass and return objects using methods.	2	2	5M
		ii) What is the purpose of 'this' and 'static' keyword? Write a java program to explain this.	2	2	5M
	OR				
	b	i) Explain method overriding with example.	2	2	5M
		ii) Define a recursive method for computing x raised to power y by doing repetitive multiplication where x and y are positive integer numbers. Define main to use above method.	2	2	5M

4	Unit-III				
	a	i) Describe Inheritance and its type with suitable example.	2	3	5M
		ii) Declare an array reference variable for a two-dimensional array of int values. create a 4-by-5 int matrix, and assign it to the variable.	3	3	5M
	OR				
b	i) Differentiate between Interface and abstract class. When Interface is preferred over abstract class. Explain.	2	3	5M	
	ii) The abstract vegetable class has three subclasses named Potato, Brinjal and Tomato. Write a java prog. That demonstrates how to establish this class hierarchy. Declare one instance variable of type String that indicates the color of a vegetable. Create and display instances of these objects. Override the toString() method of object to return a string with the name of vegetable and its color.	3	3	5M	
5	Unit-IV				
	a	i) What is package? What are the benefits of package? Explain Java API packages.	2	4	5M
		ii) What is Stream Class? Explain input stream class and output stream class in details.	2	4	5M
	OR				
	b	i) What is an Exception? Explain different types of Exception?	2	4	5M
		ii) Consider following code fragment: <pre>try { statement1; statement2; statement3; } catch (Exception1 ex1) { } finally { statement4; } statement5;</pre> 1. Which Statements will execute if no exception is occurs. 2. Which Statements will execute if Exception 1 is occurs at statement	3	4	5M
6	Unit-V				
	a	i) Write a java program to explain the use of File class and its methods.	2	5	5M
		ii) Explain comparable interface and cloneable with example.	2	5	5M
	OR				
b	i) Write a Java program that creates three threads. First thread displays — Good Morning! every one second, the second thread displays- Hello! every two seconds	2	5	5M	
	ii) Write a java program to implement join() method in multithreading.	3	5	5M	

KL: Blooms Taxonomy Knowledge Level

CO: Course Outcome

M: Marks