

**B.TECH III SEMESTER END EXAMINATIONS, DECEMBER 2023**  
**DISCRETE MATHEMATICS (20ABS5405)**

Time : 3 Hours

ESE

Max. Marks : 70

(10 X 2 = 20 Marks)

**PART - A**

Answer the following:

- |   | Unit | Marks |
|---|------|-------|
| 1 a) Prove that $\sqrt{2}$ is irrational by giving a proof by contradiction.                                    | I    | (2 M) |
| b) Find the negative of $p \rightarrow q$ .   | I    | (2 M) |
| c) If $f(x) = x^2 - 6 = y$ , then find $f^{-1}(y)$ .  | II   | (2 M) |
| d) $A = \{1, 2, 3, 4, 5\}$ , $B = \{4, 5, 6, 7\}$ , $C = \{5, 6, 7, 8, 9\}$ , show that $A \cap B = A \cap C$ . | II   | (2 M) |
| e) Every chain is a distributive lattice.   | III  | (2 M) |
| f) Define Boolean algebra and show that $x \vee x = x$ .  | III  | (2 M) |
| g) Find the number of ways of arranging 8 men and 4 women around a circular table.                              | IV   | (2 M) |
| h) In how many ways, a committee of 3 members can be selected from 8 persons?                                   | IV   | (2 M) |
| i) Find the generating function of $\text{im}\{1, a, a^2, a^3, \dots\}$ .                                       | V    | (2 M) |
| j) Define Adjacency matrix with example.  | V    | (2 M) |

**PART - B**

(5 X 10 = 50 Marks)

(Answer One FULL Question from each Unit; All questions carry EQUAL marks)

**UNIT - I**

2. Let  $A = \{1, 2, 3, 4, 6\}$  and let R be the relation on A defined by x divides y.
- Write R as a set of ordered pairs. (10 M)
  - Draw its directed graph.
  - Find the inverse relation  $R^{-1}$  of R. Can  $R^{-1}$  be described in words.

(OR)

3. Prove that  $(p \rightarrow q) \rightarrow r$  and  $(p \wedge q) \vee r$  are logically equivalent. (10 M)

**UNIT - II**

4. State and prove Fundamental theorem of group homomorphism. (10 M)
- (OR)
5. If  $f(x) = x + 2$ ,  $g(x) = x - 2$ ,  $h(x) = 3x$  for  $x \in \mathbb{R}$  where  $\mathbb{R}$  is a set of Real numbers then find fog, foh, fof, fohog and fogoh. (10 M)

**UNIT - III**

6. Find the number of ways of selecting 11 member cricket team from 7 batsman, 6 bowlers and 2 wicket keepers so that team contains 2 wicket keepers and atleast 4 bowlers. (10 M)

(OR)

7. Find the number of solutions  $x_1 + x_2 + x_3 = 19$  with the condition  $x_1 > 1, x_2 > 2, x_3 > 1$ . (10 M)

**UNIT - IV**

8. Solve the Recurrence relations,  $U_n = 6U_{n-1} - 9U_{n-2}$  with initial conditions  $U_0 = 1$  and  $U_1 = 6$ . (10 M)
- (OR)
9. Solve the recurrence relation,  $a_n = 3a_{n-1} + 2, n \geq 1$  with  $a_0 = 1$  by the method of Generating function. (10 M)

**UNIT - V**

10. Prove that the maximum number of edges in a simple disconnected graph G with 'n' vertices and 'k' components is  $(n-k)(n-k-1)/2$ . (10 M)

(OR)

11. Find the minimal spanning tree using Krushal's algorithm. (10 M)

Time: 3 Hours

**PART-A**

(10 X 2 = 20 M)

**(Compulsory Question)**

Answer the following.		Unit	Marks
1	a) Define constructor.	I	(2 M)
	b) Define recursion write a recursive function to find factorial of a given number.	I	(2 M)
	c) Define abstract class.	II	(2 M)
	d) What is use of class path and write how we set class path.	II	(2 M)
	e) Write usage of catch clause.	III	(2 M)
	f) Define autoboxing.	III	(2 M)
	g) What is inter thread communication.	IV	(2 M)
	h) Define stack and write operations we can perform on stack.	IV	(2 M)
	i) Define Applet.	V	(2 M)
	j) Define Swing.	V	(2 M)

**PART-B**

(5X 10 = 50 M)

**(Answer One FULL Question from each Unit; All questions carry EQUAL marks)**

UNIT-I		
2	Write a java program that implement this keyword.	(10 M)
(OR)		
3	Define string and explain string functions with suitable examples.	(10 M)
UNIT-II		
4	Define inheritance and write different types of inheritances.	(10 M)
(OR)		
5	Define package and create a java package that implements all arithmetic operations.	(10 M)
UNIT-III		
6	Explain how exceptions are handled in Java with a neat example. Write all necessary clauses.	(10 M)
(OR)		
7	Explain different types of file operations. Write a java program that copies contents of one file into another file.	(10 M)
UNIT-IV		
8	Define thread. Write a java program that implements a thread.	(10 M)
(OR)		
9	Define tree set and explain operations we can perform on tree set	(10 M)
UNIT-V		
10	Explain applet life cycle in detail.	(10 M)
(OR)		
11	Explain different types of layout supported by java.	(10 M)



**B.TECH III SEMESTER END EXAMINATIONS, DECEMBER 2023**  
**DIGITAL ELECTRONICS (20AES0403)**  
**(CSE)**

Time: 3 Hours

Max. Marks: 70

**PART-A**  
**(Compulsory Question)**

(10 X 2 = 20 M)

Answer the following.

- |   | Unit | Marks |
|---|------|-------|
| 1 a) Convert (110101) <sub>2</sub> into decimal and octal numbers.                          | I    | (2 M) |
| b) What are the advantages of multi computer.   | I    | (2 M) |
| c) Using 10's complement, subtract 72532 - 3250.  | II   | (2 M) |
| d) Convert the hexadecimal number 64CD to binary, and then convert it from binary to octal. | II   | (2 M) |
| e) What are universal logic gates why we call it as universal gates.                        | III  | (2 M) |
| f) What are the advantages of K-maps.   | III  | (2 M) |
| g) Differentiate multiplexer and de-multiplexer.  | IV   | (2 M) |
| h) Draw 3 X 8 decoder.  | IV   | (2 M) |
| i) Define Ripple counter.   | V    | (2 M) |
| j) What is the disadvantage of SR flip-flop how can we overcome it.                         | V    | (2 M) |

**PART-B**

(5X 10 = 50 M)

(Answer One FULL Question from each Unit; All questions carry EQUAL marks)

**UNIT-I**

- 2 a) Explain the basic functional units of a computer with neat diagram. (5 M)  
 b) List the various addressing modes with each an example instruction. (5 M)

**(OR)**

- 3 a) Explain instruction cycle with neat flow chart and example. (5 M)  
 b) Define subroutine. Explain how subroutines are handled. (5 M)

**UNIT-II**

- 4 Explain the design process of fast adders and explain how they are advantageous compared to normal adders. (10M)

**(OR)**

- 5 a) Define floating point number, how we represent it in computer, add two floating point numbers and write how the result is stored. (5 M)  
 b) Write short notes on signed and unsigned numbers. (5 M)

**UNIT-III**

- 6 Simplify the Boolean function  $F(w, x, y, z) = \Sigma(1, 3, 7, 11, 15)$  which has the don't-care conditions  $d(w, x, y, z) = \Sigma(0, 2, 5)$  and draw the logic gate. (10 M)

**(OR)**

- 7 a) Implement the following Boolean function with NAND gates:  $F(x, y, z) = (1, 2, 3, 4, 5, 7)$ . (5 M)  
 b) Explain how we implement XOR gates with NAND gates. (5 M)

**UNIT-IV**

- 8 a) Design an 16:1 Multiplexer with two 8X1 multiplexers. (5 M)  
 b) Write short notes on PLAs. (5 M)

**(OR)**

- 9 Design a combinational circuit with three inputs and one output.  
 a) The output is 1 when the binary value of the inputs is less than 3. The output is 0 otherwise. (5 M)  
 b) The output is 1 when the binary value of the inputs is an even number. (5 M)

**UNIT-V**

- 10 a) Explain the working of a JK flip flop. State its advantages. (5 M)  
 b) Draw the logic diagram of a 4-bit left shift register. Explain the working of it. (5 M)

**(OR)**

- 11 Differentiate synchronous and asynchronous counters with neat examples. (10 M)

**B.TECH III sem EXAMINATIONS, DEC-2023**  
**UNIVERSAL HUMAN VALUES (20AMC9902)**

Time : 3 Hours

Max. Marks : 70

**PART – A**

(10 X 2 = 20 Marks)

Answer the following.

		Unit	Marks
1	a) What is meant by Values	I	(2 M)
	b) Write about Self-Exploration	I	(2 M)
	c) Define Happiness	II	(2 M)
	d) Explain Swasthya and Health	II	(2 M)
	e) What do you understand by trust?	III	(2 M)
	f) Describe Respect.	III	(2 M)
	g) Holistic perception	IV	(2 M)
	h) Nature recyclability	IV	(2 M)
	i) Ethical Human Conduct	V	(2 M)
	j) What is Humanistic constitution?	V	(2 M)

**PART – B**

(5 X 10 = 50 Marks)

(Answer One FULL Question from each Unit; All questions carry EQUAL marks)

**UNIT – I**

2/ Enumerate different levels of harmony for living. (10 M)

**(OR)**

3 Explain necessities for fulfilment of aspirations of every human being with the correct priority. (10 M)

**UNIT – II**

4 In what way sensations and preconditioning effect our imagination? (10 M)

**(OR)**

5/ Explain the way to ensure harmony in self (I) with the help of an example. (10 M)

**UNIT – III**

6/ How we are generally making differentiation in the name of respect. (10 M)

**(OR)**

7 Define and Explain the Undivided society and Universal Order (10 M)

**UNIT – IV**

8 Discuss the criteria for evaluation of Holistic technology with an example. (10 M)

**(OR)**

9/ Explain the holistic perception of harmony at all levels of existence. (10 M)

**UNIT – V**

10 State the reasons and solutions for unethical practices in the profession today? (10 M)

**(OR)**

11 What is meant by professional ethics. Outline the competence in professional ethics? (10 M)

20AES0403

B.Tech. DEGREE EXAMINATION, JULY 2024.

Third Semester

ECE

DIGITAL ELECTRONICS

(RU 20)

(Supplementary)

Time : 3 Hours

Max. Marks : 70

PART — A

(Compulsory question)

(10 × 2 = 20 Marks)

1. (a) Describe the System bus architecture.
- (b) What are the Differences Between Microprocessor and Micro Controller?
- (c) Given that  $(292)_{10} = (1204)_b$ , determine b.
- (d) What is the gray code equivalent of the Hexa number 3A7?
- (e) Convert the following expression SOP into POS  $(AB + C)(B + C_1D)$ .
- (f) What are the don't care conditions of a Boolean function?
- (g) Write a note on asynchronous counter.
- (h) Draw the circuit of a full adder using two half adders and OR gate.
- (i) Define Toggle condition.
- (j) Write a note on synchronous counter.

PART — B

Answer ONE full question from each Unit. (5 × 10 = 50 Marks)

All questions carry equal marks.

UNIT — I

- 2/ (a) Explain the basic functional units of computer and System bus architecture. (5)
  - (b) List the various addressing modes with each an example instruction. (5)
- Or
3. (a) What are the Basic I/O Operations? (5)
  - (b) Describe the operations involved in an Instruction Sequencing. (5)

Turn Over



**B.Tech III Semester (RU20) End Examination February 2023**  
**ADVANCED DATA STRUCTURES & ALGORITHMS (20APC0501T)**  
**(Computer Science and Engineering)**

Time: 3 Hours

Max. Marks: 70

**PART-A**  
**(Compulsory Question)**

(10 X 2 = 20 M)

**Answer the following.**

- |  | <b>Unit</b> | <b>Marks</b> |
|--|-------------|--------------|
| 1 a) Define AVL tree.  | I           | (2 M)        |
| b) Write different types of rotations that we perform on AVL tree. | I           | (2 M)        |
| c) Define hash function.   | II          | (2 M)        |
| d) Write advantages of linear open addressing.                     | II          | (2 M)        |
| e) Define algorithm write an algorithm to find GCD of two numbers. | III         | (2 M)        |
| f) Find the average time complexity of quick sort.                 | III         | (2 M)        |
| g) Write control abstraction for greedy technique.                 | IV          | (2 M)        |
| h) Define reliability design.                                      | IV          | (2 M)        |
| i) Define Hamiltonian circuit.                                     | V           | (2 M)        |
| j) Define NP complete problem write an example.                    | V           | (2 M)        |

**PART-B**

(5X 10 = 50 M)

**(Answer One FULL Question from each Unit; All questions carry EQUAL marks)****UNIT-I**

- 2/ Write procedure to insert an element from BST. Construct binary search tree for the following elements 13,3,4,12,14,10,5,1,8,2,7,9,11,6,18. Insert an element 20 and reconstruct the tree. (10 M)

**(OR)**

- 3 Construct an AVL tree having the following elements H, I, J, B, A, E, C, F, D, G, K, L. (10 M)

**UNIT-II**

- 4/ Explain different types of techniques to avoid collision during hashing. Explain it with a neat example. (10 M)

**(OR)**

- 5 Define B tree write an algorithm to delete an element from B tree. Construct B tree for the following keys 25,43,56,76,34,89,90,28. Delete 34 and reconstruct B tree. (10 M)

**UNIT-III**

- 6 Define recursive function. Write a recursive function to find the factorial of a given number. Find the time complexity of it. (10 M)

**(OR)**

- 7/ Define control abstraction of divide and conquer technique. Write an algorithm for quick sort. Explain it with an example. (10 M)

**UNIT-IV**

- 8 Define job sequencing problem. Solve the following problem. (10 M)

Job	J <sub>1</sub>	J <sub>2</sub>	J <sub>3</sub>	J <sub>4</sub>	J <sub>5</sub>
Deadline	2	1	3	2	1
Profit	60	100	20	40	20

**(OR)**

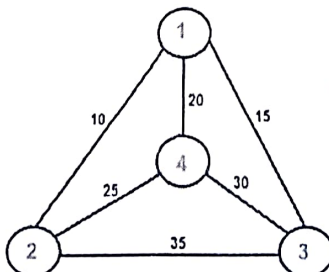
- 9/ Explain All pairs shortest path algorithm with a neat example. (10 M)

**UNIT-V**

- 10/ Write control abstraction for n-queens problem. Write solution for 4-queen's problem. Draw state space tree. (10 M)

**(OR)**

- 11 Solve the following travelling sales person problem. (10 M)



20APC0503T

B.Tech. DEGREE EXAMINATION, JULY 2024.

Third Semester

Computer Science and Engineering

SOFTWARE ENGINEERING

(RU20 Regulations)

(Supplementary)

Time : 3 Hours

Max. Marks : 70

PART — A

Compulsory question.

(10 × 2 = 20 Marks)

Answer the following :

1.
  - (a) What is meant by Software Engineering?
  - (b) What is meant by COCOMO?
  - (c) Explain the nature of Software.
  - (d) What is meant by Decision Tree?
  - (e) Define Cohesion.
  - (f) What is level -0 DFD?
  - (g) What is meant by software documentation?
  - (h) What is meant by Debugging.
  - (i) What is meant by Six sigma.
  - (j) Mention any Basic issues in any reuse program.

PART — B

Answer ONE Full question from each Unit.

All questions carry equal marks

(5 × 10 = 50 Marks)

UNIT I

2. Explain neatly about Spiral model and Agile model.

Or

3. State the importance of project planning and project estimation in software project management.

Turn Over

## UNIT II

4. Explain The overview of formal system development techniques.

Or

5. Explain about decision tables and decision trees.

## UNIT III

6. Explain Basic Object-oriented concepts.

Or

7. Explain Software design approaches in detail.

## UNIT IV

8. Explain Black Box Testing in detail.

Or

9. Explain about system testing, performance testing in detail.

## UNIT V

10. Explain Software maintenance processes model in detail.

Or

11. Explain CASE environment and CASE support in software life cycle.

Decision Table