

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

**UNIT-I**

- |   | Marks | CO | BTL |
|---|-------|----|-----|
| 1. a) How does the setting influence the actions and decisions of the characters in The Power of a Plate of Rice? | 7     | 1  | K2  |
| b) For each of the following sentences, choose a <b>synonym</b> of the underlined word.                           | 7     | 1  | K3  |
| i. She was absolutely <u>delighted</u> with her promotion at work.  |       |    |     |
| a) Overjoyed b) Angry c) Confused d) Indifferent  |       |    |     |
| ii. The new software was designed to be very <u>user-friendly</u> and easy to navigate.                           |       |    |     |
| a) Complex b) Simple c) Expensive d) Complicated  |       |    |     |
| iii. He gave a very <u>lucid</u> explanation of the project's objectives during the meeting.                      |       |    |     |
| a) Clear b) Confusing c) Vague d) Uncertain   |       |    |     |
| iv. The government has taken steps to <u>mitigate</u> the effects of the recession on small businesses.           |       |    |     |
| a) Ignore b) Exacerbate c) Alleviate d) Provoke   |       |    |     |
| For each of the following sentences, provide an antonym of the underlined word.                                   |       |    |     |
| v. The research showed that the company had made <u>significant</u> progress in reducing emissions.               |       |    |     |
| a) Important b) Insignificant c) Considerable d) Trivial  |       |    |     |
| vi. The manager asked for a <u>detailed</u> report on the sales figures for the last quarter.                     |       |    |     |
| a) Brief b) Elaborate c) Incomplete d) Complex  |       |    |     |
| vii. Despite their initial doubts, the experiment turned out to be <u>successful</u> .                            |       |    |     |
| a) Disastrous b) Successful c) Unfavourable d) Fruitless  |       |    |     |

**(OR)**

- |       |  |   |   |    |
|-------|--|---|---|----|
| 2. a) | Explain the significance of the plate of rice in the story. Why is it considered powerful?   | 7 | 1 | K2 |
| b)    | Scan the passage below and fill in the blanks with the most appropriate word from the options provided.<br>The concept of artificial intelligence (AI) has evolved significantly over the past few decades. Initially, AI was seen as a futuristic idea, something that might one day revolutionize the way we live. Today, however, AI is already an integral part of our daily lives, from personal assistants like Siri and Alexa | 7 | 1 | K3 |

to more complex systems in healthcare, transportation, and education. Despite its many (1) \_\_\_\_\_, such as increased efficiency and the ability to handle complex tasks, there are concerns about its potential to replace human workers. The fear of widespread job losses has led to debates about how AI should be (2) \_\_\_\_\_ to ensure that it benefits society as a whole. Some argue that AI could be used to enhance human abilities, while others worry that it may lead to a greater (3) \_\_\_\_\_ between the rich and the poor. Furthermore, the ethical implications of AI are still being explored, particularly with regard to privacy and data security. Many experts agree that regulation is necessary to (4) \_\_\_\_\_ potential misuse, but there is disagreement on how strict those regulations should be. In the future, it will be essential to find a balance between embracing the potential of AI and addressing the risks it presents, so that we can (5) \_\_\_\_\_ the benefits without compromising our values. Ultimately, the development of AI will depend on our ability to (6) \_\_\_\_\_ the challenges it brings and ensure that it is used responsibly. With the right guidance, AI has the potential to (7) \_\_\_\_\_ society in profound ways.

**Options:**

- |                   |              |                  |
|-------------------|--------------|------------------|
| 1. a) limitations | b) benefits  | c) failures      |
| 2. a) ignored     | b) regulated | c) controlled    |
| 3. a) unity       | b) gap       | c) understanding |
| 4. a) encourage   | b) prevent   | c) overlook      |
| 5. a) ignore      | b) maximize  | c) minimize      |
| 6. a) solve       | b) avoid     | c) tackle        |
| 7. a) harm        | b) transform | c) neglect       |

**UNIT-II**

- |  |   |   |    |
|--|---|---|----|
| 3. a) How would you interpret the community's response to the scorpion's sting in the context of their cultural beliefs? | 7 | 2 | K2 |
| b) Write a descriptive paragraph in about 100-150 words on "Time Management".  | 7 | 2 | K2 |

**(OR)**

- |   |   |   |    |
|---|---|---|----|
| 4. a) What is/are the main event(s) that take(s) place in the poem "Night of the Scorpion"? Illustrate. | 7 | 2 | K2 |
| b) Choose the correct preposition from the options given  | 7 | 2 | K3 |
| a. We were surprised _____ (by/with/of) his sudden arrival.   |   |   |    |
| b. She is very fond _____ (in/of/with) chocolates.  |   |   |    |
| c. They agreed _____ (to/with/on) all the conditions.   |   |   |    |
| d. I was sitting _____ (in/on/at) the chair when the phone rang.  |   |   |    |
| e. His house is _____ (beside/between/among) the bank and the grocery store.                            |   |   |    |
| f. The kids were excited _____ (for/about/with) the upcoming trip.                                      |   |   |    |
| g. The teacher divided the students _____ (in/into/among) three groups.                                 |   |   |    |

### UNIT-III

5. a) How can Steve Jobs' leadership style be applied in modern business practices? 7 3 K2
- b) Fill in the blanks with the correct form of the verb. (Use the tense indicated in the brackets) 7 3 K3
- a) By the time you arrive, I \_\_\_\_\_ (finish) my homework. (Future Perfect)
- b) I \_\_\_\_\_ (wait) for you when you called me. (Past Continuous)
- c) If she had known about the meeting, she \_\_\_\_\_ (attend) it. (Past Perfect)
- d) I \_\_\_\_\_ (go) to the store when I saw her yesterday. (Past Continuous)
- e) They \_\_\_\_\_ (already leave) by the time we got there. (Past Perfect)
- f) By next year, I \_\_\_\_\_ (complete) my degree. (Future Perfect)
- g) While I \_\_\_\_\_ (study) last night, the power went out. (Past Continuous)

**(OR)**

6. a) Summarize Steve Jobs' philosophy on failure and how it shaped his professional journey. 7 3 K2
- b) Paraphrase and rewrite the following sentences without changing their meaning 7 3 K3
- a. The manager said, "We need to submit the report by Monday."
- b. The invention of the internet has significantly changed the way people communicate.
- c. Due to heavy rainfall, the event had to be postponed.
- d. She was so exhausted that she could barely keep her eyes open.
- e. Despite his intelligence, he failed to solve the problem.
- f. It is essential to exercise regularly to maintain good health.
- g. The teacher explained the topic in a way that everyone could understand.

### UNIT-IV

7. a) What messages does Saki try to convey to the readers about childhood and violence in the story? 7 4 K2
- b) Identify whether the following sentences are in Active or Passive voice. 7 4 K3
- a) The proposal was approved by the board.
- b) She is painting a beautiful landscape.
- c) The CEO announced the new policy yesterday.
- d) A rare painting was discovered in the old attic.
- e) The workers are installing solar panels on the roof.
- f) The contract had been signed before the negotiation ended.
- g) The book will be translated into multiple languages.

**(OR)**

- |       |   |   |   |    |
|-------|---|---|---|----|
| 8. a) | How does Saki use irony to highlight the contrast between the intention of the toys and the outcome in The Toys of Peace? | 7 | 4 | K2 |
| b)    | Write a formal letter to Amazon company expressing your dissatisfaction and requesting a refund or replacement.           | 7 | 4 | K2 |

### UNIT-V

- |       |  |   |   |    |
|-------|--|---|---|----|
| 9. a) | Critically evaluate the role of intrapersonal communication in conflict resolution.  | 7 | 5 | K4 |
| b)    | Read the text and answer the questions:<br>Life skills are the essential abilities that help individuals manage and navigate daily challenges effectively. These skills include decision-making, communication, problem-solving, time management, and emotional regulation. Having a good set of life skills allows people to handle life's complexities with ease and make better choices for themselves and others. For instance, time management skills help individuals prioritize tasks and meet deadlines, leading to increased productivity and reduced stress. Effective communication ensures that people can express their thoughts clearly and listen actively to others, fostering better relationships in both personal and professional settings. Moreover, problem-solving and decision-making abilities allow people to approach challenges logically, analyze potential solutions, and take action confidently. Emotional regulation plays a significant role in coping with stress and maintaining mental well-being, enabling individuals to remain calm and focused in difficult situations. Overall, mastering these skills not only enhances one's personal growth but also contributes to building strong relationships and achieving success in various aspects of life. | 7 | 5 | K3 |

Questions:

- a) Why are life skills important?
- b) How does time management contribute to reducing stress?
- c) What is the role of communication in fostering relationships?
- d) How do problem-solving skills help individuals?
- e) Why is emotional regulation crucial for coping with stress?
- f) How do life skills impact personal growth and success?
- g) In what way do life skills contribute to achieving success?

**(OR)**

- |        |   |   |   |    |
|--------|---|---|---|----|
| 10. a) | Analyze how intrapersonal communication affects problem solving and decision-making processes.            | 7 | 5 | K3 |
| b)     | Write an essay in about 250 - 300 words on the topic "Challenges and Solutions in Engineering Education". | 7 | 5 | K2 |

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

		Marks	CO	Blooms Level
<b><u>UNIT-I</u></b>				
1.	a) Compare and contrast the performance analysis of iterative and recursive algorithms, highlighting the advantages and the disadvantages of each.	8	CO1	3
	b) Analyze the time complexity for any algorithm using appropriate asymptotic notations, considering best-case, worst-case, and average-case scenarios.	6	CO1	3
<b>(OR)</b>				
2.	a) Describe all the asymptotic notations used in the performance analysis of algorithms.	7	CO1	1
	b) Calculate the time and space complexity of the program “to check whether a number is palindrome or not”.	7	CO1	2
<b><u>UNIT-II</u></b>				
3.	a) Implement a sorting algorithm of Bubble Sort in a C programming language.	7	CO2	4
	b) Write a program that demonstrates the use of hashing to store and retrieve elements efficiently.	7	CO2	1
<b>(OR)</b>				
4.	a) Implement linear search and binary search in any programming language.	7	CO2	4
	b) Explain merge sort algorithm with example.	7	CO2	3
<b><u>UNIT-III</u></b>				
5.	a) Compare and contrast single linked lists with arrays.	4	CO3	3
	b) Implement stack using linked lists along with its operations.	10	CO3	4
<b>(OR)</b>				
6.	a) Analyze the time complexities of these operations including creation, insertion, deletion, and traversing of circular linked lists.	7	CO3	3
	b) Differentiate between doubly and circular linked lists.	7	CO3	3
<b><u>UNIT-IV</u></b>				
7.	a) Implement a queue data structure in C using an array.	7	CO4	4
	b) Write a pseudo code for converting an infix expression to postfix notation and write an example for it.	7	CO4	1
<b>(OR)</b>				
8.	a) Differentiate between stacks and queues.	4	CO4	3
	b) Write pseudo code of stacks and queues using linked lists	10	CO4	1
<b><u>UNIT-V</u></b>				
9.	a) Write pseudo code for insertion and search operations in a binary search tree (BST). Analyze the time complexity of each operation.	10	CO5	4
	b) Explain the basic terminologies related to graphs, including vertices, edges, directed and undirected graphs, adjacency matrix, and adjacency list.	4	CO5	2
<b>(OR)</b>				
10.	a) Explain about Dijkstra’s Algorithm with an example.	7	CO5	2
	b) Briefly explain about DFS algorithm with an example.	7	CO5	2

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**I B.Tech II Semester Supplementary Examinations, June, 2025**

**Surveying and Geomatics  
(CIVIL ENGINEERING)**

**Time: 3 Hours**

**Max Marks: 60**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

**UNIT-I**

1. a) Discuss in brief the principles of surveying. (5M)
  - b) Differentiate clearly between plane and geodetic surveying. (5M)
- (OR)**
2. a) What are the instruments used in chain surveying? How is a chain survey executed in the field? (5M)
  - b) What is a well conditioned triangle? Why is it necessary to use well-conditioned triangles? (5M)

**UNIT-II**

3. a) What is local attraction? How is it detected and eliminated? (3M)
- b) Determine the values of included angles in the closed compass traverse ABCD conducted in the clockwise direction, given the following fore bearings of their respective lines. Apply the check. (7M)

line	F.B.
AB	40°
BC	70°
CD	210°
DA	280°

**(OR)**

4. a) Define the terms: True and magnetic bearing, local attraction, back bearings and magnetic declination. (3M)
- b) Below are the bearings observed in a traverse survey conducted with a prismatic compass at a place where local attraction was suspected (7M)

Line	Fore Bearing	Back Bearing
AB	139° 25'	319° 45'
BC	154° 45'	334° 45'
CD	295° 40'	115° 20'
DA	353° 30'	175° 00'

Calculate the included angles of the closed traverse and find corrected angles.

### **UNIT-III**

5. a) Describe the 'height of instrument' and 'rise and fall' methods of computing the levels. Discuss the merits and demerits of each. (3M)
- b) The following staff readings were observed successively with level, the instrument having been moved forward after the second, fourth and eighth readings: (7M)
- 0.815, 1.235, 2.310, 1.385, 2.930, 3.125, 4.125, 0.120, 1.815, 2.030, 3.765.
- The first reading was seen with the staff held upon a benchmark of elevation 132.135. Enter the readings in level book-form and reduce the levels. Apply the usual checks. Find also the difference in level between the first and the last points.
- (OR)**
6. a) Describe various methods of contouring. Discuss the merits and demerits of each. (3M)
- b) Describe with the help of sketches the characteristics of contours. (7M)

### **UNIT-IV**

7. a) Define the terms: face right and face left observations: swinging the telescope; transiting the telescope; telescope normal. (5M)
- b) Discuss the principle of theodolite survey and principle of tachometry. (5M)
- (OR)**
8. a) Discuss the fundamentals of total station and GPS. (5M)
- b) Explain the methods of setting out a simple curve. (5M)

### **UNIT-V**

9. a) Discuss the perspective geometry of aerial photograph (5M)
- b) Write short on flight planning and Stereoscopy (5M)
- (OR)**
10. a) Explain the terrestrial photogrammetric surveying? (5M)
- b) Fundamental principle of Photogrammetric and how it is used in the field of mapping surveying. (5M)

### **UNIT-VI**

11. a) Describe remote sensing data acquisition? (5M)
- b) Describe about electromagnetic spectrum with neat sketch. (5M)
- (OR)**
12. a) Explain the interaction of electromagnetic radiation with the atmosphere and earth surface. (5M)
- b) Write a short note on GIS. (5M)

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**I B.Tech II Semester Supplementary Examinations, June,2025**

**Data Structures and Algorithms  
(Common to CSE & IT Branches)**

**Time: 3 Hours**

**Max Marks: 60**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

**UNIT-I**

- 1 Compare the time and space complexities of iterative and recursive algorithms. Support your answer with examples. 10M
- (OR)**
- 2 a) Calculate the time complexity of recursive Fibonacci series 5M  
b) What are primitive and non-primitive data structures? Give 5M examples.

**UNIT-II**

- 3 Explain the working of Linear Search and Binary Search with algorithms. Compare their time complexities. 10M
- (OR)**
- 4 Design a hash table for the given set of keys {27, 43, 35, 17, 86} using division hashing with a table size of 7. Use linear probing to resolve collisions. Show the steps clearly 10M

**UNIT-III**

- 5 a) Explain the differences between linked list and an array. 5M  
b) Write a C program to delete a node from the beginning of a Doubly linked list? 5M
- (OR)**
- 6 Perform insertion at beginning, at the end and at the position of a Circular linked list. 10M



## UNIT-IV

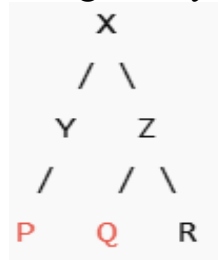
- 7 How can a queue be implemented using a linked list? Write an algorithm for the enqueue and dequeue operations. 10M

(OR)

- 8 a) Differentiate between infix, prefix, and postfix expressions with examples. 5M
- b) What are the applications of stacks in real life? List any five. 5M

## UNIT-V

9. a) Write the preorder, inorder, and postorder traversals for the following binary tree: 5M



- b) Define an AVL tree. Why is it called a self-balancing tree? 5M

(OR)

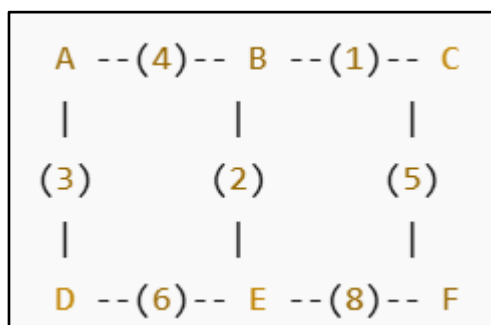
- 10 Construct a binary search tree (BST) for the following elements: 10M  
**50, 30, 70, 20, 40, 60, 80** and perform inorder, preorder, and postorder traversals.

## UNIT-VI

- 11 a) Differentiate between directed and undirected graphs with examples. 5M
- b) Describe the working of the Depth-First Search (DFS) algorithm with an example. 5M

(OR)

- 12 Explain the working of Dijkstra's Algorithm with an example. 10M  
Construct a shortest path tree for the following graph:



Assume A as the source vertex. Show all steps

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**I B.Tech II Semester Supplementary Examinations, June, 2025**

**ENGLISH**

**(Common to EEE & ECE Branches)**

**Time: 3 Hours**

**Max Marks: 60**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

**UNIT-I**

1. a) Discuss the relationship between the narrator and his father in *Father's Help*. How does the father-son relationship evolve throughout the story? 5M
- b) **Provide at least two synonyms for each of the following words:** 5M
  - i. Abundant
  - ii. Courageous
  - iii. Fragile
  - iv. Intelligent
  - v. Prosperous

**(OR)**

2. a) How does the story show the relationship between students and teachers in India? How does Mr. Ebenezer treat the narrator? 5M
- b) **Write one-word substitutes for the following expressions:** 5M
  - i. A person who can predict the future
  - ii. One who is fond of collecting books
  - iii. A person who cannot hear
  - iv. A person who loves his country
  - v. A person who studies the weather

**UNIT-II**

3. a) How did A.P.J. Abdul Kalam balance his love for science with the cultural and traditional aspects of his upbringing? 5M
- b) **Fill in the blanks with the correct tense form of the verb:** 5M
  - i. By the time you arrive, I \_\_\_\_\_ (finish) my homework.
  - ii. She \_\_\_\_\_ (not/see) him since last month.
  - iii. We \_\_\_\_\_ (study) for three hours when the power went out.
  - iv. When I was young, I \_\_\_\_\_ (play) outside every day.
  - v. I \_\_\_\_\_ (go) to the market tomorrow.

**(OR)**

4. a) What role did the village and its people play in shaping Kalam's early life? How does he describe the influence of his community on his growth? 5M
- b) **Change the following sentences to passive voice:** 5M
  - i. She writes a letter every week.
  - ii. The teacher will explain the lesson tomorrow.
  - iii. He gave me a book on my birthday.
  - iv. They were repairing the car when I called.
  - v. I have finished my assignment.

### UNIT-III

5. a) Discuss the theme of choice and its consequences in "The Road Not Taken" by Robert Frost. How does the poet convey the idea that the choices we make in life can shape our future? 5M
- b) **Fill in the blanks with the correct degree of comparison:** 5M
- Mount Everest is the \_\_\_\_\_ (high) mountain in the world.
  - This exercise is \_\_\_\_\_ (easy) than the last one.
  - She is the \_\_\_\_\_ (beautiful) girl in the class.
  - This problem is \_\_\_\_\_ (difficult) than I thought.
  - John is the \_\_\_\_\_ (intelligent) student in our class.
- (OR)**
6. a) Why does the speaker say that the two roads were "really about the same" in "The Road Not Taken"? 5M
- b) **Change the following sentences into indirect speech:** 5M
- The teacher said, "Open your books to page 10."
  - "I'll call you when I arrive," he said.
  - She said, "I cannot attend the meeting tomorrow."
  - "Where is your brother?" asked the mother.
  - "You should read this book," he said to her.

### UNIT-IV

7. a) Why does Orwell believe that unclear language leads to unclear thinking? 5M
- b) **Punctuate the following extract:** 5M
- now i am going to introduce you to mr rajeev kumar who is an expert in artificial intelligence technology he has made significant contributions to the development of robotics in india good morning rajeev we are excited to have you with us today thank you for inviting me here rajeev can you tell us how you became interested in ai and what challenges you faced while working in this field
- (OR)**
8. a) What is the role of metaphors in unclear writing, according to Orwell? 5M
- b) **Fill in the blanks of the below passage with appropriate prepositions:** 5M
- i. The book was placed \_\_\_\_\_ the table. ii. She is afraid \_\_\_\_\_ flying in airplanes. iii. We have been waiting \_\_\_\_\_ the bus for 15 minutes. iv. The children ran \_\_\_\_\_ the playground after school. v. The letter was sent \_\_\_\_\_ post yesterday.

### UNIT-V

9. a) What is the significance of the Mother's Day celebration in the play? How does it reflect the characters' personalities and relationships? 5M
- b) Write a letter to the Municipal Corporation, complaining about the unhygienic conditions in your locality and requesting immediate action. 5M
- (OR)**
10. a) How does the play explore the idea of self-worth and personal fulfilment through the character of Mrs. Baines? 5M
- b) Draft an email to the Admissions Office of a college, enquiring about the eligibility criteria and process for applying for an undergraduate program in Computer Science. 5M

## UNIT-VI

11. a) What was the Chipko Movement, and what was its main objective? 5M  
b) **Read the following passage carefully and answer the questions given below:** 5M

The internet has revolutionized the way we communicate, access information, and conduct business. It has made the world more connected than ever before. With the click of a button, people can communicate with others across the globe. Education has become more accessible with the rise of online learning platforms. However, despite all its advantages, the internet also has its downsides. Cybersecurity issues are a growing concern, as individuals and businesses face increasing threats from hackers. Social media platforms, once heralded for their ability to connect people, are now also blamed for spreading misinformation and creating echo chambers. The internet's ability to influence opinions and behaviors can be both powerful and dangerous.

- i. **What is the main idea of this passage?**
  - A. The internet is only useful for business.
  - B. The internet has both positive and negative impacts.
  - C. Online learning is the only benefit of the internet.
  - D. Cybersecurity is the biggest issue with the internet.
- ii. **In the passage, what does the term "echo chambers" mean?**
  - A. Sounds bouncing off walls.
  - B. A place where people hear only similar opinions.
  - C. Rooms used for online learning.
  - D. A type of social media platform.
- iii. **What is one negative impact of the internet mentioned in the passage?**
  - A. Lack of communication.
  - B. Cybersecurity issues.
  - C. Global connection.
  - D. Easy access to information.
- iv. **What role do social media platforms play according to the passage?**
  - A. Spreading fake news and creating echo chambers.
  - B. Encouraging face-to-face communication.
  - C. Eliminating global connections.
  - D. Protecting users from hackers.
- v. **Write a synonym for the word "revolutionized":**
  - A. Changed
  - B. Destroyed
  - C. Ignored
  - D. Ignited

(OR)

12. a) Discuss the significance of women's involvement in the Chipko Movement. How did it empower women in rural areas? 5M  
b) **Write an essay on "The Role of Technology in Education" in 500 words.** 5M

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)****I B.Tech II Semester Supplementary Examinations, June, 2025****THERMODYNAMICS  
(MECHANICAL ENGINEERING)****Time: 3 Hours****Max Marks: 60**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

**UNIT-I**

1. a) Define system and explain the different types 5M
- b) Discuss in detail about i) macroscopic view ii) microscopic view 5M

**(OR)**

2. a) Explain the concept of thermodynamic equilibrium. What is its importance in thermodynamics 5M
- b) 325 kJ of heat is supplied to a system at constant volume. The system rejects 365 kJ of heat at constant pressure and 100 kJ of work is done on it. The system is brought to its initial state by an adiabatic work. Calculate all values of internal energy at all end states if initial value is 400 J 5M

**UNIT-II**

3. Derive the steady flow energy equation. Write down the steady flow energy equation for the following 10M
- (i) Steam nozzle (ii) Heat exchanger.

**(OR)**

4. a) Discuss in detail about the concept of free expansion 5M
- b) What are the advantages and disadvantages of first law of thermodynamics 5M

**UNIT-III**

5. a) Explain briefly about kelvin plank statement 5M
- b) Discuss in detail about the concept of entropy 5M

**(OR)**

6. a) Explain Carnot cycle. Write its specialties 5M
- b) Two Carnot engines A and B are operated in series. The first one A receives heat at 900 K and rejects to a reservoir at temperature T K. The second engine B receives the heat rejected by the first engine and in turn rejects to a sink at 400 K calculate the temperature T when (i) The efficiencies of the two engines are equal (ii) The work output of the two engines is equal 5M

#### UNIT-IV

7. An insulated piston–cylinder device contains 2 L of saturated liquid water at a constant pressure of 250 kPa. An electric resistance heater inside the cylinder is turned on, and electrical work is done on the water in the amount of 2200 kJ. Assuming the surroundings to be at 35°C and 150 kPa, determine (i) the minimum work with which this process could be accomplished and (ii) the exergy destroyed during this process 10M
- (OR)
8. A freezer is maintained at 30°F by removing heat from it at a rate of 85 Btu/min. The power input to the freezer is 0.70 hp, and the surrounding air is at 75°F. Determine (i) the reversible power, and (ii) the irreversibility 10M

#### UNIT-V

9. a) Explain Avogadro's law 5M  
b) Discuss in detail about the phase transformations 5M
- (OR)
10. A 1.8m<sup>3</sup> rigid tank contains steam at 250°C. Two third of the volume is in the liquid phase and the rest is in the vapor form. Determine (i) the pressure of the steam, (ii) the quality of the saturated mixture, and (iii) the density of the mixture 10M

#### UNIT-VI

11. State the assumptions made for the analysis of air standard cycle and Derive expression for efficiency of Diesel cycle 10M
- (OR)
12. An air standard Otto cycle operates with a compression ratio 8.5. At the beginning of the compression the air is at 1 bar and 320C, and during the heat addition process the pressure is tripled. Calculate (a) the thermal efficiency of the cycle and (b) the efficiency of the Carnot engine operating between the same overall temperature limits. 10M