Jharkhand University of Technology, Ranchi

Diploma 4th Semester Examination, 2025 (NEP)

Subject : Object Oriented Programming and Design with Java **Subject Code : CSE 403**

Time Allowed : 3 Hours **Full Marks : 70**

Answer in your own words.

Answer five *questions.* Question No. 1 *is compulsory, and from the rest of the questions answer* any four *only.*

All *questions carry equal marks.*

2×7=14

1. Choose the correct option:

(i) What is Software Engineering?
- (a) Designing a software
- (b) Testing a software
- (c) Application of engineering principles to the design a software
- (d) None of the above

(ii) When does method overloading is determined?
- (a) At run time
- (b) At compile time
- (c) At coding time
- (d) At execution time

(iii) Which concept of Java is a way of converting real world objects in terms of class?
- (a) Polymorphism
- (b) Encapsulation
- (c) Abstraction
- (d) Inheritance

(iv) Which principle of OOP allows for the same function to be used in different ways?
- (a) Inheritance
- (b) Polymorphism
- (c) Encapsulation
- (d) Abstraction

(v) In OOP, an 'object' is
- (a) an instance of a class.
- (b) a type of data structure.
- (c) a programming technique.
- (d) a method definition.

(vi) Which keyword is used to create a class in Java?
- (a) class
- (b) Class
- (c) object
- (d) Object

(vii) Which keyword is used in Java to create a new object?
- (a) new
- (b) class
- (c) object
- (d) this

Please Turn Over

2. (a) What are JVM and the structure of JVM?

   (b) What are command line arguments? Give a suitable example. 7+7

3. (a) Define object oriented programming with their features.

   (b) Define inheritance. Describe different forms of inheritance. 7+7

4. (a) What do you understand by Class and Object? Also explain abstract class with syntax and example.

   (b) Explain different types of constructors in Java. 7+7

5. (a) Write a program input three numbers to find out greatest using nested if statements.

   (b) Write a program using class and object to check whether given number is prime or not? 7+7

6. (a) Explain polymorphism with syntax and example.

   (b) Write functions in C++ using function overloading to compute the area of a square, circle, triangle, rectangle. 7+7

7. Write short notes on *any four* of the following: 3.5×4=14

   (a) Destructor

   (b) Exception handling

   (c) Encapsulation

   (d) Inline function

   (e) JDBC

   (f) Abstract class

401
CSE

Jharkhand University of Technology, Ranchi

Diploma 4th Semester Examination, 2025 (NEP)

Subject : Data Structures with Python | **Subject Code : CSE 401**

Time Allowed : 3 Hours | **Full Marks : 70**

Answer in your own words.

Answer five *questions.* Question No. 1 *is compulsory, and from the rest of the questions answer* any four *only.*

All *questions carry equal marks.*

1. Choose the correct option: 2×7=14

(i) Which type of Programming does Python support?

(a) object-oriented programming
(b) structured programming
(c) functional programming
(d) All of the mentioned

(ii) Is Python code compiled or interpreted?

(a) Python code is both compiled and interpreted
(b) Python code is not compiled nor interpreted
(c) Python code is only compile
(d) Python code is only interpreted

(iii) Which data structure follows the LIFO (Last In First Out) principle?

(a) Queue
(b) Stack
(c) Linked List
(d) Tree

(iv) What is the time complexity of inserting an element at the beginning of a singly linked list?

(a) O(1)
(b) O(n)
(c) O(log n)
(d) $O(n^2)$

(v) Which of the following is a non-linear data structure?

(a) Array
(b) Linked List
(c) Tree
(d) Stack

(vi) What is the maximum number of children a node can have in a binary tree?

(a) 1
(b) 2
(c) 3
(d) Any number

(vii) Which searching algorithm requires the data to be sorted beforehand?

(a) Linear Search (b) Binary Search

(c) Hashing (d) Interpolation Search

2. (a) Describe the concept of Abstract Data Type (ADT)with its syntax and an example.

(b) Discuss the Time and Space complexity of algorithms. 7+7

3. (a) Discuss Linear and Binary search. Which technic is best? Justify your answer.

(b) Write a python program to perform Linear search on a given array.

[12, 5, 16, 96, 28, 4, 56, 92, 82] 7+7

4. (a) Write a python code to delete a node at a specified position in a doubly linked list. Linked list.

(b) List out the difference circular and singly linked list. Also describe the advantages of both the linked list. 7+7

5. (a) What do front and rear signify in a queue? If in a queue the rear points to the front, what is the queue called.

(b) What is postfix notation? Also give the postfix notation of the following:

(i) A+B*C

(ii) (A+B)*C

(iii) (A–B)/(D*E)

(iv) A+((C+D)*E)

(v) A*B/C*E 7+7

6. (a) What do you mean by Binary Search Tree? Describe any five properties of BST.

(b) For a Binary Tree T, The in-order and post-order traversal sequences are as follows:

In-order : D B F E A G C L J H K

Post-order : D F E B G L J K H C A 7+7

7. Write short notes on *any four* of the following: 3.5×4=14

(a) Algorithm for Breadth first search

(b) Find the in-degree of each vertex v of graph G.

(c) Binary Search Tree

(d) Hashing and collision detection

(e) In-degree and out-degree

(f) Recursion

Jharkhand University of Technology, Ranchi

Diploma 4th Semester Examination, 2025 (NEP)

Subject : OS and Administration **Subject Code : CSE 402**

Time Allowed : 3 Hours **Full Marks : 70**

Answer in your own words.

Answer five *questions.* Question No. 1 *is compulsory, and from the rest of the questions answer* any four *only.*

All *questions carry equal marks.*

1. Choose the correct option: 2×7=14

(i) What is an operating system?

(a) Interface between the hardware and application programs.

(b) Collection of programs that manages hardware resources.

(c) System service provider to the application programs.

(d) All of the mentioned

(ii) In Operating Systems, which of the following is/are CPU scheduling algorithms?

(a) Priority (b) Round Robin

(c) Shortest Job First (d) All of these

(iii) CPU scheduling is the basis of

(a) multiprogramming operating systems. (b) larger memory sized systems.

(c) multiprocessor systems. (d) None of the mentioned

(iv) A memory buffer used to accommodate a speed differential is called _____.

(a) stack pointer (b) cache

(c) accumulator (d) disk buffer

(v) Program always deals with _____.

(a) logical address (b) absolute address

(c) physical address (d) relative address

(vi) In Linux, which system call creates the new process?

(a) Fork (b) Create

(c) New (d) None of the mentioned

(vii) What is interposes communication?

(a) Communication within the process

(b) Communication between two processes

(c) Communications between two threads of same process

(d) None of the mentioned

2. (a) What is Operating System? Give the view of OS as Resource Manager.

(b) What is system call? Explain the types of system call. 7+

3. (a) Explain Process Control Block (PCB)?

(b) Five batch jobs A to E arrive at same time. They have estimated running times 10,6,2,4 and minutes. Their priorities are 3,5,2,1 and 4 respectively with 5 being highest priority. For ea of the following algorithm, determine mean process turn around time. Ignore proce swapping overhead. Round Robin, Priority Scheduling, FCFS, SJF. 7

4. (a) What is Virtual Memory? Explain.

(b) What is paging? What is Page Table? Explain the conversion of Virtual Address to Physi Address in paging with example. 7

5. (a) What is Deadlock? Explain Deadlock prevention and Avoidance.

(b) What is thread? Explain thread structure.

6. (a) What are the different types of files? What are the tasks of the file management system?

(b) Define external and internal fragmentation. 7

7. Write short notes on *any four* of the following: 3.5×4=

(a) System call

(b) Round Robin scheduling

(c) Mutual Exclusion

(d) Inter process communication

(e) Page Segmentation

(f) Role of "Kernel" and "Shell" in Linux

404
CSE/ALL

Jharkhand University of Technology, Ranchi

Diploma 4th Semester Examination, 2025 (NEP)

Subject : Software Engineering Principles and Practices **Subject Code : CSE 404**

Time Allowed : 3 Hours **Full Marks : 70**

Answer in your own words.

Answer any five questions.

Question No. 1 *is compulsory and from the rest of the questions answer* any four *only.*

All *questions carry equal marks.*

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1. Choose the correct option: 2×7=14

(i) What is Software Engineering?

(a) Designing a software

(b) Testing a software

(c) Application of engineering principles to the design a software

(d) None of the above

(ii) What are the features of Software Code?

(a) Simplicity (b) Accessibility

(c) Modularity (d) All of the above

(iii) Define Agile Scrum methodology.

(a) project management that emphasizes incremental progress

(b) project management that emphasizes decremental progress

(c) project management that emphasizes neutral progress

(d) project management that emphasizes no progress

(iv) CASE stands for

(a) Computer-Aided Software Engineering (b) Control Aided Science and Engineering

(c) Cost Aided System Experiments (d) None of these

(v) Why do bugs and failures occur in software?

(a) Because of Developers

(b) Because of companies

(c) Because of both companies and Developers

(d) None of these

(vi) SDLC stands for

(a) System Design Life Cycle
(b) Software Design Life Cycle
(c) Software Development Life Cycle
(d) System Development Life Cycle

(vii) Who proposed the spiral model?

(a) Barry Boehm
(b) Pressman
(c) Royce
(d) IBM

2. (a) List out the goals of software engineering.

(b) What is the difference between verification and validation? 7+7

3. (a) Define the Waterfall Model. What are its advantages and disadvantages? Also compared to the Agile Model.

(b) What do you understand by requirement analysis? Also explain different types of requirement with example. 7+7

4. (a) Describe the concept of Software Design. Differentiate between high-level design and low-level design with examples.

(b) Explain the various types of software testing with suitable example. 7+7

5. (a) What do you Data Flow Diagram (DFD)? Explain the rules of DFD and draw a Level 0 and Level 1 DFD for a college management system.

(b) What is Software Project Management? Discuss project planning, cost estimation, scheduling and risk management. 7+7

6. (a) Discuss software quality attributes. How software reliability, maintainability and stability can play important role during development?

(b) What is UML? Explain any five types of UML diagrams with suitable examples. 7+7

7. Write short notes on *any four* of the following: 3.5×4=14

(a) SDLC

(b) Spiral Model

(c) Feasibility study

(d) Bug in software

(e) What is unit testing?

(f) Coupling in software design