Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech.

SEM: V - THEORY EXAMINATION (2022 - 2023)

Subject: Design Patterns

Time: 3 Hours   Max. Marks: 100

General Instructions:

IMP: Verify that you have received the question paper with the correct course, code, branch etc.

1. This Question paper comprises of three Sections -A, B, & C. It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.

2. Maximum marks for each question are indicated on right -hand side of each question.

3. Illustrate your answers with neat sketches wherever necessary.

4. Assume suitable data if necessary.

5. Preferably, write the answers in sequential order.

6. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION A   20

1. Attempt all parts:-

1-a.   In the following patterns which one is concerned with communication between objects.   1
(CO1)

         (a) J2EE Design Patterns

         (b) Behavioral Design Patterns

         (c) Creational Design Pattern

         (d) Structural Design Patterns

1-b.   MVC stands for (CO1)   1

         (a) Mock View Controller

         (b) Model View Controller

         (c) Mock view Class

         (d) Model View Class

1-c.   Choose which mechanism is applied to use a design pattern in an OO system. (CO2)   1

         (a) Inheritance

         (b) Composition

(c) Both a and b.

(d) None of the mentioned above

1-d. Which of the following is a generic structure that is extended to create a more specific   1
subsystem or application? (CO2)

    (a) Software reuse

    (b) Object-oriented programming language

    (c) Frameworks

    (d) None of the mentioned above

1-e. Select the design pattern that focus on the design patterns movement. (CO3)   1

    (a) Architectural Styles

    (b) Mid-Level Design Patterns

    (c) Data Structures and Algorithms

    (d) Programming Idioms

1-f. Choose one of the following pattern which is used when creation of object directly is costly   1
(CO3)

    (a) Bridge Pattern

    (b) Adapter Pattern

    (c) Prototype Pattern

    (d) Filter Pattern

1-g. Choose design pattern that works on data and action taken based on data provided. (CO4)   1

    (a) MVC

    (b) Command pattern

    (c) Singleton Pattern

    (d) Facade Pattern

1-h. Which pattern allows an object to notify interested listeners of changes to its state? (CO4)   1

    (a) Chain of responsibility

    (b) Observer

    (c) Iterator

    (d) Command

1-i. What is the starting point of Strategic Intent ?(CO5)   1

    (a) Vision

    (b) Goals

(c) Objectives

(d) Mission

1-j.   The corporate level is where top management directs (CO5)   1

           (a) All employees for orientation

           (b) Its efforts to stabilise recruitment needs

           (c) Overall strategy for the entire organisation

           (d) Overall sales projections

2. Attempt all parts:-

2.a.   Give differences between design principles and design patterns. (CO1)   2

2.b.   Write about applicability of the abstract factory design pattern. (CO2)   2

2.c.   In the Façade pattern, elaborate how do clients work with subsystems. (CO3)   2

2.d.   Write down the uses of Memento Pattern. (CO4)   2

2.e.   Mention the benefits of the Visitor and template design patterns. (CO5)   2

<div align="center">SECTION B   30</div>

3. Answer any <u>five</u> of the following:-

3-a.   Explain with example where we prefer abstract classes over interfaces in Java. (CO1)   6

3-b.   List out the approaches we can use to choose the appropriate design pattern. (CO1)   6

3-c.   Write the drawbacks of using a singleton design pattern. (CO2)   6

3-d.   Elaborate the benefits of using factory pattern. (CO2)   6

3.e.   In discussing the essence of the Decorator, it is said that "the structure is not the pattern."   6
        What does this mean? Why is this important? (CO3)

3.f.   Discuss any case study on Behavioural Design Pattern in design pattern. (CO4)   6

3.g.   Explain when service locator pattern is used. (CO5)   6

<div align="center">SECTION C   50</div>

4. Answer any <u>one</u> of the following:-

4-a.   What do you understand by MVC? With a suitable example, structure and explain the UML   10
        diagram of the MVC architecture. (CO1)

4-b.   Discuss the role of design patterns in solving real life problems and show with an example   10
        how design patterns makes the code reusable. (CO1)

5. Answer any <u>one</u> of the following:-

5-a.   What is meant by Document structure? Elaborate the seven design problems in document   10

editor. (CO2)

5-b.   Write a note on a) Builder Pattern b) Prototype pattern (CO2)   10

6. Answer any <u>one</u> of the following:-

6-a.   Write a Java program to print Diamond Number Pattern. Explain any one Bridge or Adapter.   10
          (CO3)

6-b.   Write a Java program to print Pascal's Triangle Pattern. Explain any one Flyweight or Proxy   10
          pattern. (CO3)

7. Answer any <u>one</u> of the following:-

7-a.   Explain the Chain of responsibility pattern. With a suitable real world example, show its   10
          implementation. (CO4)

7-b.   Show with the help of implementation, how an observer pattern define one to one   10
          dependency. (CO4)

8. Answer any <u>one</u> of the following:-

8-a.   Explain State pattern with its pros and cons. Make a comparison with Strategy pattern.   10
          (CO5)

8-b.   Explain the Use of Visit and Accept Methods in the Visitor Design Pattern, with the help of   10
          UML diagram of Visitor Design Pattern. (CO5)