Subject Code:- **ACSE0514 / ACSEH0514**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: V - THEORY EXAMINATION (2023-2024)

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.   Pattern is a   (CO1)   1

            (a) It is a model proposed for imitation

            (b) It solves a software design problem

            (c) All of the mentioned above

            (d) None of the mentioned above

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 the correct statement about design patterns. (CO2)   1

            (a) Design patterns represent the best practices used by experienced object-oriented software developers.

            (b) Design patterns are solutions to general problems that software

developers faced during software development.

(c) Design patterns are obtained by trial and error by numerous software developers over quite a substantial period of time.

(d) All of the above.

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

(a) Software reuse

(b) Object-oriented programming language

(c) Frameworks

(d) None of the mentioned

1-e. Pattern is used where we need to treat a group of objects in similar way as a single object (CO3)   1

(a) Composite Pattern

(b) Facade Pattern

(c) Flyweight Pattern

(d) Decorator Pattern

1-f. In which of the following pattern, a class behavior changes based on its state (CO3)   1

(a) State Pattern

(b) Null Object Pattern

(c) Strategy Pattern

(d) Template Pattern

1-g. The use of design patterns for the development of object-oriented software has important implications for (CO4)   1

(a) Component Based Software Engineering

(b) Reusability in general

(c) All of the above

(d) None of the above

1-h. The design pattern that represents a way to access all the objects in collections. (CO4)   1

(a) Iterator Pattern

(b) Façade Pattern

(c) Builder Pattern

(d) Bridge Pattern

1-i.   Father of Strategic Management is _____ (CO5)   1

            (a) Chandler

            (b) Igor Ansoff

            (c) Michael Porter

            (d) John Nash

1-j.   SWOT stands for _____ (CO5)   1

            (a) Services worldwide optimization and transport

            (b) Special weapons for operations for timeless

            (c) Strength weakness opportunities and threats

            (d) Strength worldwide overcome threats

2. Attempt all parts:-

2.a.   Explain Gang of Four (GOF) in Design Patterns. (CO1)   2

2.b.   Mention the limitation of using singleton pattern. (CO2)   2

2.c.   Write a short note on Bridge Pattern (CO3)   2

2.d.   Elaborate the term Dependency. (CO4)   2

2.e.   Define the Command Design Pattern Work and explain with example (CO5) 2

SECTION B   **30**

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

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

3-b.   Draw the MVC architecture and also explain its each components. (CO1) 6

3-c.   Discuss when we can use Builder design pattern. (CO2)   6

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

3.e.   Discuss the Decorator design pattern and explain with example. (CO3) 6

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

3.g.   Write the functioning of the visitor pattern and its importance. (CO5) 6

SECTION C   **50**

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

4-a.   List out the sub patterns of Behavioral patterns and explain any two.(CO1)   10

4-b.   Explain Structural Patterns with UML. (CO1)   10

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

5-a.   It is too limited to define an abstract class as a class that does not get   10

instantiated. Why is this definition too limited? What is a better (or at least alternative) way to think about abstract classes. (CO2)

5-b.   Write basic usage of Creational design patterns. (CO2)   10

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

6-a.   Explain the Proxy Design Pattern (PDP) mentioning when to use the Proxy   10
          Structural Design Pattern. (CO3)

6-b.   Give difference between adapter and bridge design pattern. (CO3)   10

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

7-a.   Discuss Iterator Pattern with its implementation and UML diagram.(CO4)   10

7-b.   Give any test case of Chain of Responsibility Pattern with UML diagram and   10
          implementation. (CO4)

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

8-a.   Elaborate Template design pattern. (CO5)   10

8-b.   Write a Java program to print Diamond Number Pattern. (CO5)   10