Printed Page:- 04 **Subject Code:- ACSE0514**

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. Choose which of the following standardizes patterns for a problem domain that promotes software reuse. (CO1) 1

(a) Promoting Communication
(b) Streamlining Documentation
(c) Increasing Development Efficiency
(d) Supporting Software Reuse

1-b. ——— is a design pattern. (CO1) 1

(a) Structural
(b) Abstract Factory
(c) Behavioral
(d) All of these

1-c. Among the following patterns which refers to creating duplicate object while keeping performance in mind.(CO2) 1

(a) Builder Pattern
(b) Bridge Pattern
(c) Prototype Pattern
(d) Filter Pattern

1-d. Among which of following patterns is not used to create an object.(CO2) 1

(a) Factory method

(b) Strategy

(c) Prototype

(d) Abstract Factory

1-e. Choose one benefit that pattern provide(CO 3) 1

(a) Novice designers can benefit from learning solution patterns that experts use, without needing design experience

(b) Expert designers can benefit from studying patterns too: They can broaden their repertoire of patterns and deepen their understanding of the patterns they already know

(c) All of the mentioned

(d) None of the mentioned

1-f. Choose correct sentence about Structural design patterns.(CO3) 1

(a) These design patterns are specifically concerned with communication between objects.

(b) These design patterns provide a way to create objects while hiding the creation logic, rather than instantiating objects directly using new opreator.

(c) These design patterns concern class and object composition. Concept of inheritance is used to compose interfaces and define ways to compose objects to obtain new functionalities.

(d) None of the above.

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

(a) Command Pattern

(b) Singleton Pattern

(c) MVC Pattern

(d) Façade Pattern

1-h. Choose the valid classification of design pattern.(CO4) 1

(a) Creational

(b) Java

(c) Object

(d) Inheritance

1-i. Choose one of the following pattern that allows multiple objects an opportunity to process a request without guaranteeing that any of them must process it (CO5) 1

(a) Chain of Responsibility

(b) Visitor

(c) Strategy

(d) Mediator

1-j. Competitive advantage can be best described as (CO5) 1

(a) Increased efficiency

(b) What sets an organisation apart

(c) A strength and the organisations

(d) Intangible resources

2. Attempt all parts:-

2.a.	Explain the significance of the design pattern. (CO1)	2
2.b.	Write about applicability of the abstract factory design pattern. (CO2)	2
2.c.	Give An Example Where Interpreter Pattern Is Used(CO3)	2
2.d.	Elaborate the term Concrete Class.(CO 4)	2
2.e.	Elaborate when will we need Command Design Pattern. Explain it. (CO 5)	2

SECTION-B 30

3. Answer any five of the following:-

3-a.	Explain categories of Design Pattern. (CO1)	6
3-b.	Explain how Design patterns categorized and also list out all the design patterns according to their category. (CO1)	6
3-c.	In this pattern, there are two kinds of factories. Explain about “Abstract Factory” and “concrete factory” class.(CO2)	6
3-d.	We use a factory class to instantiate a class when we can use a new operator, Why.(CO2)	6
3.e.	Is it problematic for classes to be tightly-coupled. Explain. (CO3)	6
3.f.	Discuss any case study on Behavioural Design Pattern in design pattern. (CO4)	6
3.g.	Mention which pattern is used when we need to decouple an abstraction from its implementation. (CO5)	6

SECTION-C 50

4. Answer any one of the following:-

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

5. Answer any one of the following:-

5-a.	Explain in how many ways can you create singleton pattern.(CO2)	10
5-b.	Write a note on a) Builder Pattern b) Prototype pattern (CO2)	10

6. Answer any one of the following:-

6-a.	Explain the Structural Design Patterns (SDP). What are the different Structural Design Patterns? (CO3)	10
6-b.	Explain the Composite Design Pattern (CDP) or Tree Pattern.(CO3)	10

7. Answer any one of the following:-

7-a.	Show with the help of implementation how objects interact with each other in Behaviour Pattern.(CO4)	10
7-b.	Show how to access the elements of aggregate object sequentially without exposing its underlying implementations in Iterator Pattern.(CO 4)	10

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

8-a.	Write difference between method Overloading and Overriding in java.(CO5)	10
8-b.	Explain Structure of State Design Pattern. (CO5)	10