Printed Page:- 03 Subject Code:- AMICSE0514

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

M.Tech(Integrated)

SEM: V - THEORY EXAMINATION (2024 - 2025)

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. (CO1, K1) 1

(a) J2EE Design Patterns

(b) Behavioral Design Patterns

(c) Creational Design Pattern

(d) Structural Design Patterns

1-b. MVC stands for (CO1, K1) 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, K1) 1

(a) Inheritance

(b) Composition

(c) Both a and b.

(d) None of the mentioned above

1-d. The number of objects in the Singleton responsible for creation . (CO2, K1) 1

(a) one

(b) two

(c) NONE

(d) three

1-e. Choose correct statement for Builder pattern from the following.(CO3,K1) 1

(a) This pattern builds a complex object using simple objects and using a step by step approach.

(b) This pattern refers to creating duplicate object while keeping performance in mind.

(c) This pattern is used when creation of object directly is costly.

(d) This pattern is used when we need to decouple an abstraction from its implementation so that the two can vary independently.

1-f. Choose from the patterns given below that hides the complexities of the system and provides an interface to the client using which the client can access the system (CO3,K1) 1

(a) Composite Pattern

(b) Facade Pattern

(c) Flyweight Pattern

(d) Decorator Pattern

1-g. Choose design pattern that works on data and action taken based on data provided.(CO4,K1) 1

(a) Command Pattern

(b) Singleton Pattern

(c) MVC Pattern

(d) Façade Pattern

1-h. Choose design pattern that defines one-to-many dependency among objects (CO4,K1) 1

(a) Singleton Pattern

(b) Façade Pattern

(c) Observer Pattern

(d) Factory Method Pattern

1-i. What is the starting point of Strategic Intent ?(CO5,K2) 1

(a) Vision

(b) Goals

(c) Objectives

(d) Mission

1-j. Pattern prevents one from creating more than one instance of a variable(CO5,K1) 1

(a) Factory Method

(b) Singleton

(c) Observer

(d) None of the mentioned

2. Attempt all parts:-

2.a.	Explain Gang of Four (GOF) in Design Patterns. (CO1,K1)	2
2.b.	Write about applicability of the abstract factory design pattern. (CO2,K2)	2
2.c.	Explain the applicability of the decorator pattern. (CO3,K2)	2
2.d.	Explain the process of invoking object in Command Pattern. (CO4, K2)	2
2.e.	Mention the benefits of the Visitor and template design patterns. (CO5,K2)	2

SECTION-B 30

3. Answer any five of the following:-

3-a.	Explain the purpose in catalogue. (CO1,K2)	6
3-b.	Discuss Adapter design pattern. (CO1,K2)	6
3-c.	Write the implementation of a Singleton Java class. (CO2,K3)	6
3-d.	Discuss when we can use Builder design pattern. (CO2,K2)	6
3.e.	Differentiate between Bridge pattern and Composite pattern. (CO3,K2)	6
3.f.	Show the implementation of Iterator design pattern. (CO4,K3)	6
3.g.	Write the functioning of the visitor pattern and its importance. (CO5,K3)	6

SECTION-C 50

4. Answer any one of the following:-

4-a.	List out the sub patterns of Behavioral patterns and explain any two.(CO1,K2)	10
4-b.	Mention which pattern is used when we need to decouple an abstraction from its implementation. (CO1,K2)	10

5. Answer any one of the following:-

5-a.	Explain the structure of the abstract factory design pattern with the UML diagram. (CO2,K2,K3)	10
5-b.	Write the steps to build a builder design pattern in java. (CO2,K3)	10

6. Answer any one of the following:-

6-a.	Explain the Structural Design Patterns (SDP). What are the different Structural Design Patterns? (CO3,K2)	10
6-b.	Explain the Composite Design Pattern (CDP) or Tree Pattern.(CO3,K2)	10

7. Answer any one of the following:-

7-a.	Define Chain of Responsibility Pattern with its implementation and UML diagram. (CO4,K2)	10
7-b.	Define itrator design pattern ? Give example along with UML diagram. (CO4, K3)	10

8. Answer any one of the following:-

8-a.	Implement abstract factory design pattern. Draw UML diagram and provide the intent. (CO5,K2)	10
	OR	
8-a.	Define Observer Pattern with its implementation and UML diagram. (CO5,K2)	10
8-b.	Explain Structure of State Design Pattern. (CO5,K2)	