

Course Code : CST 316

MQNR/MW – 19 / 9609

**Fifth Semester B. E. (Computer Science and Engineering)
Examination**

DESIGN PATTERNS

Time : 3 Hours]

[Max. Marks : 60

Instructions to Candidates :—

- (1) Due credit will be given to neatness.
- (2) Question no **One** and **Three** have internal choices.

1. Solve any **Two** :—

- (a) "Liskov Substitution Principle is a way of ensuring that inheritance is used correctly". Illustrate. 5(CO1)
- (b) What is a Design Pattern Template ? Explain its elements in brief. 5(CO1)
- (c) What should be abstraction level that should be provided by a design pattern? Explain. 5(CO1)

2. (a) Builder design Pattern is best suited for step-by-step construction of a complex object. Explain with the help of a sample implementation. 5(CO2)

- (b) Client-Server clock application in Java is to be implemented. The server sends time data to all connected clients, each connection running on a separate thread. The timed event is managed by Clock Task, which is singleton, so that all connection threads have access to the same Server time. Now, if a client sends a request to change server time, Server sets its new time, and all connected clients get a new, updated time. Construct the solution. 5(CO2)

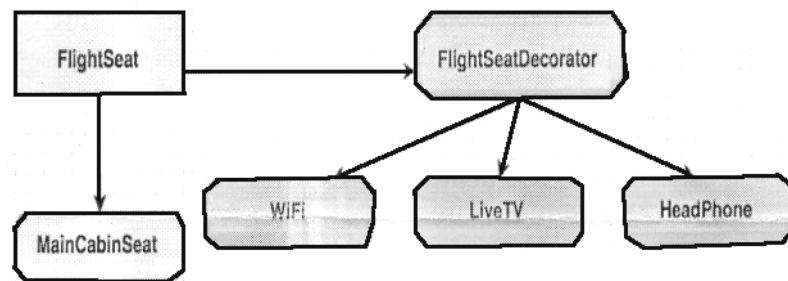
3. Solve any **Two** :—

- (a) "Adapter lets classes work together that couldn't otherwise because of incompatible interfaces". Illustrate. 5(CO2)

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- (b) *Equipment* class defines an interface for 3 equipments in the part-whole hierarchy using *Name ()* and *Netprice ()* methods. *CompositeEquipment* is the base class for equipment that contains other equipment. Implement a java program using Composite design pattern to print payment statement where client must be able to buy any single equipment or composite equipment. 5(CO2)
- (c) Tight coupling can lead to an explosion in the number of classes. How does Bridge design pattern address this problem ? 5(CO2)
4. (a) For the given diagram, design a java program using decorator pattern to decorate cabin seat with different accessories.



- 5(CO3)
- (b) Illustrate the use of Iterator design pattern. 5(CO3)
5. (a) With reference to structure and consequences integrate mediator and observer design patterns. 4(CO3)
- (b) Depending on monthly percentage profit a company has to change the marketing strategy for subsequent month.
- * Email Marketing (if profit is less than 30%)
 - * Social Media Marketing (if profit is less than 50% and more than 30%).
- Identify pattern and design the solution. 6(CO3)
6. (a) In Lexi WYSIWYG editor design, can we use Abstract Factory to support multiple window systems. If yes, how ? If no, why ? 5(CO4)
- (b) "A common way to represent hierarchical structured information is through a technique called recursive composition". How Lexi document structure makes use of this technique ? 5(CO4)