

**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.

1. Solve any Two :—

- (a) What is need of design pattern ? Explain the classification of design pattern on the basis of purpose and scope both. 5 (CO 1)
- (b) Explain essential characteristics of design pattern. 5 (CO 1)
- (c) "We should favor object composition over class inheritance". Justify. 5 (CO 1)

2. Question (a) is compulsory. Solve (b) or (c) :—

- (a) Using Abstract Factory design pattern implement a java program to create a Laptop object which has OS, RAM and ScreenSize. 5 (CO 2)
- (b) With the help of the motivation, explain the applicability of singleton design pattern. 5 (CO 2)
- (c) Identify the design pattern that refers to creating duplicate object while keeping performance in mind ? Explain the same. 5 (CO 2)

3. Question (a) is compulsory. Solve (b) or (c) :—

- (a) An Employee class defines an interface for components as subordinates, in the part–whole hierarchy using Name() and Post() methods. CompositeEmployee is the base class for Employee that contains other subordinates which are the objects of Employee class. Implement a java program using Composite design pattern to print Name and post for all the employees of a company. 5 (CO 2)

- (b) Explain two variants of Adapter design patterns. 5 (CO 2)
 - (c) Tight coupling can lead to an explosion in the number of classes. Identify the design pattern that addresses this problem ? How ? 5 (CO 2)
- 4.
- (a) Illustrate the use of Interpreter design pattern to handle the language grammar. 5 (CO 3)
 - (b) Define Intent of Chain of responsibility design pattern. Also explain how this design pattern shares responsibilities among the objects using request passing approach. 5 (CO 3)
5. Solve any **Two** :—
- (a) A clock display application is required in which if the global time stamp is updated it should be reflected in all connected clocks. Identify the design pattern and implement java program for the same. 5 (CO 3)
 - (b) Can ATC (Air Traffic Controller) system be a motivation to use mediator design pattern ? Write java implementation for the same. 5 (CO 3)
 - (c) Compare Observer and Mediator design patterns in terms of intent, motivation, applicability and consequences. 5 (CO 3)
- 6.
- (a) Explain applications of various design patterns in product design. 5 (CO 4)
 - (b) How decorator design patterns can be used in Lexi WYSIWYG editor design ? 5 (CO 4)