B.E. (Computer Science Engineering) Sixth Semester (C.B.S.)

Design Patterns

P. Pages : 2 **NRT/KS/19/3491**

Time : Three Hours * 0 6 0 5 * Max. Marks : 80

Notes : 1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Explain the concept of software reusability used in design patterns. **7**

b) Describe the elements of design pattern. **6**

OR

2. a) Explain the characteristics of design pattern. **7**

b) Explain the applications of design patterns. **6**

3. a) Explain the concept of prototype design pattern with suitable example. **7**

b) What are the characteristics of creational design patterns. **6**

OR

4. a) Explain the applicability of Builder design pattern. Illustrate a Scenario in which builder pattern can be used. **7**

b) Explain where singleton design pattern play an important role along with its advantages and disadvantages. **6**

5. a) Explain the role of structural design pattern in object oriented design. **7**

b) Differentiate between Decorator and adapter design patterns. **6**

OR

6. a) How to implement composite design pattern explain with suitable example. **7**

b) Demonstrate with suitable example, the use of proxy design pattern. Also explain its advantages and drawbacks. **6**

7.	a)	Explain the observer design pattern with suitable example.	**7**
	b)	Explain the Memento design pattern with suitable example.	**7**
		OR	
8.	a)	Explain the features of behavioral design patterns.	**7**
	b)	Explain the visitor design pattern with suitable example.	**7**
9.		Explain the overall case study of document editor with proper example.	**13**
		OR	
10.	a)	Explain how design patterns can be used for Document structure, formatting and Embellishing the user interface.	**8**
	b)	Discuss spelling checking and hyphenation in Document editor.	**5**
11.	a)	Explain the product design process.	**7**
	b)	What is design complexity? Explain it's types.	**7**
		OR	
12.	a)	Explain case study of Game design.	**7**
	b)	Explain the application of design pattern in product design.	**7**

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B.E. (Computer Science Engineering) Sixth Semester (C.B.S.)

Design Patterns

P. Pages : 2 **NIR/KW/18/3491**

Time : Three Hours * 1 2 6 1 * Max. Marks : 80

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Diagrams and chemical equations should be given whenever necessary.
11. Illustrate your answers whenever necessary with the help of neat sketches.
12. Use of non programmable calculator is permitted.

1. a) Describe the elements of design pattern. **6**

b) i) Abstract factory is also known as **1**

ii) Match the following. **4**

1.	Abstract	a.	Wrapper
2.	Factory method	b.	Handle/Body
3.	Adopter pattern	c.	Kit
4.	Bridge pattern	d.	Virtual constructor

iii) Which of the following is not a section in design pattern description? **2**

a) Motivation b) Domain
c) Consequences d) Related patterns

OR

2. a) Explain design pattern. List all design patterns and its classification. **7**

b) Explain usage of design pattern with proper example. **6**

3. a) Explain the concept of prototype design pattern with suitable example. **7**

b) Define Intent, Also known as, Applicability sample code of bridge design pattern with example. **6**

OR

4. a) Explain where singleton design pattern plays on important role along with its advantages and disadvantages. **7**

b) Explain abstract factory design pattern with class diagram. **6**

5. a) Explain Adapter design pattern in terms of its intent, applicability, structure and consequences. **7**

b) Where to use Decorator design pattern explain with example. **6**

OR

6. a) How to implement composite design pattern explain with suitable example. **7**

b) Explain the role of structural design pattern in object oriented design. **6**

7. a) Illustrate the notion of command design pattern with suitable example. **7**

b) Explain template method design pattern with class diagram implementation. **7**

OR

8. a) Match the following design pattern with the design aspects that design patterns let you vary. **4**

a)	Strategy	i)	Grammar & interpretation of long
b)	State	ii)	An algorithm
c)	Mediator	iii)	States of object
d)	Interpreter	iv)	How and which object interact with each other.

b) Explain observer design pattern intent, motivation, consequences and applicability. **4**

c) Explain mediator design pattern in terms of intent, structure, usage and applicability. **6**

9. a) Which design pattern is suitable for supporting multiple look-and-feel standards. Explain with example. **7**

b) Explain the concept of embellishing the user interface. **7**

OR

10. a) List and explain the seven design problem for document editor application. **7**

b) Which design pattern is help for spelling checking and hyphenation problem. **7**

11. a) What are design complexities? List the design complexities. **7**

b) Explain the design pattern application for gaming. **6**

OR

12. a) Explain methods to analyze the complexities of design pattern. **7**

b) Explain the product design and its application. **6**

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B.E. (Computer Science Engineering) Sixth Semester (C.B.S.)

Design Patterns

P. Pages : 3 **NJR/KS/18/4546**

Time : Three Hours * 0 5 8 7 * Max. Marks : 80

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Assume suitable data whenever necessary.
9. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) What is a Design Pattern? Explain the format for describing a design pattern. **8**

b) Explain the meaning of following OOP principles: **6**
i) "Favor object composition over class inheritance"
ii) "Program to an interface, not an implementation.

OR

2. a) List and explain any 4 design problems. Also explain how design patterns solve these design problems faced by object – oriented software designers. **8**

b) compare and contrast the code reusability techniques: Inheritance and Composition. **6**

3. a) Consider a business case of a chocolate factory which has a computer controlled chocolate boiler. The job of a boiler is to take in chocolate and milk, bring them to boil and then pass them on to next phase. Following class diagram represents chocolate Boiler class. **13**

Chocolate Boiler
boolean empty boolean boiled
Chocolate Boiler ( ) Void fill ( ) Void drain ( ) Void boil ( ) boolean is Empty ( ) boolean is Boiled ( )

The company uses a single chocolate Boiler for its operations. Use appropriate design pattern to create a chocolate Boiler class and a single object. Also illustrate different ways to make this class safe from multithreading.

OR

4. a) Explain the applicability of Builder design pattern. Illustrate a scenario in which builder pattern can be used. **6**

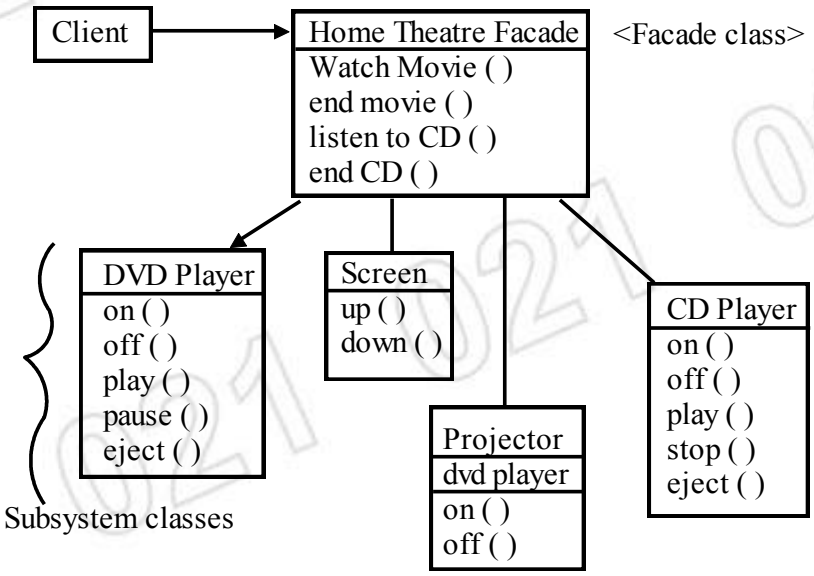
b) Consider a business case of a Pizza store. The Pizza store has started its two Franchisies specific for regional preferences. One franchise makes Indian style pizzas and the other makes American style Pizzas. **7**

Indian pizza store makes a variety of Indian style pizzas like cheese Pizza, veggie pizza and clam Pizza. American pizza store also makes same pizzas but in American style. A client requests for a pizza by calling a method "order Pizza ( )" defined in Pizza store.

For the given scenario, identify the creator class and the product class and design an appropriate class diagram using "Factory Method" design pattern.

5. a) Differentiate between Decorator and adapter design patterns. **5**

b) For the given class diagram, write a program to implement facade design pattern. **9**



for each method in the facade, use the objects and methods of the subsystem appropriately

OR

6. a) Explain the intent, applicability, structure and consequences of composite design pattern. **7**

b) Demonstrate with a suitable example, the use of proxy design pattern. Also explain its advantages and drawbacks. **7**

7. a) A Purchase request approval system is to be designed for a college Different types of purchase request include **13**

1) Stationary requirement
2) Staff table requirement
3) Staff computer requirement
4) Lab setup requirement

Request of type 1 can be approved by a clerk. Request type 2 and 3 can be approved by Head of the department and type 4 can be approved by principal. Design a class diagram using an appropriate design pattern. Also implement a program to illustrate your design.

OR

8. a) The recipe for preparing tea is as follows: **7**

1) Boil water
2) Put tea bag in boiled water
3) Pour in cup
4) Add leman

The recipe for preparing coffee is as follows

1) Boil water
2) Brew coffee in boiled water
3) Pour in cup
4) Add milk and sugar

Identify the code duplication in above procedures of preparing tea and coffee. Use template method pattern to remove this code duplication and draw the resultant class diagram.

b) Explain the features of behavioral design patterns. **6**

9. a) List and explain various design problems in document editor design. **7**

b) Explain how does recursive composition help to compose a document out of simple graphical elements. **6**

OR

10. a) Explain in detail how Abstract Factory Pattern helps to support multiple look-and – feel for a Document editor. Illustrate the answer with GUI Factory class hierarchy. **8**

b) Which design pattern provides undo/redo capability in document editor? Describe the procedure in brief. **5**

11. a) Explain how design patterns help to reduce complexity of a design. **6**

b) List and illustrate the use of various design patterns in game design. **7**

OR

12. a) What are the methods used to analyze the complexity of design patterns? Explain in detail. **7**

b) Explain the applications of design patterns in product design. **6**

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B.E. (Computer Science Engineering) Sixth Semester (C.B.S.)

Design Patterns

P. Pages : 2 **NRJ/KW/17/4546**

Time : Three Hours * 0 1 2 9 * Max. Marks : 80

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) What do you mean by Design Patterns? Explain with suitable example. **7**

b) Explain the concept of software reusability used in design patters. **6**

OR

2. a) What are the different types of Design Patterns? **6**

b) Explain the applications of design patterns. **7**

3. a) Consider a business case of fast-food restaurant where a typical meal could be a burger and cold drink. Burger could be either a veg burger or chicken burger and will be packed by a wrapper. Cold drink could be either a coke or Pepsi and will be packed in a bottle. Draw a class diagram to implement this business case using a Builder Design Pattern. **10**

b) What are the characteristics of creational design patterns? **4**

OR

4. a) Explain singleton design pattern with suitable example. **7**

b) Explain abstract factory pattern with suitable example. **7**

5. a) Explain the significance of Bridge design pattern in object oriented programming. **7**

b) Explain the flyweight design pattern with suitable example. **6**

OR

6. Consider an example in which an audio player device can play mp3 files only and wants to use an advanced audio player capable of playing VLC and mp4 files.
Create an interface 'Media Player' and concrete class 'Audio Player' implementing the Media Player interface 'Audio Player' can play mp3 format audio files by default. Use adaptor design pattern to implement this design pattern. **13**

7.	a)	Explain the observer design pattern with suitable example.	**7**
	b)	Explain the Memento design pattern with suitable example.	**6**

OR

8.	a)	Explain command design pattern with suitable example.	**7**
	b)	Explain Interpreter design pattern with suitable example.	**6**
9.	a)	Discuss the design problems of designing a Document editor.	**7**
	b)	Explain the supporting of Multiple Look-and-feel standards.	**7**

OR

10.	a)	Explain how design patterns can be used for Document structure, formatting and Embellishing the user interface.	**9**
	b)	Discuss spelling checking and hyphenation in document editor.	**5**
11.	a)	Which techniques are used for complexity analysis of design patterns.	**7**
	b)	Explain the product design process.	**6**

OR

12.	a)	Discuss complexity analysis of design patterns.	**7**
	b)	Explain applications of design pattern in game design.	**6**

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B.E.Sixth Semester (Computer Science Engineering) (C.B.S.)

Design Patterns

P. Pages : 3 **NKT/KS/17/7407**

Time : Three Hours * 0 6 7 2 * Max. Marks : 80

Notes : 1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Assume suitable data whenever necessary.
9. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Select an appropriate answer for the following multiple choice questions.

i) Which of the following is not true about a design pattern ? **1**
   a) Design pattern is a data structure
   b) Design pattern is a core of solution to a problem
   c) Both A and B
   d) None of these

ii) Design patterns are classified on the basis of - **1**
   a) Purpose b) Scope
   c) Both A and B d) None of these

iii) The scope of inheritance is limited to ---------- and is defined ----------. **1**
   a) Object, dynamically b) Class, dynamically
   c) Object, statistically d) Class, statistically

iv) Which of the following is not a section in design pattern description ? **1**
   a) Motivation b) Domain
   c) Consequences d) Related Patterns

v) A ---------- class provides an optional interface or functionality to other classes. **1**
   a) Augmented class b) Concrete class
   c) Hybrid class d) Mixin class

b) What is a design pattern ? Explain the classification and catalog of design pattern. **8**

OR

2. a) According to an OOP principle, we should "Favor object composition over class inheritance". Justify the given principle. **5**

b) List the common causes of redesign of an existing system. **4**

c) Explain in short several approaches to find an appropriate design pattern to solve a problem. **4**

3. a) Differentiate between factory method and Abstract factory design patterns. **4**

b) Explain the features of creational design patterns. **4**

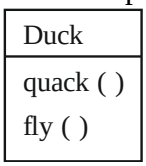
c) Explain the situations where we can use following listed design patterns : **6**
i) Builder design pattern
ii) Prototype design pattern

OR

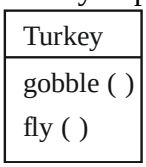
4. a) An interactive role playing game is to be designed in which a hero needs to reach to his destination. On the way, the hero encounters a large number of monsters. It is expected to evolve a monster as the landscape changes - for example, for land, a land monster is required for water, a fish monster and for air a bird monster is required. As the landscape changes dynamically, you need to change (create) appropriate monsters while the game is running. Identify a suitable design pattern to handle the dynamic creation of different objects and to reduce the overhead creating same objects repeatedly. Justify your answer and draw a class diagram for the solution. **9**

b) Explain the different ways for making a singleton class thread safe. **5**

5. a) Consider an example of a Duck simulation application which uses Duck objects. A Duck class is represented as follows : **14**



Due to some reason, the number of duck objects are limited and hence it is decided to use a Turkey in place of Duck. A Turkey class is represented as follows :



A turkey cannot directly replace a duck because their operations are different. Design a Turkey adapter' class using Adapter design pattern and use this class to make a turkey object perform duck operations. Also, explain the advantages and disadvantages of Adapter design pattern.

OR

6. a) Explain the bridge design pattern in terms of its intent, applicability, structure and consequences. **7**

b) A coffee shop makes different types of coffees like expresso, Decaf, Darkroast and Mocha. Alongwith these beverages it also offers a variety of toppings used to top on the coffee. Different toppings available are Chocolate, Cream & Milk. A coffee can be topped with any combination and any number of toppings. Design a solution which will be capable of making any type of coffee with a variety of toppings on it. (Use decorator design pattern to decorate a coffee with toppings) **7**

7. a) Compare state and strategy design patterns in terms of their intent, motivation, applicability, consequences, collaborations and structure. **6**

b) A restaurant offering breakfast menu has decided to merge with other restaurant that offers lunch menu. The existing implementation of both the restaurant's systems are different. Both the systems use same representation of a menu item which is **7**

MenuItem
price : double name : string
getPrice ( ) getName ( )

The breakfast menu is represented using breakfastmenu class and lunch menu is represented using lunchmenu class. Breakfast menu uses an Arraylist to store list of menu items whereas lunchmenu uses an array to store menuitems.
Define an Iterator class using iterator design pattern in order to encapsulate iteration of BreakFastMenu.

OR

8. a) Match the following design patterns with the design aspects that design patterns let you vary. **4**

A)	Strategy	i)	Grammar & interpretation of language
B)	State	ii)	An algorithm
C)	Mediator	iii)	States of object
D)	Interpreter	iv)	How and which objects interact with each other

b) Suppose that you want to time travel to any era of your life. Current time for your life is represented by a "time" attribute in your "life" class. Which is the best suitable design pattern to restore your life to a previous time. Justify your answer. **4**

c) Explain observer design pattern's intent, motivation, consequences and applicability. **5**

9. a) List and describe the seven design problems that arise in Document editor's design. **7**

b) How can we represent hierarchically structured information in a document editor ? Illustrate with example. **6**

OR

10. a) Which design pattern helps to encapsulate the formatting algorithm ? Explain in detail. **7**

b) Explain in detail, use of Abstract factory pattern to support multiple look-and-feel standards for document editor. **6**

11. a) What is the use of various design patterns in game design. **7**

b) Explain the methods used to analyze the complexity of design patterns. **6**

OR

12. a) Explain how design patterns help to reduce complexity of a design. **6**

b) Explain applications of various design patterns in product design. **7**

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B.E. Sixth Semester (Computer Science & Engineering) (C.B.S.)

Design Patterns

P. Pages : 2 **KNT/KW/16/7407**

Time : Three Hours * 0 1 0 5 * Max. Marks :80

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) What is Design Pattern? List all design patterns and it's classification. **7**

b) Describe the elements of design pattern. **6**

OR

2. a) Explain the characteristics of design pattern. **7**

b) Explain usages of design pattern with proper example. **6**

3. a) Illustrate the notion of bridge design pattern with example. **7**

b) Explain the concept of prototype design pattern with suitable example? **7**

OR

4. a) Explain abstract factory design pattern with class diagram. **7**

b) Explain where singleton design pattern play an important role along with it's advantages and disadvantages. **7**

5. a) Explain the role of structural design pattern in object oriented design. **7**

b) Explain working of Adapter design pattern with its applications. **6**

OR

6. a) Where to use Decorator design pattern explain with example. **7**

b) How to implement composite design pattern explain with suitable example. **6**

7.	a)	Explain working of visitor design pattern with example.	**7**
	b)	Explain observer design pattern along with its advantages and disadvantages.	**7**

OR

8.	a)	Explain working of Memento design pattern with it's applications.	**7**
	b)	Draw a class diagram for Template method and explain working of Template method with suitable example.	**7**
9.	a)	Explain the overall case study of document editor with proper example.	**13**

OR

10	a)	Write a short note on. i) Supporting multiple look-and fell standard in document editor. ii) Spelling checking & hyphenation. iii) User operation.	**13**
11.	a)	What is design complexity? Explain it's types.	**7**
	b)	Explain methods to analyze the complexity of design pattern.	**6**

OR

12.	a)	Explain case study of Game design.	**7**
	b)	Explain the application of design pattern in product design.	**6**

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B.E. (Computer Science Engineering) Sixth Semester (C.B.S.)

Design Patterns

P. Pages : 2 **TKN/KS/16/7494**

Time : Three Hours * 0 3 5 7 * Max. Marks : 80

Notes :
1. All questions carry marks as indicated.
2. Solve **Six** questions as follows:
3. Solve No Questions 1 OR Questions No. 2.
4. Solve No Questions 3 OR Questions No. 4.
5. Solve No Questions 5 OR Questions No. 6.
6. Solve No Questions 7 OR Questions No 8.
7. Solve No Questions 9 OR Questions No 10.
8. Solve No Questions 11 OR Questions No 12.
9. Due credit will be given to neatness and adequate dimensions.
10. Illustrate you answers whenever necessary with the help of neat sketches.
11. Use of non programmable calculator is permitted.
12. Assume suitable data whenever necessary.

1. a) What is design pattern? List down all design patterns and their classification? **7**

b) Explain usage of design pattern with example. **6**

OR

2. a) Explain the various elements of design pattern. **7**

b) Explain properties of design patterns? Also explain the advantages of design pattern. **6**

3. a) Write an explain singleton design pattern with suitable example. **7**

b) Explain the difference between factory method and abstract factory design pattern. **6**

OR

4. a) Explain prototype design pattern along with it's practical implementation. **7**

b) Differentiate between abstract factory and builder design pattern. **6**

5. a) What is the working strategy of adopter design pattern. **7**

b) Explain decorator design pattern along with it's advantages. **7**

OR

6. a) Illustrate the notion of flyweight design pattern with example. **7**

b) Where to use proxy design pattern? Also explain it's advantages and disadvantages. **7**

7.	a)	Explain command design pattern? Also explain it's advantages and disadvantages.	**7**
	b)	What is observer pattern explain it's implementation.	**7**

OR

8.	a)	Explain strategy design pattern along with it's applicability.	**7**
	b)	Illustrate the concept of visitor design pattern with example.	**7**
9.	a)	Explain the different design problem in Lexi's document editor.	**7**
	b)	Explain the concept of recursive composition with example.	**6**

OR

10.	a)	Which design pattern is suitable for spelling checking and hyphenation explain it with example.	**7**
	b)	Explain the concept of embellishing the user interface.	**6**
11.	a)	What is software complexity? Explain it's type.	**7**
	b)	What are the applications of design pattern in game design.	**6**

OR

12.	a)	State different methods to analyze the complexity of design pattern.	**7**
	b)	Explain the application of design pattern in product design.	**6**

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W-15

Faculty of Engineering and Technology

Sixth Semester B.E. (Comp. Sci. Engg.) C.B.S. Examination

DESIGN PATTERNS

Time : Three Hours] [Maximum Marks : 80

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.

(2) Solve Question No. **1 OR** Question No. **2.**

(3) Solve Question No. **3 OR** Question No. **4.**

(4) Solve Question No. **5 OR** Question No. **6.**

(5) Solve Question No. **7 OR** Question No. **8.**

(6) Solve Question No. **9 OR** Question No. **10.**

(7) Solve Question No. **11 OR** Question No. **12.**

(8) Due credit will be given to neatness and adequate dimensions.

(9) Assume suitable data wherever necessary.

(10) Diagrams and chemical equations should be given wherever necessary.

(11) Illustrate your answers wherever necessary with the help of neat sketches.

1. (a) What are design patterns ? List documented design patterns. 6

(b) Explain the catalog of design Pattern with its classification. 7

OR

2. (a) What are the advantages of design pattern ? 6

(b) How do we document a design pattern ? 7

3. (a) What is creational design pattern ? Explain the role of creational design pattern in object oriented design. 7

(b) Write a thread-safe singleton design pattern practical implementation. 6

OR

4. (a) Explain the situation where we use factory method design pattern. 7

(b) Explain the advantages and disadvantages of Builder Design Pattern. 6

5. (a) Explain composite design pattern with the help of class diagram. 6

(b) Write the intent and motivation to use Decorator pattern with example. 8

OR

6. (a) What are the advantages and disadvantages of Adapter design pattern ? 6

(b) Explain the working of Bridge design pattern with example. 8

7. (a) How to implement command design pattern ? Explain with proper example. 7

(b) What are the applications of Mediator design pattern ? 6

OR

8. (a) Explain the concept of Chain of Responsibility design pattern with example. 7

(b) Where to use Interpreter design pattern ? Explain with example.. 6

9. (a) What are design problem ? List the design problem for document editor application. 7

(b) What are the various elements of document editor ? Explain with example. 6

OR

10. (a) Explain overall working of designing a document editor case study. 7

(b) Explain the formatting structure of any text editor with example. 6

11. (a) Define design complexity. List and explain various design complexity. 7

(b) Expalin the implementation techniques and application of design pattern in game design. 7

OR

12. (a) What are the methods to analyze the complexity of design pattern ? 7

(b) Explain how design pattern helps for product design ? 7

Faculty of Engineering & Technology

Sixth Semester B.E. (Com. Sci. Engg.)

(C.B.S.) Examination

DESIGN PATTERNS

Time : Three Hours] [Maximum Marks : 80

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.

(2) Solve Question **1** OR Question No. **2.**

(3) Solve Question **3** OR Question No. **4.**

(4) Solve Question **5** OR Question No. **6.**

(5) Solve Question **7** OR Question No. **8.**

(6) Solve Question **9** OR Question No. **10.**

(7) Solve Question **11** OR Question No. **12.**

(8) Due credit will be given to neatness and adequate dimensions.

(9) Assume suitable data wherever necessary.

(10) Diagrams and Chemical equations should be given wherever necessary.

1. (a) What do you mean by Design Patterns ? Explain with suitable example. 6

(b) Explain how design patterns are used to solve design problems. 7

OR

2. (a) What are the different types of Design patterns ? 6

(b) Explain the uses of design patterns. 7

3. (a) What are the characteristics of creational design patterns ? 4

(b) Consider a business case of fast-food restaurant where a typical meal could be a burger and cold drink. Burger could be either a veg burger or chicken burger and will be packed by a wrapper. Cold drink could be either a Coke or Pepsi and will be packed in a bottle. Draw a class diagram to implement this business case using a Builder Design pattern. 10

OR

4. (a) Explain Factory pattern with suitable example. 7

(b) Explain Singleton design pattern with suitable example. 7

5. (a) Explain the Facade design pattern with suitable example. 7

(b) Explain the Proxy design pattern with suitable example. 7

OR

6. Consider an example in which an audio player device can play mp3 files only and wants to use an advanced audio player capable of playing VLC and mp4 files. Create an interface 'Media Player' and a concrete class 'Audio Player' implementing the Media Player interface. 'Audio Player' can play mp3 format audio files by default. Use Adapter Design pattern to implement this audio player. 14

7. (a) Explain Chain-of-Responsibility design pattern with suitable example. 6

(b) Explain how behavioral design patterns are different than creational and structural design patterns. 7

OR

8. (a) Explain command design pattern with suitable example. 6

(b) Explain Interpreter design pattern with example. 7

9. (a) Discuss the design problems of designing a Document Editor. 7

(b) Explain the supporting of Multiple Look-and-Feel Standards. 7

OR

10. (a) Explain how design patterns can be used for Document structure, formatting and Embellishing the user interface. 9

(b) Discuss spelling checking and hyphenation in document editor. 5

11. (a) Explain the methods to analyze the complexity of design patterns. 7

(b) Explain the product design process. 6

OR

12. (a) Discuss complexity analysis of design patterns. 7

(b) Explain applications of design pattern in game design. 6