

Paper Id: 

113503
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Roll No: 

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**B TECH**  
**(SEM V) THEORY EXAMINATION 2019-20**  
**OBJECT-ORIENTED TECHNIQUES**

Time: 3 Hours

Total Marks: 70

**Notes:**

- Attempt all Sections.
- Assume any missing data.

**SECTION A**

- 1. Attempt all questions in brief. 2 x 7 = 14**
- a. Define programming paradigms. List the programming paradigms.
  - b. Differentiate Procedural programming between OOP with example.
  - c. Define Abstraction and Encapsulation with example.
  - d. Define class diagram. Draw a class diagram for university.
  - e. Define sequence diagram. Draw a sequence diagram for making a cup of tea.
  - f. Discuss callback mechanism.
  - g. Differentiate Macro and Inline functions.

**SECTION B**

- 2. Attempt any three of the following: 7 x 3 = 21**
- a. Discuss polymorphism. How polymorphism is implemented in C++? Discuss with suitable code. Differentiate virtual and pure virtual functions with example.
  - b. Explain how data conversion is done from one class to another class. Write a program in C++.
  - c. Discuss and Compare SA/SD and JSD with OMT methodology.
  - d. Explain inheritance with its different types. Write a program in C++ to demonstrate multi-level inheritance.
  - e. Describe the relation of functional model, object model and dynamic model. What is relationship and difference between OOA and OOD?

**SECTION C**

- 3. Attempt any one part of the following: 7 x 1 = 7**
- (a) Explain Object-Oriented Techniques in terms of abstraction, inheritance, encapsulation & polymorphism with the help of suitable examples.
  - (b) What do you mean by UML? Discuss the conceptual model of UML with the help of an appropriate example.
- 4. Attempt any one part of the following: 7 x 1 = 7**
- (a) Discuss collaboration diagram. Explain polymorphism in collaboration Diagrams with example.
  - (b) Discuss State Machine diagram. What is Event and signals? Is any difference between Time diagram and state machine diagram? Justify your answer.
- 5. Attempt any one part of the following: 7 x 1 = 7**
- (a) Differentiate between data abstraction and data encapsulation Define a class called employee with the following specifications:

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**States:** Name, BP (Basic salary), DA (Dearness allowance), HRA (House rent allowance), salary

**Behaviors:**

**computeSal ():** computes the salary

**readData ():** accepts the data value

**dispSal ():** prints the data on the screen

The salary is computed by the following formula:

$$\text{Salary} = \text{BP} + \text{DA} + \text{HRA}$$

Where DA and HRA are 65% and 20% of the BP respectively.

Write a program in C++ to demonstrate the default constructor, parameterized constructor and constructor overloading. The program reads the name and BP (basic salary) of the employee and print the salary.

- (b) Discuss documentation. What are the various considerations in documentation designing? Explain depicting asynchronous messages with/without priority.

6. Attempt any *one* part of the following:

7 x 1 = 7

- (a) Explain virtual base class in inheritance. Define a class called student which models the following states and behaviors of a student:

**States:** Name, Roll, Marks, Grade

**Behaviors:** Read\_data (), Display\_data (), Compute\_grade ()

Write a program in C++ for demonstration to compute the grade as per the following rules:

Marks	Grade
$\geq 50 < 60$	D
$\geq 60 < 70$	C
$\geq 70 < 80$	B
$\geq 80$	A

- (b) Explain operator overloading. Write a program to overload + operator.

7. Attempt any *one* part of the following:

7 x 1 = 7

- (a) Discuss pointer. What is pointer reference? Write a C++ program to assign some values to the member of class objects using pointer structure ( $\rightarrow$ ).
- (b) Differentiate between constructors and destructors. Explain the use of constructors and destructor with suitable examples. How we override a constructor?