MODEL QUESTION
FIFTH SEMESTER BTECH DEGREE EXAMINATION OCTOBER 2015
(2013 SCHEME)
13. 504 OBJECT ORIENTED PROGRAMMING & NUMERICAL METHODS (N)

Branch: Mechanical Engineering (Industrial Engineering)

Time: 3 Hours  Maximum: Marks 100

Instructions: Answer all questions from Part-A and four full questions from Part B choosing not more than one full question from each Module.

PART A

1. Explain the exception handling system used in object oriented programming?
2. Explain dynamic initialization of a variable with an example?
3. Explain the rate and order of convergence of numerical methods?
4. We know that a private member of a base class is not inheritable. Is it anyway possible for the objects of a derived class to access the private members of a base class. If yes how?
5. What does polymorphism means in c++ language?
6. Why do we need virtual functions?
7. When do we use the protected visibility specifier to a class member?
8. What are pointes and their uses in object oriented programming language?
9. Derive the finite difference formula for Laplace equation?
10. Explain the significance of abstract class in C++?
(10X2=20)

PART B

Answer one full questions from each module

Module 1

11. Explain the need for Object Oriented approach. Why modern concepts are implemented in Object Oriented Programming. Explain with the help of suitable examples?

12. a) Explain the concept of Function over loading with the help of a class called shape in which we have to find the area of circle, rectangle,square,triangle. Use a switch case statement to select the appropriate shape.  
    b) Create two classes DM and DB which store the value of distances. DM stores distances in meters and centimetres and DB in feet and inches. Write a programme to read the values for class objects and and add one object of DM with another object of DB. Use a friend function to carry out these operation.
    
Module 2

13. 
   a) What is meant by operator overloading? Create a class string and create objects of this class
namely S1, S2, S3. Write a program to
i) concatenate strings using + operator ie S3=S1+S2
ii) compare strings using '=' operator

b) For the above program initialize the string variables and sort the names in ascending and
descending order using a function called sort.

14. Create a Matrix class and initialize two 3x3 Matrix using constructors. The class contains the
member functions like addition, subtraction and multiplication. Functions should take the
arguments and return the result. Use constructors to initialize the variables

Module 3

15. Assume that a bank maintains two kinds of accounts for customers one called as savings
account and the other as current account. The savings account provides the compound interest
and withdrawal facilities but no cheque book facility. The current account provides cheque book
facility but no interest. Current account should also maintain a minimum balance and if the
balance falls below this level, a service charge is imposed. Create a class Account that stores
customer name, account number and type of account. From this derive the classes curr_acct and
sav_acct to make them more specific to their requirements. Include necessary member functions
in order to achieve the following tasks:
i) accept deposit from a customer and update the balance
ii) display the balance
iii) compute deposit and interest
iv) permit withdrawal and update the balance
v) check for minimum balance and impose penalty.

16) a) Using C++ write a program to accept roll no, name, mark1, mark2, mark3, mark4, mark5. Find the
grade point average using the concept of class in which the student should be declared as class. This class
should initialize the variables with dynamic memory allocation to accept the details of 50 students.
Whenever the user enters the roll number of a particular student the details of the student and his
GPA should be published.

b) Explain the concept of error handling methods and use of abstract classes with the help of
suitable examples

Module 4

17.a) Using lagrange’s interpolation find f(8.5) for following data:

<table>
<thead>
<tr>
<th>x</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>f(x)</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>9</td>
</tr>
</tbody>
</table>

b) Find the number of students who obtained less than 45 marks using following data using
Newton’s formula

<table>
<thead>
<tr>
<th>Marks</th>
<th>30-40</th>
<th>40-50</th>
<th>50-60</th>
<th>60-70</th>
<th>70-80</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.of students</td>
<td>31</td>
<td>42</td>
<td>51</td>
<td>35</td>
<td>31</td>
</tr>
</tbody>
</table>

18) Implement a suitable programme for the above 2 problems?