

## GANPAT UNIVERSITY

B. Tech. Semester: 4<sup>th</sup> Mechanical Engineering

CBCS Regular Examination May-June 2014

2ME405 Numerical Methods &amp; Computer Programming

Time: 3 Hours

Total Marks: 70

## Instruction:

- (1) All questions are compulsory.
- (2) Assume suitable data if necessary.

## Section - I

Que.1 Attempt the following questions.

- (A) Using Newton's Divided differences formula, find the missing value from the table: [06]

X	1	2	4	5	6
Y	14	15	5	---	9

- (B) Solve by Jacobi's iteration method up 4th iteration, the equations. [06]
- 
- $20X+Y-2Z = 17$
- ;
- $3X + 20Y-Z = -18$
- ;
- $2X -3Y+20Z = 25$
- .

OR

Que.1 Attempt the following questions.

- (A) Fit a straight line to the following data: [06]

X	6	7	7	8	8	8	9	9	10
Y	5	5	4	5	4	3	4	3	3

- (B) Using Euler' Method, Find an approximate value of Y corresponding to X = 1, given that
- $dy/dx = X+Y$
- and
- $Y = 1$
- when
- $X = 0$
- . [06]

Que.2 Attempt the following questions.

- (A) Derive formula for Simpson's 1/3 rd rule. [05]
- (B)  $F(x) = X^3 - X - 1 = 0$  find real root up to two place decimal. [04]
- (C) What is basic difference between Euler's method & Modified Euler's method and Find X from  $X^2 - 5 = 0$  [02]

OR

Que.2 Attempt the following questions.

- (A) Derive formula of Newton Raphson method and give four application of the NMCP. [05]
- (B) Evaluate the integral  $\int_0^1 \frac{x^2}{1+x^3} dx$  using Simpson's  $\frac{1}{3}$  rule, Compare the error with the exact value. [04]
- (C) Explain Interpolation and Curve fitting with small Graph. [02]

**Que.3 Attempt the following questions.**

- (A) Find by Taylor's series method, the values of Y at  $X = 0.1$  and  $X = 0.2$  to five places of decimals from  $\frac{dy}{dx} = X^2Y - 1$ ,  $Y(0) = 1$ . [05]
- (B) Apply R-K fourth order method to find an approximate value of Y when  $X=0.2$  given that  $\frac{dy}{dx} = X + Y$  and  $Y = 1$  when  $X=0$ . [04]
- (C) Use the secant method to estimate the root of the equation  $X^2 - 4X - 10 = 0$  with the initial estimates of  $X_1=4$  and  $X_2=2$ . [03]

**Section – II**

**Que.4 Attempt the following questions.**

- (A) Explain the function over loading with appropriate Program. [06]
- (B) Write a program to convert decimal number to binary number. [06]

**OR**

**Que.4 Attempt the following questions.**

- (A) Explain Enumerated data type with appropriate program. [06]
- (B) Write a program for addition of  $3 \times 3$  matrixes. [06]

**Que.5 Attempt the following questions.**

- (A) Explain the multiple inheritances with appropriate Program. [05]
- (B) Write a program which read student roll number, two subject marks and finally total of two subjects using multilevel inheritance. [06]

**OR**

**Que.5 Attempt the following questions.**

- (A) Explain abstract class with appropriate program. [05]
- (B) Write a program to do the sum of two complex numbers using multiple constructors in a class. [06]

**Que.6 Write Any THREE questions.**

- (A) Explain copy constructor with appropriate Program. [12]
- (B) Explain the basic concepts of object oriented program.
- (C) Explain following terms:
- (1) Constructor
  - (2) Destructor
  - (3) Copy constructor
- (D) Explain the input & output operator with appropriate Program.

**END OF PAPER**