

**MW-131**

**003-007206**

**MCA (CBCS) (Sem.-II) Examination  
May-2014**

**MCA 2006 : Computer Oriented Numerical Method and Statistical Method**

**Faculty Code : 003  
Subject Code : 007206**

**Time : 2½ Hours]**

**[Total Marks : 70**

1. Attempt the following Multiple Choice Questions. **14**
- (1) Which of the following method gives the comparatively faster conversion ?
- (a) Bisection method                      (b) False position method  
(c) Newton Raphson method              (d) None of these
- (2) If the distance between each  $x$  is not same in the interpolation, then which of the method is used to find the value of  $y$  at given point  $x$ .
- (a) Newton forward formula  
(b) Lagrange's formula  
(c) Newton central forward formula  
(d) None of these
- (3) In interpolation if the value of  $x$  is nearer to the end of the set of  $x$  values, then which of the following method is used to find the value of  $y$  at given point  $x$ .
- (a) Newton forward formula              (b) Newton backward formula  
(c) Newton central formula                (d) None of these
- (4)  $\Delta^2 y_0 =$
- (a)  $\Delta y_1 - \Delta y_0$                               (b)  $y_2 - 2y_1 + y_0$   
(c) (a) and (b) both                          (d) None of these
- (5) Which of the following method is iterative to solve the solution of linear equation ?
- (a) Gauss Elimination                      (b) Jacobi  
(c) Gauss Jordan                              (d) None of these

- (6)  $\Delta y_0 =$
- (a)  $\nabla y_0$  (b)  $\nabla y_1$   
 (c)  $y_0 - y_1$  (d) None of these
- (7) Which of the following method cannot be used to find the solution of non linear algebraic and transcendental equation
- (a) Scent method (b) Regular false position method  
 (c) Newton forward formula (d) None of these
- (8) In bisection method while taking the initial value for the two points which of the following condition must be satisfied ?
- (a) Both must be positive  
 (b) Both must be negative  
 (c) Both must give the opposite sign  
 (d) None of these
- (9) Which of the following formula is not true with respect of interpolation ?
- (a)  $E y_1 = y_{n+1}$  (b)  $\nabla \equiv E^{-1}$   
 (c)  $\Delta \equiv E - 1$  (d) None of these
- (10) \_\_\_\_\_ is a value which occurs most frequently in a set of observations and around which the other items of the set cluster densely.
- (a) Mode (b) Median  
 (c) Average (d) None of these
- (11) \_\_\_\_\_ of a distribution is the value of the variable which divides it into two equal parts.
- (a) Mode (b) Median  
 (c) Average (d) None of these
- (12) Which of the following property is wrong for arithmetic mean ?
- (a) Algebraic sum of the deviations of a set of values from their arithmetic mean is zero  
 (b) The sum of the square of the deviations of a set of values is minimum when taken about mean  
 (c) (a) and (b) both  
 (d) None of these

- (13) Which of the following is true for mode ?
- Mode is not at all affected by extreme values.
  - It is not based upon all the observations.
  - It is not capable of further mathematical treatment.
  - All of the above.
- (14) Which of the following is not true for geometric mean ?
- It is based upon all the observation.
  - It is rigidly defined.
  - It is suitable for further mathematical treatment.
  - None of these.
- (15) \_\_\_\_\_ is the difference between two extreme observations of the distribution.
- |            |                   |
|------------|-------------------|
| (a) Median | (b) Mode          |
| (c) Range  | (d) None of these |

2. Attempt any **five** of the following :

15

- Explain the forward differences and forward difference table.
- Write a C program to find the numerical integration using trapezoidal rule.
- Write only the formula for the waddles rule to find the numerical integration.
- Solve the following differential equation using Euler's method  
 $y' - 1 = xy$  where  $y(0) = 1$  find  $y(0.1)$  take  $h = 0.05$ .
- Write a C program that will find the mode for the given data.
- Define : histogram, frequency polygon with example.

3. Attempt any **three** of the following :

15

- Solve the following set of linear equation using Gauss seidel method correct upto four decimal places. (Take initial value 1, 2, 2)
 
$$3x_1 + 4x_2 + 15x_3 = 54.8$$

$$x_1 + 12x_2 + 3x_3 = 39.66$$

$$10x_1 + x_2 - 2x_3 = 7.74$$
- What is nonlinear equation ? Solve the following using bisection method correct upto 3 decimal places. Root lies between 0 and 1.  
 $\cos x = 3x - 1$



- (3) Find the value of  $y$  at given point  $x = 6$  using Lagrange's formula for the following data :

$x$	3	7	9	10
$y$	168	120	72	63

- (4) Consider the following row data, prepare a frequency distribution table with class interval of 10 size. Also find mean, median and mode for the same.

9 11 12 13 55 33 77 12 11 22 23 34 34 45 56 67 77 88 99 88  
 7 44 22 67 45 12 56 78 90 23 45 56 67 23 33 44 26 34 46 68  
 6 12 23 65 34 23 45 57 23 45 56 23 48 63 45 65 86 26 54 26  
 5 23 56 98 65 32 12 65 45 56 65 55 78 56 55 23 32 12 21 32  
 9 45 65 12 32 45 85 65 56 45 32 12 52 65 45 25 32 14 25 16

4. Attempt any **two** of the following :

**15**

- (1) What is divided difference ? Prepare the divided difference table and list the different properties of divided difference and also prove one of them.
- (2) Fit the rogon line  $x$  on  $y$  for the following data :

X	1	1	2	2	3	3	4	5	6	7
Y	2	7	7	10	8	12	10	14	11	14

- (3) Explain Gaussian Elimination method to solve the set of  $n$  linear equation. Also write the program for the same.

5. Attempt any of the following :

**10**

- (1) Write a C program to find the value of  $Y$  at given point  $x$  using the Newton's forward interpolation formula. Input total number of points, values of  $x$  series and corresponding  $y$  series.
- (2) Write a C program that will find the rank correlation for the given two series.

**BH-14**

**003-007206**



**M.C.A. (CBCS) (Semester-II) Examination  
May-2013**

**MCA 2006 – Computer Oriented Numerical and Statistical Methods**

**Faculty Code : 003  
Subject Code : 007206**

**Time : 3 Hours]**

**[Total Marks : 70**

1. Answer the following multiple choice questions. 15
1. Which of the following methods is/are direct method(s) ?
    - (1) Gaussian Elimination method
    - (2) Gaussian Jordan method
    - (3) Gaussian Seidel method
    - (4) Jacobi method

(a) (1) and (2) both                      (b) (3) and (4) both  
(c) (1), (2) and (3)                      (d) (4) only
  2. Which of the following is the shift or translator operator ?
    - (a) S
    - (b) E
    - (c)  $\mu$
    - (d)  $\delta$
  3. In which of the following method initial guess is very important because it may trap into an endless cycle ?
    - (a) Successive bisection
    - (b) Regula falsi
    - (c) Newton Raphson
    - (d) All of the above
  4.  $\Delta^2 y_1 =$  \_\_\_\_\_.
    - (a)  $\nabla^2 y_1$
    - (b)  $\nabla^2 y_0$
    - (c)  $\nabla^3 y_2$
    - (d)  $\nabla^2 y_3$
  5. Which of the following methods are used for interpolation with unequal intervals ?
    - (a) Newton Forward Interpolation Method
    - (b) Gauss Forward Interpolation Method
    - (c) Newton Divided Difference Method
    - (d) None of the above

6. In which of the following numerical methods total number of points must be odd ?
- (a) Trapezoidal Rule                      (b) Simpson's 1/3 Rule  
(c) Simpson 3/8 Rule                      (d) All of the above
7. Which of the following is the measure of central tendency ?
- (a) Mean                                      (b) Median  
(c) Mode                                      (d) All of the above
8.  $Y_{n+1} = y_n + h f(x_n, y_n)$  gives the  $(n + 1)_{th}$  approximation value in which of the following numerical solution of ordinary differential equation ?
- (a) Euler Method                              (b) Modified Euler Method  
(c) Improved Euler Method              (d) Runge-Kutta Method
9. Which of the following methods is useful when we have approximate experimental data ?
- (a) Correlation                              (b) Interpolation  
(c) Regression                              (d) Numerical Integration
10. What is the standard deviation of first five natural numbers ?
- (a) 3.16                                      (b) 1.41  
(c) 2.23                                      (d) None of the above
11. Which of the following methods is also known as back substitution method ?
- (a) Gaussian Elimination method  
(b) Gaussian Jordan method  
(c) Gaussian Seidel method  
(d) Jacobi method
12.  $[x_0 - x_1] = \underline{\hspace{2cm}}$ .
- (a)  $[x_1 - x_0]$                               (b)  $\Delta y_0/h$   
(c)  $(y_1 - y_0) / (x_1 - x_0)$               (d) All of the above
13. In bisection method if  $f(x) = 0$  has real roots between a and b ( $a < b$ ),  $c = (a + b)/2$ , if a is changed to c for next iteration, then
- (a)  $f(a)$  and  $f(c)$  must be of opposite sign  
(b)  $f(a)$  and  $f(c)$  must be of same sign  
(c)  $f(b)$  and  $f(c)$  must be of same sign  
(d) None of the above

14. If a function is given tabulated at random unequal intervals, then which rule of numerical integration can be applied ?
- (a) Trapezoidal Rule                      (b) Simpson's 1/3 Rule  
 (c) Simpson 3/8 Rule                      (d) None of the above
15. In numerical solution of differential equations, a solution is a curve  $g(x, y)$  in the  $(x, y)$  plane whose slope at every point  $(x, y)$  in specified region is given by \_\_\_\_\_.
- (a)  $dy/dx = f(x, y)$                       (b)  $d^2y/dx^2 = f(x, y)$   
 (c)  $dx/dy = f(x, y)$                       (d) All of the above

2. Attempt any **five** of the following :

15

- (1) Explain False position method using graphical representation.
- (2) Write a program for Runge-Kutta 2<sup>nd</sup> order method.
- (3) Prove that  $\Delta V = V \Delta = \Delta - V = \delta^2$ .
- (4) Write a program for numerical integration solution using Simpson's 3/8 rule.
- (5) Write a program for interpolation using Lagrange's formula.
- (6) Form a table of backward differences of the function  
 $f(x) = x^3 - 3x^2 - 5x - 7$  for  $x = -1, 0, 1, 2, 3, 4, 5$ .

3. Attempt any **three** of the following :

15

- (1) Solve the following system of equations using Gauss - Jordan method :  
 $10x + y + z = 12, x + 10y + z = 12, x + y + 10z = 12$ .
- (2) Solve the following differential equation using modified Euler method :  
 $y' = x + y$  given that  $y(0) = 0$  find  $y(0.6)$  and take  $h = 0.2$ .
- (3) Assuming that the following values of  $y_x$  belong to a polynomial of degree four, compute the next two values :

<b>x</b>	2	4	6	8	10	12	14
<b>y</b>	2	3	5	8	9	-	-

- (4) Write a program to find out the Karl Pearson correlation of given series X and Y.

4. Attempt any **two** of the following :

15

- (1) Explain graphical representation of data using frequency polygon, frequency curve and histogram by taking suitable example. What is frequency distribution ? Explain discrete data, class data and continuous data with proper example.
- (2) Write a program using two functions to find out the median and mode for grouped data.
- (3) Values for  $y$  for various specified values of  $x$  are given below. Fit a quadratic curve through the points.

$x$	-4	-3	-2	-1	0	1	2	3	4	5
$y$	21	12	4	1	2	7	15	30	45	67

5. Attempt any **one** of the following :

10

- (1) Derive the formula to solve the equation using Newton-Raphson method. Also explain it geometrically. When does this method fail ? Solve the equation  $x^3 + 2x^2 + 10x - 20 = 0$  using Newton-Raphson method.
- (2) Derive the formula of Newton divided differences and find out the value of  $\log_{10}656$  using this method for the following given data :

$\log_{10}654$	$\log_{10}658$	$\log_{10}659$	$\log_{10}661$
2.8156	2.8182	2.8189	2.8202





MW-845-003-007206

Seat No. \_\_\_\_\_

M.C.A. (Sem. II) (CBCS) Examination

May/June - 2012

MCA 2006 : Computer Oriented Numerical &  
Statistical Methods

Faculty Code : 003

Subject Code : 007206

Time : 3 Hours]

[Total Marks : 70

1 Answer the following multiple choice questions : 15

- (1)  $X^2 - 3\cos X + Xe^X$  is which of the following equation ?  
(A) Algebraic Equation (B) Transcendental Equation  
(C) Logarithmic Equation (D) Functional Equation
- (2) Bisection method is also known as  
(A) Bolzano method (B) Interval Halving method  
(C) Both of the above (D) None of the above
- (3) Newton Raphson method has which of the following convergence ?  
(A) Linear convergence (B) Quadratic conversion  
(C) Cubic conversion (D) All of the above
- (4) The prime condition for Newton Raphson method is  
(A)  $f'(x)$  must be zero  
(B)  $f'(x)$  must not be non zero  
(C)  $f'(x)$  must be non zero  
(D)  $f'(x)$  may or may not be zero
- (5) In which of the following methods the resultant matrix will be a diagonal matrix ?  
(A) Gauss Elemination (B) Gauss Jordan  
(C) Gauss Seidal (D) Jacobi Method
- (6)  $\Delta^2 y_0 =$  \_\_\_\_\_  
(A)  $y_2 - 2y_1 + y_0$  (B)  $y_2 + 2y_1 - y_0$   
(C)  $y_2 - 2y_1 - y_0$  (D)  $y_2 + 2y_1 + y_0$



- (14) Which of the following is not a type of a graphical representation of data ?  
 (A) Frequency Polygon (B) Frequency Curve  
 (C) Histogram (D) None of the above
- (15) What is the empirical relationship among mean, median and mode ?  
 (A) Mean – Mode = 3 (Mean – Median)  
 (B) Mean – Median = 3 (Mean – Mode)  
 (C) Median = 3\* Mode – 2\* Mean  
 (D) Mean = 3\* Mode – 2\* Median

2 Attempt any **five** of the following : 15

- (i) Explain bisection method using graphical representation.  
 (ii) Write a program to generate and print the forward difference table.  
 (iii) Prove that  $\Delta + \bar{\nabla} = \Delta / \bar{\nabla} - \bar{\nabla} / \Delta$ .  
 (iv) Write a program for numerical integration solution using trapezoidal rule.  
 (v) Prove that  $[X_0, X_1, X_2, X_3, \dots, X_n] = \Delta^n y_0 / n! h^n$ .  
 (vi) Write a program to find out the median for the given discrete data.

3 Attempt any **three** of the following : 15

- (i) Solve the following system of equations using Gauss Elimination method.  
 (1)  $x_1 + x_2 + x_3 + x_4 = 2$   
 (2)  $x_1 + x_2 + 3x_3 - 2x_4 = -6$   
 (3)  $2x_1 + 3x_2 - x_3 + 2x_4 = 7$   
 (4)  $x_1 + 2x_2 + x_3 - x_4 = -2$
- (ii) Solve the following differential equation using Runge-Kutta 4<sup>th</sup> order method.  $y' = -y$  given that  $y(0) = 1$  find  $y(0.04)$  and take  $h = 0.01$ .  
 (iii) Using Newton's forward interpolation formula find the value of  $f(1.6)$  if

$x$	1	1.4	1.8	2.2
$y$	3.49	4.82	5.96	6.5

- (iv) Write a program to find out the mode for discrete data.

4 Attempt any **two** of the following :

15

- (i) Find  $y_6$  if  $y_0 = 9$ ,  $y_1 = 18$ ,  $y_2 = 20$ ,  $y_3 = 24$  and the third order differences are constant.
- (ii) Write a program to find out the rank correlation when rank of series X and Y are given.
- (iii) Find out mean, median and mode for the following given data.

<i>Class</i>	0-10	10-20	20-30	30-40	40-50	50-60	60-70
<i>Frequency</i>	3	5	9	21	6	3	1

5 Attempt any **one** of the following :

10

- (i) Derive the formula and write a program to find out the  $p^{\text{th}}$  root of the given number using Newton Raphson method. Using this derived formula find out the cube root of 25.
- (ii) Find a polynomial satisfied by the following table using Newton divided difference formula.

$x$	-4	-1	0	2	5
$f(x)$	1245	33	5	9	1335

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003-007-206/RN-466

M.C.A. (Sem. II) (CBCS) Examination

May/June - 2011

MCA-2006 : Computer Oriented Numerical &  
Statistical Methods

Faculty Code : 003

Subject Code : 007-206

Time : 3 Hours]

[Total Marks : 70

Q : 1 Answer the following multiple choice questions :

[15]

- [1] Which of the following is not a method of measure of central tendency
- a) Arithmetic Mean
  - b) Harmonic Mean
  - c) Mode
  - d) Correlation coefficient
- [2] What will be the mode of the following data:  
4 5 4 4 1 2 1
- a) 1
  - b) 5
  - c) 4
  - d) 2
- [3] Which of the following methods can be used to solve linear equations
- a) Gauss - Elimination method
  - b) Gauss - Seidel method
  - c) Jacobi method
  - d) All of the above
- [4] The geometric mean of a set of values lies between arithmetic mean & \_\_\_\_\_
- a) Harmonic Mean
  - b) Weighted Mean
  - c) Mode
  - d) Median
- [5] Newton's Backward difference formula can be applied on a data points when
- a) X data may be at equidistance
  - b) X data may not be at equidistance
  - c) X data must be at equidistance
  - d) None of the above
- [6] Which of the following method is not used to solve ODE
- a) RK 2<sup>nd</sup> order
  - b) Trapezoidal
  - c) Predictor-corrector
  - d) Euler



[7]  $I = \int_{x_0}^{x_n} y dx = y_0 + 2y_1 + 2y_1 + 2y_1 + 2y_1 + \dots + y_n$  is the formula of

Integration for

- a) Trapezoidal
- b) Simpson's 1/3
- c) Simpson's 3/8
- d) None of the above.

[8] What is the relationship between mean, median & mode.

- a) Mean - Mode = 3(Mean - Median)
- b) Mean + Mode = 3(Mean + Median)
- c) Mean - Mode = 3(Mean + Median)
- d) Mean + Mode = 3(Mean - Median)

[9] If equation contains log, sin, cos then such an equation is known as :

- a) Transcendental
- b) Algebraic
- c) Polynomial
- d) ODE

[10] Variance is \_\_\_\_\_

- a) S.D.<sup>2</sup>
- b) A.M.<sup>2</sup>
- c) Median<sup>2</sup>
- d) MODE<sup>2</sup>

[11] Regula falsi method is also known as :

- a) Bisection method
- b) False position method
- c) Predictor - corrector method
- d) None of the above.

[12] Correlation can be \_\_\_\_\_

- a) Positive linear correlation
- b) Negative linear correlation
- c) No correlation
- d) All of the above.

[13] Which of the following methods requires to find differentiation of the given  $f(x)$

- a) Newton Raphson
- b) Secant
- c) Bisection
- d) False position

[14] Difference between lower & upper class boundary is :

- a) Class limit
- b) Class interval
- c) Class mark
- d) None of the above

[15]  $\Delta$  is \_\_\_\_\_ difference operator

- a) Backward
- b) Forward
- c) Central
- d) Divided

**Q : 2 Attempt Any Five of the following:** [15]

- [1] Explain Forward Differences with example.  
 [2] Using inverse interpolation find the value of  $x$  for  $y=5$  from the following data:

X	1	3	4
Y	3	12	19

- [3] Define & explain partial pivoting with gauss elimination method.  
 [4] Compute the approximate value of  $\int_0^2 x^4 dx$  by taking four sub-intervals using trapezoidal rule.  
 [5] Define : Frequency polygon.  
 [6] Explain following (1) Class mark (2) Class interval.

**Q : 3 Attempt Any Three of the following:** [15]

- [1] Find the root of the equation  $xe^x = 3$  by regula falsi method correct to three decimal places.  
 [2] Solve the following set of equation using Jacobi method:  
 $3x + 4y + 15z = 54.8$   
 $x + 12y + 3z = 39.66$   
 $10x + y - 2z = 7.74$   
 [3] Using Runge Kutta method of order 4, computer  $y(0.1)$  for each of the following problems.  
 $y' = x + y^2, y(0) = 1$ .  
 [4] Find the median of the following distribution :

X	20-30	30-40	40-50	50-60	60-70
Y	3	5	20	10	5

**Q : 4 Explain Any Two of the Following** [15]

- [1] Solve the following set of equations using Gauss Elimination method.  
 $x + 2y - 12z + 8w = 27$   
 $5x + 4y + 7z - 2w = 4$   
 $-3x + 7y + 9z + 5w = 11$   
 $6x - 12y - 8z + 3w = 49$   
 [2] Write a C program / algorithm to find a solution of given equation using Newton - raphson method.  
 [3] Calculate the mean & standard deviation for the following data given the age distribution of 542 members.

Age in years	20-30	30-40	40-50	50-60	60-70	70-80	80-90
No. of members	3	61	132	153	140	51	2

**Q : 5 Explain Any One of the Following** [10]

- [1] Explain with example concept of correlation. Calculate Correlation Coefficient of the following data using Karl pearson's coefficient correlation.

X	65	66	67	67	68	69	70	72
Y	67	68	65	68	72	72	69	71

- [2] Find  $e^{-0.75}$  and  $e^{-2.25}$  from the following data using both Newton's forward and backward formulas.

X	1.00	1.25	1.50	1.74	2.00
Y = $e^{-x}$	0.3679	0.2865	0.2231	0.1738	0.1353