II Semester B.C.A. Examination, May/June 2018  
(CBCS) (2014-15 and Onwards) (F+R)  
COMPUTER SCIENCE  
BCA 205 : Numerical and Statistical Methods

Time : 3 Hours  
Max. Marks : 100

Instruction : Answer all Sections.

SECTION – A

1. Answer any ten questions of the following : (10×2=20)
   1) Subtract 0.9432E-4 from 0.5452E-3.
   2) Mention four types of errors.
   3) Write the formula for secant method.
   4) Construct the difference table for the following:
      \[
      \begin{array}{c|c|c|c|c}
        x & 0 & 1 & 2 & 3 \\
        f(x) & 1 & 3 & 7 & 3 \\
      \end{array}
      \]
   5) Write the Newton backward interpolation formula.
   6) Explain Cholesky method of solving the linear equation of the form \( AX = B \).
   7) Write the Taylor’s series expansion of \( f(x) \).
   8) Write the formula for Harmonic mean for discrete series.
   9) Find the coefficient of variation, given : arithmetic mean is 9.58 and standard deviation is 14.20.
   10) Write the formula to calculate the coefficient of correlation for two groups.
   11) Find the probability of getting a head in tossing a coin.
   12) If \( P(B) = \frac{1}{4} \) and \( P(A \cap B) = \frac{3}{14} \), find \( P(A/B) \).

P.T.O.
II. Answer any six of the following: 

(6x5=30)

13) Find a real root of the equation \( x^4 - 4x - 9 = 0 \) using bisection method in four stages lies in the interval (2, 3).

14) Find \( f(1.4) \) from the following data:

<table>
<thead>
<tr>
<th>x</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>f(x)</td>
<td>10</td>
<td>26</td>
<td>58</td>
<td>112</td>
<td>194</td>
</tr>
</tbody>
</table>

15) Find the polynomial of which satisfies the following data:

<table>
<thead>
<tr>
<th>x</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>f(x)</td>
<td>3</td>
<td>6</td>
<td>11</td>
<td>18</td>
<td>27</td>
</tr>
</tbody>
</table>

16) Evaluate \( \int \frac{dx}{1 + x^2} \) by Simpson's (3/8)th rule by taking \( h = 1 \).

17) By using Trapezoidal rule, evaluate \( \int \frac{dx}{1 + x} \). Divide \((0, 1)\) into six equal parts.

18) Solve the system of linear equation by using Crout's LU decomposition method:

\[
\begin{align*}
x_1 + x_2 + x_3 &= 1 \\
4x_1 + 3x_2 - x_3 &= 6 \\
3x_1 + 5x_2 + 3x_3 &= 4
\end{align*}
\]

19) Solve the system of linear equations by Cholesky method:

\[
\begin{align*}
x_1 + 2x_2 + 3x_3 &= 5 \\
2x_1 + 8x_2 + 22x_3 &= 6 \\
3x_1 + 22x_2 + 82x_3 &= -10
\end{align*}
\]

20) Determine the single-precision and double precision machine representation of 492.788125.
SECTION – C

III. Answer any six of the following: (6x5=30)

21) Solve the system of equations by Gauss-elimination method:

\[ \begin{align*}
    x + 2y + z &= 3 \\
    2x + 3y + 3z &= 10 \\
    x + 10y - z &= -22
\end{align*} \]

22) Solve the following system of equations by Gauss-Seidel method:

\[ \begin{align*}
    x + y + 54z &= 110 \\
    27x + 6y - z &= 85 \\
    6x + 15y + 2z &= 72
\end{align*} \]

23) Find the largest eigen value and the corresponding eigen vector of

\[ A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \]. Do only five steps.

24) Use Taylor’s series method to find \( y \) at \( x = 0.2 \) considering terms up to the third degree given \( \frac{dy}{dx} = x^2 + y^2 \) and \( y(0) = 1 \).

25) Solve \( \frac{dy}{dx} = y - x^2, \ y(0) = 1 \) by Picard’s method up to the third approximation.

Hence find the value of \( y(0.2) \).

26) By using Runge-Kutta method of 4th order, solve \( \frac{dy}{dx} = x + y^2, \ y(0) = 1 \) for \( x = 0.2 \).

27) Find the Arithmetic Mean (AM) from the following data by step deviation:

<table>
<thead>
<tr>
<th>Marks</th>
<th>0 – 10</th>
<th>10 – 20</th>
<th>20 – 30</th>
<th>30 – 40</th>
<th>40 – 50</th>
<th>50 – 60</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Students</td>
<td>10</td>
<td>5</td>
<td>30</td>
<td>25</td>
<td>10</td>
<td>20</td>
</tr>
</tbody>
</table>

28) State the prove Baye’s theorem.
IV. Answer any four of the following:

29) Find the standard deviation from assumed mean method for the following data:

<table>
<thead>
<tr>
<th>Class Interval (C.I)</th>
<th>0 - 10</th>
<th>10 - 20</th>
<th>20 - 30</th>
<th>30 - 40</th>
<th>40 - 50</th>
<th>50 - 60</th>
<th>60 - 70</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency (f)</td>
<td>1</td>
<td>4</td>
<td>17</td>
<td>45</td>
<td>26</td>
<td>5</td>
<td>2</td>
</tr>
</tbody>
</table>

30) Find the coefficient of skewness for the following data:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>2</td>
<td>5</td>
<td>7</td>
<td>13</td>
<td>21</td>
<td>16</td>
<td>8</td>
<td>3</td>
</tr>
</tbody>
</table>

31) Find the rank correlation coefficient for the following data:

<table>
<thead>
<tr>
<th>x</th>
<th>65</th>
<th>45</th>
<th>67</th>
<th>38</th>
<th>48</th>
<th>50</th>
<th>26</th>
<th>47</th>
<th>70</th>
<th>62</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>64</td>
<td>40</td>
<td>58</td>
<td>46</td>
<td>52</td>
<td>49</td>
<td>38</td>
<td>47</td>
<td>59</td>
<td>60</td>
</tr>
</tbody>
</table>

32) If A and B are two events with \( P(A) = \frac{5}{8} \), \( P(B) = \frac{3}{8} \) and \( P(A \cup B) = \frac{1}{8} \). Find:
   i) \( P(\text{not } A) \)
   ii) \( P(\text{not } B) \)
   iii) \( P(A \cap B) \)
   iv) \( P(B/A) \).

33) If A and B are two events then prove that \( P\left(\frac{A}{B}\right) = \frac{P(A) - P(A \cap B)}{1 - P(B)} \), where \( P(B) \neq 1 \).

34) Obtain the function of the normal probability curve to the following data:

<table>
<thead>
<tr>
<th>( x _i )</th>
<th>2</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>( f_1 )</td>
<td>1</td>
<td>4</td>
<td>6</td>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>
II Semester B.C.A. Examination, May 2017
(CBCS) (2014-15 and Onwards) (F + R)
COMPUTER SCIENCE
BCA 205 : Numerical and Statistical Methods

Time : 3 Hours
Max. Marks : 100

Instruction: Answer all Sections.

SECTION - A

1. Answer any ten of the following: (10×2=20)

1) Subtract 0.9432 E – 4 from 0.5452E – 3.
2) Define Round-off error.
3) Write the formula for Newton-Raphson method.
4) Write the ‘Lagrange’s interpolation formula’.
5) Construct the difference table for the following data.

<table>
<thead>
<tr>
<th>x</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>f(x)</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>7</td>
<td>11</td>
<td>16</td>
<td>22</td>
<td>29</td>
</tr>
</tbody>
</table>

6) Write the Simpson’s \( \left( \frac{3}{8} \right)^n \) rule formula.

7) Define power method.

8) Write the formula to calculate the standard deviation by actual mean method.

9) Find the median of the following data.

| x  | 10  | 15  | 9   | 25  | 19  |

10) Write the alternative formula to calculate Karl Pearson’s coefficient of correlation.

11) Find the coefficient of variation given that mean is 1.2 and S.D. is 1.378.

12) If \( P(B) = \frac{1}{5} \) and \( P(A \cap B) = \frac{1}{4} \) then find \( P(A|B) \).
SECTION – B

II. Answer any six of the following: (6x5=30)

13) Find a real root of the equation $x^3 - 2x - 5 = 0$ lies in the interval (2, 3) using bisection method in five stages.

14) Use Newton-Backward interpolation formula find $f(84)$ from the following data.

<table>
<thead>
<tr>
<th>x</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
</tr>
</thead>
<tbody>
<tr>
<td>f(x)</td>
<td>184</td>
<td>204</td>
<td>226</td>
<td>250</td>
<td>276</td>
<td>304</td>
</tr>
</tbody>
</table>

15) Estimate $f(6)$ using Lagrange’s interpolation formula from the following data.

<table>
<thead>
<tr>
<th>x</th>
<th>3</th>
<th>7</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>f(x)</td>
<td>168</td>
<td>120</td>
<td>72</td>
<td>63</td>
</tr>
</tbody>
</table>

16) Evaluate $\int_0^6 \frac{dx}{1 + x^2}$, using Trapezoidal rule. Divide (0, 6) into six parts.

17) Evaluate $\int_0^1 e^x \, dx$, using Simpson’s $\left(\frac{1}{3}\right)^{\text{rd}}$ rule. Divide (0, 1) into five equal parts.

18) Solve by Gauss-Seidal method

$$10x + 2y + z = 9, \quad x + 10y - z = -22, \quad -2x + 3y + 10z = 22.$$

19) Solve using Crout’s LU decomposition method.

$$2x_1 + 3x_2 + x_3 = -1,$$
$$5x_1 + x_2 + x_3 = 9,$$
$$3x_1 + 2x_2 + 4x_3 = 11.$$

20) Determine the machine representation of the decimal number 492.234375 in both single precision and double precision.

SECTION – C

III. Answer any six of the following: (6x5=30)

21) Solve by Gauss-Jacobi’s method

$$10x + 2y + z = 9, \quad x + 10y - z = -22, \quad -2x + 3y + 10z = 22$$

(only five approximations).

22) Use power method to find the largest eigen value and corresponding eigen vector of the matrix $A = \begin{bmatrix} 4 & 2 \\ 1 & 3 \end{bmatrix}$. 
23) Solve by Gauss elimination method
   \[ x + y + z = 3,\ 2x + 3y + 3z = 10,\ 3x - y + 2z = 13. \]

24) Solve by Taylor's series method the value of \( x = 0.2 \) correct to four decimal
    places. If \( y(x) \) satisfies \( \frac{dy}{dx} = x - y^2 \) and \( y(0) = 1 \) (upto third degree).

25) Use Picard's method, solve \( \frac{dy}{dx} = x^2 + y^2 \), \( y(0) = 1 \) upto the second
    approximation. Hence find the value of \( y(1) \).

26) Using Runge-Kutta method of IV-order, solve \( \frac{dy}{dx} = x + y^2 \); \( y(0) = 1 \) for \( x = 0.2 \).

27) Find geometric mean from the following data.

    \[
    \begin{array}{c|cccccc}
    \text{C.I.} & 20-30 & 30-40 & 40-50 & 50-60 & 60-70 \\
    \hline
    f & 5 & 13 & 7 & 11 & 4 \\
    \end{array}
    \]

28) If \( A \) and \( B \) are two events such that \( P(A) = \frac{1}{3} \), \( P(B) = \frac{1}{9} \) and \( P(A \cup B) = \frac{1}{27} \)
    find \( P(A|B) \), \( P(\text{not } A) \) and \( P(\text{not } A \text{ OR not } B) \).

SECTION - D

IV. Answer any four of the following : \((4 \times 5 = 20)\)

29) Find median for the following data.

    \[
    \begin{array}{c|cccccc}
    \text{C.I.} & 0-10 & 10-20 & 20-30 & 30-40 & 40-50 & 50-60 & 60-70 \\
    \hline
    f & 7 & 18 & 34 & 50 & 35 & 20 & 6 \\
    \end{array}
    \]

30) Find the coefficient of correlation for the following data.

    \[
    \begin{array}{c|cccc}
    x & 10 & 14 & 18 & 22 \\
    y & 18 & 12 & 24 & 6 \\
    \end{array}
    \]

31) Calculate the rank correlation from the following data:

    \[
    \begin{array}{c|cccccccc}
    x & 42 & 68 & 92 & 48 & 81 & 52 & 39 & 78 & 22 & 11 \\
    y & 32 & 52 & 82 & 62 & 72 & 94 & 22 & 92 & 12 & 14 \\
    \end{array}
    \]

32) Two cards are drawn from a well-shuffled deck of 52 cards. Find the probability
    that they are both aces if the first card is (a) replaced (b) not replaced.

33) State and prove Bayes theorem.

34) Obtain the function of the normal probability curve that may be fitted to the
    following data.

    \[
    \begin{array}{c|cccccc}
    x & 5 & 6 & 7 & 8 & 9 & 10 & 11 \\
    f & 2 & 5 & 8 & 12 & 7 & 4 & 3 \\
    \end{array}
    \]
II Semester B.C.A. Degree Examination, May 2016
(CBCS) (2014 – 15 and Onwards) (F+R)
COMPUTER SCIENCE
BCA – 205 : Numerical and Statistical Methods

Time : 3 Hours  Max. Marks : 100

Instruction: Answer all Sections.

SECTION – A

I. Answer any ten of the following : (10x2=20)

1) Multiply .5543E12 x .4111E – 15.
2) Define relative error and absolute error.
3) Write the formula for Secant method.
4) Write the Lagrange interpolation formula.
5) Construct the forward difference table for the following data :

<table>
<thead>
<tr>
<th>x</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>f(x)</td>
<td>10</td>
<td>26</td>
<td>58</td>
<td>112</td>
<td>194</td>
</tr>
</tbody>
</table>

6) Write the Newton’s Backward interpolation formula.
7) Write the Simpson’s \( \frac{3}{8} \) rule formula.
8) Explain Gauss-Elimination method for solving system of linear equations.
9) Find the Harmonic Mean (HM) of the following series : 5, 10, 15, 20, 25.
10) Define correlation.
11) Write the alternate formula for Karl Pearson’s coefficient of correlation.
12) Define the conditional probability.

P.T.O.
II. Answer any six of the following:

13) Find a root of the equation \(x^3 - 2x - 5 = 0\) lies between 2 and 3 by using Bisection method in five stages.

14) Estimate \(f(7.5)\) from the following table:

<table>
<thead>
<tr>
<th>x</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>f(x)</td>
<td>1</td>
<td>8</td>
<td>27</td>
<td>64</td>
<td>125</td>
<td>216</td>
<td>343</td>
<td>512</td>
</tr>
</tbody>
</table>

15) Using Lagrange's interpolation formula find \(f(10)\) from the following data:

<table>
<thead>
<tr>
<th>x</th>
<th>5</th>
<th>6</th>
<th>9</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>y = f(x)</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>16</td>
</tr>
</tbody>
</table>

16) Find the approximate value of \(\int_{0}^{\pi/2} \sqrt{\cos \theta} \, d\theta\) by Simpson's \(\frac{\pi}{3}\) rule by dividing \(0, \frac{\pi}{2}\) into 6 equal parts.

17) Evaluate \(\int_{0}^{3} \frac{dx}{(1+x)^2}\) by Simpson's \(\frac{2^n}{8}\) rule by taking \(h = 1\).

18) Solve following system of linear equations using Crout's LU decomposition method. \(2x + 3y + z = -1, 5x + y + z = 9, 3x + 2y + 4z = 11\).

19) Solve the system of linear equations by Cholesky method.
\[x_1 + 2x_2 + 3x_3 = 5, 2x_1 + 8x_2 + 22x_3 = 6, 3x_1 + 22x_2 + 82x_3 = -10.\]

20) Determine the single-precision machine representation of the decimal number 52.234375 in both single precision and double precision.
SECTION C

III. Answer any six of the following:

21) Solve the Gauss-Jacobi method. \(10x + 2y + z = 9, \ x + 10y - z = -22, \ 2x - 3y - 10z = -22\).

22) Solve by Gauss-Seidel iterative method.

\[\begin{align*}
10x + y + z &= 12, \\
x + 10y + z &= 12, \\
x + y + 10z &= 12
\end{align*}\]

23) Find the largest eigen value and the corresponding eigen vector of the matrix

\[A = \begin{bmatrix} 5 & 4 \\ 1 & 2 \end{bmatrix}\]

24) Solve \(\frac{dy}{dx} = y - x^2, \ y(0) = 1\) by Picard's method upto the third approximation. Hence find the value of \(y(0.1)\).

25) Using Taylor's series method to find \(y\) at \(x = 1.1\) and \(1.2\) considering terms upto third degree given that \(\frac{dy}{dx} = x + y, \ y(1) = 0\).

26) Using Runge-Kutta method of IV-order, solve \(\frac{dy}{dx} = 3x + \frac{y}{2}\) with \(y(0) = 1\), find \(y(0.2)\) by taking \(h = 0.2\).

27) From the following data calculate Arithmetic Mean (AM) by step deviation method.

<table>
<thead>
<tr>
<th>Marks</th>
<th>0 - 10</th>
<th>10 - 20</th>
<th>20 - 30</th>
<th>30 - 40</th>
<th>40 - 50</th>
<th>50 - 60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of students</td>
<td>10</td>
<td>5</td>
<td>30</td>
<td>25</td>
<td>10</td>
<td>20</td>
</tr>
</tbody>
</table>

28) If ‘A’ and ‘B’ are two events such that \(P(A) = \frac{3}{4}, \ P(B) = \frac{1}{2}\) and \(P(A \cap B) = \frac{1}{8}\). Find

i) \(P(A \text{ or } B)\)

ii) \(P(\text{not } A \text{ and not } B)\).
IV. Answer any four of the following: \((4\times5=20)\)

29) Find mean and standard deviation from the following data:

<table>
<thead>
<tr>
<th>Marks</th>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>8</td>
<td>12</td>
<td>20</td>
<td>10</td>
<td>7</td>
<td>3</td>
</tr>
</tbody>
</table>

30) Calculate Karl - Pearson’s co-efficient of skewness for the following data:

31) If 'A' and 'B' are two events, prove that \(P(A \setminus B) = \frac{P(A) - P(A \cap B)}{1 - P(B)}\) where \(P(B) \neq 1\).

32) A man is known to speak truth 3 out of 4 times. He throws a die and reports that it is a six. Find the probability that it is actually a six.

33) Show that the following distribution represents a discrete probability distribution. Find mean and variance.

<table>
<thead>
<tr>
<th>(x_i)</th>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
</tr>
</thead>
<tbody>
<tr>
<td>(P(x_i))</td>
<td>(\frac{1}{8})</td>
<td>(\frac{3}{8})</td>
<td>(\frac{3}{8})</td>
<td>(\frac{1}{8})</td>
</tr>
</tbody>
</table>

34) Find the probability that in a family of 4 children there will be
   i) Atleast one boy.
   ii) Atleast one boy and atleast one girl.

Assume that the probability of male birth is \(\frac{1}{2}\).
II Semester B.C.A. Degree Examination, April/May 2015
(CBCS) (2014 – 15 and Onwards)
Computer Science

BCA 205: NUMERICAL AND STATISTICAL METHODS

Time: 3 Hours Max. Marks: 100

Instruction: Answer all Sections.

SECTION – A

I. Answer any ten of the following. (2x10=20 Marks)

1) Multiply $+5543E12 \times 411E-15$.

2) Define:
   i) Truncation error
   ii) Round off error.

3) Write the formula for Newton-Raphson method.

4) Construct the difference table for the following data.

<table>
<thead>
<tr>
<th>x</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>f(x)</td>
<td>1</td>
<td>3</td>
<td>7</td>
<td>13</td>
<td>21</td>
</tr>
</tbody>
</table>

5) Write Newton's Backward interpolation formula.

6) Explain Doolittle method of solving linear equations of the form $AX = B$.

7) Find the positive root of the equation $x^3 - 3x - 5 = 0$ which lies between 2 and 2.5 by bisection method (use one approximation).

8) From the following data compute the value of harmonic mean.

   85, 70, 10, 75, 500, 8, 42, 250, 40, 36.

9) Define correlation.

10) Write a formula to calculate Arithmetic mean by step deviation method.

P.T.O.
11) State Bayes theorem.

12) From a pack of 52 cards, what is the probability of drawing one card that it is either king or queen.

II. Answer any six of the following. (6x5=30 Marks)

13) Find a real root of the equation \( f(x) = x^3 - 5x + 1 = 0 \) lies in the interval \((0, 1)\) perform four iterations of the secant method.

14) Estimate the population during the period 1955 from the following data.

<table>
<thead>
<tr>
<th>Year</th>
<th>1921</th>
<th>1931</th>
<th>1941</th>
<th>1951</th>
<th>1961</th>
<th>1971</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pop. in lakhs</td>
<td>20</td>
<td>24</td>
<td>29</td>
<td>36</td>
<td>46</td>
<td>51</td>
</tr>
</tbody>
</table>

15) Using Lagrange's interpolation formula find the value of \( f(x) \) at \( x = 6 \) from the data.

<table>
<thead>
<tr>
<th>x</th>
<th>3</th>
<th>7</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>f(x)</td>
<td>168</td>
<td>120</td>
<td>72</td>
<td>63</td>
</tr>
</tbody>
</table>

16) Evaluate \( \int_0^6 \frac{dx}{1+x^2} \) by Trapezoidal rule by taking \( n = 1 \).

17) By using Simpson's \( \frac{3}{8} \) rule evaluate \( \int_0^3 \frac{dx}{(1+x)^2} \) by taking \( n = 1 \).

18) Solve by Gauss-Seidel method.
\[ 10x + y + z = 12, \quad x + 10y + z = 12, \quad x + y + 10z = 12 \]

19) Solve using Crout's LU decomposition method.
\[ x_1 + x_2 + x_3 = 1 \]
\[ 4x_1 + 3x_2 - x_3 = 6 \]
\[ 3x_1 + 5x_2 + 3x_3 = 4 \]

20) Determine the single-precision machine representation of the decimal number 52.234375 in both single precision and double precision.
SECTION – C

III. Answer any six of the following. (6x5=30 Marks)

21) Solve by Gauss-elimination method.
\[ x + 2y + 3z = 6, \ 2x + 4y + z = 7, \ 3x + 2y + 9z = 14 \]

22) Find the dominant eigen value of the matrix \( A = \begin{bmatrix} 4 & 2 \\ 1 & 3 \end{bmatrix} \).

23) Solve the system of equations by Gauss-Jacobi method.
\[ 10x + y + z = 12, \ 2x + 10y + z = 13, \ 2x + 2y + 10z = 14 \]

24) Use Taylors series method to find \( y(1.02) \) when \( \frac{dy}{dx} = xy - 1 \) for \( y(1) = 2 \).

25) Solve \( \frac{dy}{dx} = 2x - y \) with \( y(0) = 3 \) by Picard's iterative method upto third approximation.

26) Solve \( \frac{dy}{dx} = xy, \ y(1) = 2 \) by Runge-Kutta IV order method by taking \( n = 0.2 \).

27) Calculate HM from the following data
\[ 85, 70, 10, 75, 500, 8, 42, 250, 40, 36 \]

28) A bag X contains 2 white, 3 red balls and a bag Y contains 4 white and 5 red balls. One ball is drawn at random from one of the bags and is found to be red. Find the probability that it was drawn from bag Y.

SECTION – D

IV. Answer any four from the following. (4x5=20 Marks)

29) From the following data calculate Arithmetic mean

<table>
<thead>
<tr>
<th>Marks</th>
<th>0 – 10</th>
<th>10 – 20</th>
<th>20 – 30</th>
<th>30 – 40</th>
<th>40 – 50</th>
<th>50 – 60</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Students</td>
<td>10</td>
<td>5</td>
<td>30</td>
<td>25</td>
<td>10</td>
<td>20</td>
</tr>
</tbody>
</table>
30) Compute the standard deviation from the following data.

<table>
<thead>
<tr>
<th>Salaries in thousands</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
<th>65</th>
<th>70</th>
<th>75</th>
<th>80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Persons</td>
<td>3</td>
<td>5</td>
<td>8</td>
<td>7</td>
<td>9</td>
<td>7</td>
<td>4</td>
<td>7</td>
</tr>
</tbody>
</table>

31) Calculate Karl Pearson's coefficient of skewness for the following data.

25, 15, 23, 40, 27, 25, 23, 25, 20

32) A die is thrown twice and the sum of the numbers appearing is observed to be 6. What is the conditional probability that the number 4 has appeared at least once?

33) If A and B are two events then prove that

\[ P(A/B) = \frac{P(A) - P(A \cap B)}{1 - P(B)} \]

where \( P(B) \neq 1 \).

34) Fit a normal distribution to the following data.

<table>
<thead>
<tr>
<th>( x_i )</th>
<th>5</th>
<th>7</th>
<th>9</th>
<th>11</th>
<th>13</th>
<th>15</th>
<th>17</th>
<th>19</th>
<th>21</th>
<th>23</th>
<th>25</th>
</tr>
</thead>
<tbody>
<tr>
<td>( f_i )</td>
<td>2</td>
<td>8</td>
<td>16</td>
<td>23</td>
<td>36</td>
<td>44</td>
<td>39</td>
<td>21</td>
<td>14</td>
<td>16</td>
<td>2</td>
</tr>
</tbody>
</table>