Q-1  **Encircle the appropriate one.**

(i) The word statistics may have been derived from latin word
   A) Status  B) Statistik
   C) Statistic  D) Statics .

(ii) The most popular value of data is called
    A) Arithmetic mean  B) Median
    C) Mode  D) G.M

(iii) Index numbers are called
     A) Economic barometer  B) Statistical barometer
     C) Mathematical barometer  D) Physical barometer

(iv) The probability of an event is always lies between
    A) -1 and 0  B) 0 and 1
    C) -1 and +1  D) None of the above

(v) In regression analysis, another name of independent variable is
    A) Regressand  B) Predictand
    C) Regressor  D) Explained variable

(vi) Relationship between the attributes is called
     A) Regression  B) Correlation
     C) Association  D) Causation

(vii) What is the \( a_{100} \) of the series 4,8,12,16,….
     A) 200  B) 300
     C) 400  D) 500

(viii) The rate at which sum of money would be doubled itself in 20 years is
      A) 3%  B) 5%
      C) 7%  D) 9%

(ix) For a symmetric matrix \( A \), the transpose of a matrix \( A' \) is equal to
     A) I  B) A
     C) -A  D) None of the above

(x) If payments start on a certain date and continues for indefinite period then it is called
    A) Ordinary annuity  B) Annuity due
    C) Perpetuity  D) contingent annuity.

(xi) In quadratic equation \( ax^2+bx+c=0 \), if \( b^2-4ac > 0 \) the roots are
     A) real and distinct  B) Imaginary and distinct
     C) real and equal  D) Imaginary and different

(xii) The graph of linear equation is
      A) parabola  B) straight line
      C) ellipse  D) None of the above
Q-2  Write short answers of the following. Your answer should not exceed three to four lines. (10x2=20)

(i) For a frequency distribution of a variable $x$ it is given that $X=10+5U$, $\sum f=90$, $\sum fu = -45$. Find the value of A.M

(ii) If a distribution has Mean = 54, Mode = 74, find median of the distribution

(iii) Write down uses of Index number in Business.

(iv) If $n=15$, $S_x=7.933$, $S_y=16.627$, $\sum (X - \bar{X}) (Y - \bar{Y}) = 148$. Find the regression coefficients and correlation coefficient.

(v) Calculate chi-square statistic from the following (2x2) contingency able.

<table>
<thead>
<tr>
<th></th>
<th>A1</th>
<th>A2</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>B2</td>
<td>15</td>
<td>35</td>
</tr>
</tbody>
</table>

(vi) Differentiate the following function

$$Y=2X^{2/3}+7X^{1/3}+5$$
(vii) If $A$ is singular find the value of $x$

\[
A = \begin{bmatrix} x & 10 \\ 2 & 5 \end{bmatrix}
\]

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(viii) Find the compound interest and total amount on Rs.3100 and rate of interest is 4% compounded semi-annually for 5 years.

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________________________________________________________

(ix) A property dealer sells the property and gets commission of Rs.5500 at the rate of 5½% . what is the amount of property?

_______________________________________________________

________________________________________________________

________________________________________________________

(x) Ahmad saves Rs. 1 on the first day, Rs.2 on second day, Rs.3 on third day, and so on. How much money he saved in 30 day?

_______________________________________________________

________________________________________________________

________________________________________________________

*******************************************************************
Q-3 (a) Find Arithmetic mean, Median, Mode and variance of the following . (09)

<table>
<thead>
<tr>
<th>Classes</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-39</td>
<td>2</td>
</tr>
<tr>
<td>40-49</td>
<td>3</td>
</tr>
<tr>
<td>50-59</td>
<td>11</td>
</tr>
<tr>
<td>60-69</td>
<td>15</td>
</tr>
<tr>
<td>70-79</td>
<td>25</td>
</tr>
<tr>
<td>80-89</td>
<td>10</td>
</tr>
<tr>
<td>90-99</td>
<td>4</td>
</tr>
</tbody>
</table>

(b) Calculate Laspeyre’s, Paasche’s, Fisher’s and Marshall’s index numbers for 2012 taking 2000 as base. (08)

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Price</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>B</td>
<td>15</td>
<td>8</td>
</tr>
<tr>
<td>C</td>
<td>20</td>
<td>10</td>
</tr>
</tbody>
</table>

Q-4 (a) Fit a least square line to the following pairs of values and estimate y when x = 10. (11)

<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>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>2</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>10</td>
<td>14</td>
<td>15</td>
</tr>
</tbody>
</table>

Also calculate correlation coefficient.

(b) Two fair dice are thrown, Find the Probability of getting:

(i) A double six
(ii) A doublet
(iii) Sum of two dice will be even
(iv) The sum is at least 8
(v) Sum of numbers is less than 6
(vi) Sum of numbers is 7.

Q-5 (a) A population consists of 2, 4, 6, 8, 10, 12. Draw all possible samples of size 2 without replacement from population.

(i) Make sampling distribution of mean.
(ii) Find mean and variance of sampling distribution of mean.

(iii) Verify that (a) $\mu_x = \mu$

(b) $\sigma_x^2 = \frac{\sigma^2}{n} \left( \frac{N-n}{N-1} \right)$

(b) A random sample of 200 married men were classified according to education and number of children as indicated below:

<table>
<thead>
<tr>
<th>Education of father</th>
<th>Number of children</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-1</td>
</tr>
<tr>
<td></td>
<td>2-3</td>
</tr>
<tr>
<td></td>
<td>Over 3</td>
</tr>
<tr>
<td>Elementary</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>35</td>
</tr>
<tr>
<td>Secondary</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>14</td>
</tr>
<tr>
<td>College</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>11</td>
</tr>
</tbody>
</table>

Test the hypothesis at 5% level of significance that family size is independent of education of father.

Q-6 Solve the equation by the help of matrices. (17)

$2x + 3y + z = 13$
$3x + 2y + 4z = 17$
$4x + 5y + 2z = 24$

Q-7 (a) Solve the equation (08)

$\sqrt{3x+4} + \sqrt{5-x} = 5$

(b) A sum of Rs.30,000 is invested, a part at 5% simple interest and The remainder at 8% simple interest. And earned profit Rs.2100. How much was invested at each rate.

Q-8 (a) Find the amount of ordinary annuity of Rs. 5000 deposited at the end of each quarter for 5 years at 8% compounded quarterly. (08)

(b) The difference between simple interest and compound interest for 3 years at 5% is Rs. 61. Find the principal.