

101. If $\text{var}(x) = 8.25$, $\text{var}(y) = 33.96$ and $\text{cov}(x, y) = 10.2$, then the correlation coefficient is

- (a) 0.89 (b) -0.98
(c) 0.61 (d) -0.16

102. If the standard deviation of a variable x is σ , then the standard deviation of another variable $\frac{ax + b}{c}$ is

- (a) $\frac{\sigma a + b}{c}$ (b) $\frac{\sigma \sigma}{c}$
(c) σ (d) None of these

103. If $\Sigma x = 15$, $\Sigma y = 36$, $\Sigma xy = 110$, $n = 5$, then $\text{cov}(x, y)$ equals

- (a) $\frac{1}{5}$ (b) $-\frac{1}{5}$
(c) $\frac{2}{5}$ (d) $-\frac{2}{5}$

104. The two lines of regression are given by $3x + 2y = 26$ and $6x + y = 31$. The coefficient of correlation between x and y is

- (a) $-\frac{1}{3}$ (b) $\frac{1}{3}$
(c) $-\frac{1}{2}$ (d) $\frac{1}{2}$

105. The AM of 4, 7, y and 9 is 7. Then, the value of y is

- (a) 8 (b) 10
(c) 28 (d) 0

106. The median from the table

Value	7	8	10	9	11	12	13
Frequency	2	1	4	5	6	1	3

is

- (a) 100 (b) 10
(c) 110 (d) 1110

107. The mode of the following series 3, 4, 2, 1, 7, 6, 6, 8, 9, 5 is

- (a) 5 (b) 6
(c) 7 (d) 8

108. The median of the data, weight (in kg) 54, 50, 40, 42, 51, 45, 47, 55, 57 is

- (a) 50 kg (b) 55 kg
(c) 52 kg (d) 54 kg

109. The SD of the given data

Class interval	0-10	10-20	20-30	30-40	40-50
Frequency	2	10	8	4	6

is

- (a) 12 (b) 12.36
(c) 12.40 (d) 13.05

110. There are n letters and n addressed envelopes, the probability that all the letters are not kept in the right envelope, is



(a) $\frac{1}{n!}$ (b) $1 - \frac{1}{n!}$

(c) $1 - \frac{1}{n}$ (d) $n!$

111. If A and B are two events such that $P(A) \neq 0$ and $P(B) \neq 1$, then $P\left(\frac{\bar{A}}{\bar{B}}\right)$ is equal to

(a) $1 - P\left(\frac{A}{B}\right)$ (b) $1 - P\left(\frac{\bar{A}}{B}\right)$

(c) $\frac{1 - P(A \cup B)}{P(\bar{B})}$ (d) $\frac{P(\bar{A})}{P(B)}$

112. A coin is tossed 3 times, the probability of getting exactly two heads, is

(a) $\frac{3}{8}$ (b) $\frac{1}{2}$

(c) $\frac{1}{4}$ (d) None of these

113. Six boys and six girls sit in a row, the probability that the boys and girls sit alternatively, is

(a) $\frac{1}{462}$ (b) $\frac{1}{924}$

(c) $\frac{1}{2}$ (d) None of these

114. If A and B are two independent events such that $P(A \cap \bar{B}) = \frac{3}{25}$ and $P(A \cap B) = \frac{8}{25}$, then

$P(A)$ is equal to

(a) $\frac{11}{25}$ (b) $\frac{3}{8}$

(c) $\frac{2}{5}$ (d) $\frac{4}{5}$

115. In a college of 300 students every student read 5 newspapers and every newspaper is read by 60 students. The number of newspaper is

(a) atleast 30 (b) atmost 20

(c) exactly 25 (d) None of these

116. $\int \sqrt{\frac{1-x}{1+x}} dx$ is equal to

(a) $\sin^{-1} x - \frac{1}{2} \sqrt{1-x^2} + c$

(b) $\sin^{-1} x + \frac{1}{2} \sqrt{1-x^2} + c$

(c) $\sin^{-1} x - \sqrt{1-x^2} + c$

(d) $\sin^{-1} x + \sqrt{1-x^2} + c$

117. $\int \frac{x-1}{(x+1)^3} e^x dx$ is equal to

(a) $\frac{-e^x}{(x+1)^2} + c$ (b) $\frac{e^x}{(x+1)^2} + c$

(c) $\frac{e^x}{(x+1)^3} + c$ (d) $\frac{-e^x}{(x+1)^3} + c$

118. $\int \frac{1}{x^2(x^4+1)^{3/4}} dx$ is equal to

(a) $\frac{(x^4+1)^{1/4}}{x} + c$

(b) $-\frac{(x^4+1)^{1/4}}{x} + c$

(c) $\frac{3(x^4+1)^{3/4}}{4x} + c$

(d) $\frac{4(x^4+1)^{3/4}}{3x} + c$

119. If $y = \cos(\sin x^2)$, then at $x = \sqrt{\frac{\pi}{2}}$, $\frac{dy}{dx}$ is equal

to

(a) -2 (b) 2

(c) $-2\sqrt{\frac{\pi}{2}}$ (d) 0

120. If

$$y = \sqrt{\log x + \sqrt{\log x + \sqrt{\log x + \sqrt{\log x + \dots}}}}$$

then $\frac{dy}{dx}$ is equal to

(a) $\frac{x}{2y-1}$ (b) $\frac{x}{2y+1}$

(c) $\frac{1}{x(2y-1)}$ (d) $\frac{1}{x(1-2y)}$

121. If $f(x+y) = f(x) \cdot f(y)$ for all x and y and $f(5) = 2$, $f'(0) = 3$, then $f'(5)$ will be

(a) 2 (b) 4

(c) 6 (d) 8

122. On the interval $[0, 1]$ the function $x^{25}(1-x)^{-7}$ takes its maximum value at the point

(a) 9 (b) $1/2$

(c) $1/3$ (d) $1/4$

123. If $ax^2 + 2hxy + by^2 = 1$, then $\frac{d^2y}{dx^2}$ is equal to

(a) $\frac{h^2 + ab}{(hx + by)^3}$ (b) $\frac{h^2 - ab}{(hx + by)^2}$

(c) $\frac{h^2 + ab}{(hx + by)^2}$ (d) $\frac{h^2 - ab}{(hx + by)^3}$

124. The first derivative of the function

$$\left[\cos^{-1} \left(\sin \frac{\sqrt{1+x}}{2} \right) + x^x \right] \text{ w.r.t. } x \text{ at } x = 1 \text{ is}$$

- (a) $\frac{3}{4}$ (b) $-\frac{1}{4\sqrt{2}} + 1$
 (c) $\frac{1}{2}$ (d) $-\frac{1}{2}$

125. Function $f(x) = 2x^3 - 9x^2 + 12x + 99$ is monotonically decreasing when

- (a) $x < 2$ (b) $x > 2$
 (c) $x > 1$ (d) $1 < x < 2$

126. If $f(x) = \frac{x}{\sin x}$ and $g(x) = \frac{x}{\tan x}$, where

$0 < x \leq 1$, then in this interval

- (a) both $f(x)$ and $g(x)$ are increasing function
 (b) both $f(x)$ and $g(x)$ are decreasing function
 (c) $f(x)$ is an increasing function
 (d) $g(x)$ is an increasing function

127. If $f(x) = \begin{cases} x \sin \frac{1}{x}, & x \neq 0 \\ 0, & x = 0 \end{cases}$, then $\lim_{x \rightarrow 0} f(x)$ is

equal to

- (a) 1 (b) 0
 (c) -1 (d) None of these

128. The function

$$f(x) = \frac{\log(1+ax) - \log(1-bx)}{x} \text{ is not}$$

defined at $x = 0$, the value of which should be assigned to f at $x = 0$, so that it is continuous at $x = 0$, is

- (a) $a - b$ (b) $a + b$
 (c) $\log a + \log b$ (d) $\log a - \log b$

129. Domain of the function $f(x) = \sqrt{2 - 2x - x^2}$ is

- (a) $-\sqrt{3} \leq x \leq \sqrt{3}$
 (b) $-1 - \sqrt{3} \leq x \leq -1 + \sqrt{3}$
 (c) $-2 \leq x \leq 2$
 (d) $-2 + \sqrt{3} \leq x \leq -2 - \sqrt{3}$

130. The function $f(x) = [x] \cos \left[\frac{2x-1}{2} \right] \pi$ where

$[\cdot]$ denotes the greatest integer function, is discontinuous at

- (a) all x
 (b) no x
 (c) all integer points
 (d) x which is not an integer

131. If the function,

$$f(x) = \begin{cases} x + a^2\sqrt{2} \sin x, & 0 \leq x < \frac{\pi}{4} \\ x \cot x + b, & \frac{\pi}{4} \leq x \leq \frac{\pi}{2} \\ b \sin 2x - a \cos 2x, & \frac{\pi}{2} \leq x \leq \pi \end{cases}$$

is continuous in the interval $[0, \pi]$, then the values of (a, b) are

- (a) $(-1, -1)$ (b) $(0, 0)$
 (c) $(-1, 1)$ (d) $(1, 0)$

132. $\vec{a} \cdot \{(\vec{b} + \vec{c}) \times (\vec{a} + \vec{b} + \vec{c})\}$ is equal to

- (a) 0 (b) $[abc] + [bca]$
 (c) $[abc]$ (d) None of these

133. The number of vectors of unit length perpendicular to vectors $\vec{a} = (1, 1, 0)$ and

$$\vec{b} = (0, 1, 1)$$

- (a) three (b) one
 (c) two (d) ∞

134. The points with position vectors $40\hat{i} - 8\hat{j}$, $a\hat{i} - 52\hat{j}$ are collinear, if a is equal to

- (a) -40 (b) 260
 (c) 20 (d) -20

135. If $\vec{a} = 4\hat{i} + 6\hat{j}$ and $\vec{b} = 3\hat{j} + 4\hat{k}$, then the component of \vec{a} along \vec{b} is

- (a) $\frac{18}{10\sqrt{3}} (3\hat{j} + 4\hat{k})$
 (b) $\frac{18}{25} (3\hat{j} + 4\hat{k})$
 (c) $\frac{18}{\sqrt{3}} (3\hat{j} + 4\hat{k})$
 (d) $3\hat{j} + 4\hat{k}$

136. The unit vector perpendicular to the vectors $6\hat{i} + 2\hat{j} + 3\hat{k}$ and $3\hat{i} - 6\hat{j} - 2\hat{k}$ is

- (a) $\frac{2\hat{i} - 3\hat{j} + 6\hat{k}}{7}$ (b) $\frac{2\hat{i} - 3\hat{j} - 6\hat{k}}{7}$
 (c) $\frac{2\hat{i} + 3\hat{j} - 6\hat{k}}{7}$ (d) $\frac{2\hat{i} + 3\hat{j} + 6\hat{k}}{7}$

137. A unit vector \vec{a} makes an angle $\frac{\pi}{4}$ with z -axis, if

$\vec{a} + \hat{i} + \hat{j}$ is a unit vector, then \vec{a} is equal to

$$(a) \frac{\hat{i}}{2} + \frac{\hat{j}}{2} + \frac{\hat{k}}{2} \quad (b) \frac{\hat{i}}{2} + \frac{\hat{j}}{2} - \frac{\hat{k}}{\sqrt{2}}$$

$$(c) -\frac{\hat{i}}{2} - \frac{\hat{j}}{2} + \frac{\hat{k}}{\sqrt{2}} \quad (d) \frac{\hat{i}}{2} - \frac{\hat{j}}{2} - \frac{\hat{k}}{\sqrt{2}}$$

138. If $\vec{AO} + \vec{OB} = \vec{BO} + \vec{OC}$, then A, B, C form

- (a) equilateral triangle
 (b) right angled triangle
 (c) isosceles triangle
 (d) line

139. The area of a parallelogram whose adjacent sides are $\hat{i} - 2\hat{j} + 3\hat{k}$ and $2\hat{i} + \hat{j} - 4\hat{k}$, is

- (a) $5\sqrt{3}$ sq unit (b) $10\sqrt{3}$ sq unit
 (c) $5\sqrt{6}$ sq unit (d) $10\sqrt{6}$ sq unit

140. The sum of the first n terms of the series

$$\frac{1}{2} + \frac{3}{4} + \frac{7}{8} + \frac{15}{16} + \dots \text{ is}$$

- (a) $2^n - n - 1$ (b) $1 - 2^{-n}$
 (c) $n + 2^{-n} - 1$ (d) $2^n - 1$

141. If the first and $(2n - 1)$ th terms of an AP, GP and HP are equal and their n th terms are respectively a, b and c , then

- (a) $a \geq b \geq c$ (b) $a \neq c = b$
 (c) $ac - b^2 = 0$ (d) Both (a) and (c)

142. If $a_1, a_2, a_3, \dots, a_n$ are in HP, then $a_1 a_2 + a_2 a_3 + \dots + a_{n-1} a_n$ will be equal to

- (a) $a_1 a_n$ (b) $n a_1 a_n$
 (c) $(n - 1) a_1 a_n$ (d) None of these

143. The sum of n terms of the following series $1 + (1 + x) + (1 + x + x^2) + \dots$ will be

- (a) $\frac{1 - x^n}{1 - x}$
 (b) $\frac{x(1 - x^n)}{1 - x}$
 (c) $\frac{n(1 - x) - x(1 - x^n)}{(1 - x)^2}$
 (d) None of the above

144. If $S_n = nP + \frac{1}{2}n(n - 1)Q$, where S_n denotes the sum of the first n terms of an AP, then the common difference is

- (a) $P + Q$ (b) $2P + 3Q$
 (c) $2Q$ (d) Q

145. The sum of the series $2^2 + 4^2 + 6^2 + \dots + (2n)^2$ is equal to

- (a) $\frac{2}{3}(n + 1)(2n)$
 (b) $\frac{2}{3}n(n + 1)(2n + 1)$
 (c) $\frac{2}{3}n(n - 1)$
 (d) None of the above

146. If $P = (1, 0)$, $Q = (-1, 0)$ and $R = (2, 0)$ are three given points, then the locus of a point S satisfying the relation $SQ^2 + SR^2 = 2SP^2$ is

- (a) a straight line parallel to x -axis
 (b) a circle through origin
 (c) a circle with centre at the origin
 (d) a straight line parallel to y -axis

147. If the vertices of a triangle be $(2, 1)$, $(5, 2)$ and $(3, 4)$, then its circumcentre is

- (a) $\left(\frac{13}{2}, \frac{9}{2}\right)$ (b) $\left(\frac{13}{4}, \frac{9}{4}\right)$
 (c) $\left(\frac{9}{4}, \frac{13}{4}\right)$ (d) None of these

148. The line $x + y = 4$ divides the line joining the points $(-1, 1)$ and $(5, 7)$ in the ratio

- (a) 2 : 1 (b) 1 : 2
 (c) 2 : 3 (d) None of these

149. Given the points $A(0, 4)$ and $B(0, -4)$, then the equation of the locus of the point $P(x, y)$ such that, $|AP - BP| = 6$, is

- (a) $\frac{x^2}{7} + \frac{y^2}{9} = 1$ (b) $\frac{x^2}{9} + \frac{y^2}{7} = 1$
 (c) $\frac{x^2}{7} - \frac{y^2}{9} = 1$ (d) $\frac{y^2}{9} - \frac{x^2}{7} = 1$

150. If $P(1, 2)$, $Q(4, 6)$, $R(5, 7)$ and $S(a, b)$ are the vertices of a parallelogram $PQRS$, then

- (a) $a = 2, b = 4$ (b) $a = b, b = 4$
 (c) $a = 2, b = 3$ (d) $a = 3, b = 5$

151. The incentre of the triangle formed by $(0, 0)$, $(5, 12)$, $(16, 12)$ is

- (a) $(7, 9)$ (b) $(9, 7)$
 (c) $(-9, 7)$ (d) $(-7, 9)$

152. The roots of the equation $\begin{vmatrix} 1 & 4 & 20 \\ 1 & -2 & 5 \\ 1 & 2x & 5x^2 \end{vmatrix} = 0$ are

- (a) $-1, -2$ (b) $-1, 2$
 (c) $1, -2$ (d) $1, 2$

153. $x + ky - z = 0$, $3x - ky - z = 0$ and $x - 3y + z = 0$ has non-zero solution for k is equal to



- (a) -1 (b) 0
(c) 1 (d) 2

154. If $\begin{bmatrix} x+y+z \\ x+y \\ y+z \end{bmatrix} = \begin{bmatrix} 9 \\ 5 \\ 7 \end{bmatrix}$, then the value of (x, y, z)

is

- (a) (4, 3, 2)
(b) (3, 2, 4)
(c) (2, 3, 4)
(d) None of the above

155. If A is $n \times n$ matrix, then $\text{adj}(\text{adj} A)$ is equal to

- (a) $|A|^{n-1} A$ (b) $|A|^{n-2} A$
(c) $|A|^n n$ (d) None of these

156. The value of determinant

$$\begin{vmatrix} a^2 & a & 1 \\ \cos nx & \cos(n+1)x & \cos(n+2)x \\ \sin nx & \sin(n+1)x & \sin(n+2)x \end{vmatrix}$$

is independent of

- (a) n (b) a
(c) x (d) None of these

157. If $\begin{bmatrix} 3 & 1 \\ 4 & 1 \end{bmatrix} X = \begin{bmatrix} 5 & -1 \\ 2 & 3 \end{bmatrix}$, then X is equal to

- (a) $\begin{bmatrix} -3 & 4 \\ 14 & -13 \end{bmatrix}$ (b) $\begin{bmatrix} 3 & -4 \\ -14 & 13 \end{bmatrix}$
(c) $\begin{bmatrix} 3 & 4 \\ 14 & 13 \end{bmatrix}$ (d) $\begin{bmatrix} -3 & 4 \\ -14 & 13 \end{bmatrix}$

158. If matrix $A = \begin{bmatrix} 1 & 0 & -1 \\ 3 & 4 & 5 \\ 0 & 6 & 7 \end{bmatrix}$ and its inverse is

denoted by $A^{-1} = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix}$, then the

value of a_{23} is equal to

- (a) $\frac{21}{20}$ (b) $\frac{1}{5}$
(c) $-\frac{2}{5}$ (d) $\frac{2}{5}$

159. The rank of the matrix $\begin{vmatrix} 2 & 4 & 3 \\ 1 & 2 & -1 \\ -1 & -2 & 6 \end{vmatrix}$ is

- (a) 1 (b) 2
(c) 3 (d) 4

160. $\cos \theta \begin{bmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{bmatrix} + \sin \theta \begin{bmatrix} \sin \theta & -\cos \theta \\ \cos \theta & \sin \theta \end{bmatrix}$

is equal to

- (a) $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$ (b) $\begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix}$
(c) $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ (d) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

161. The solution of differential equation $(\sin x + \cos x) dy + (\cos x - \sin x) dx = 0$ is

- (a) $e^x (\sin x + \cos x) + c = 0$
(b) $e^y (\sin x + \cos x) = c$
(c) $e^y (\cos x - \sin x) = c$
(d) $e^x (\sin x - \cos x) = c$

162. If $(G, *)$ is a group such that $a * b = b * a$ for two elements a and b , then

- (a) $a^{-1} * b^{-1} = b^{-1} * a^{-1}$
(b) $a * b = a^{-1} * b^{-1}$
(c) $a^{-1} * b = a * b^{-1}$
(d) None of the above

163. The average of 5 quantities is 6, the average of three of them is 4, then the average of remaining two numbers is

- (a) 9 (b) 6
(c) 10 (d) 5

164. A man can swim down stream at 8 km/h and up stream at 2 km/h, then the man's rate in still water and the speed of current is

- (a) 5, 3 (b) 5, 4
(c) 3, 5 (d) 3, 3

165. Equation of curve through point (1, 0) which satisfies the differential equation $(1 + y^2) dx - xy dy = 0$ is

- (a) $x^2 + y^2 = 4$ (b) $x^2 - y^2 = 1$
(c) $2x^2 + y^2 = 2$ (d) None of these

166. The order of the differential equation whose general solution is given by

$y = (c_1 + c_2) \cos(x + c_3) - c_4 e^{x+c_5}$, where

- c_1, c_2, c_3, c_4 and c_5 are arbitrary constants, is
(a) 5 (b) 6
(c) 3 (d) 2

167. The equation of the base of an equilateral triangle is $x + y = 2$ and the vertex is (2, -1), the length of the side of the triangle is

- (a) $\frac{\sqrt{3}}{2}$ (b) $\sqrt{2}$
 (c) $\sqrt{\frac{2}{3}}$ (d) $\sqrt{\frac{3}{2}}$

168. The distance between the lines $3x + 4y = 9$ and $6x + 8y = 15$ is

- (a) $\frac{3}{2}$ (b) $\frac{3}{10}$
 (c) 6 (d) 0

169. The area enclosed with in the curve $|x| + |y| = 1$ is

- (a) $\sqrt{2}$ sq unit (b) 1 sq unit
 (c) $\sqrt{3}$ sq unit (d) 2 sq unit

170. Coordinates of the foot of the perpendicular drawn from $(0, 0)$ to the line joining $(a \cos \alpha, a \sin \alpha)$ and $(a \cos \beta, a \sin \beta)$ are

- (a) $\left(\frac{a}{2}, \frac{b}{2}\right)$
 (b) $\left[\frac{a}{2}(\cos \alpha + \cos \beta), \frac{a}{2}(\sin \alpha + \sin \beta)\right]$
 (c) $\left[\cos \frac{\alpha + \beta}{2}, \sin \frac{\alpha + \beta}{2}\right]$
 (d) $\left(0, \frac{b}{2}\right)$

171. The lines $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ are perpendicular to each other, if

- (a) $a_1b_2 - b_1a_2 = 0$ (b) $a_1a_2 + b_1b_2 = 0$
 (c) $a_1^2b_2 + b_1^2a_2 = 0$ (d) $a_1b_1 + a_2b_2 = 0$

172. The angle between the pair of straight lines $y^2 \sin^2 \theta - xy \sin^2 \theta + x^2 (\cos^2 \theta - 1) = 1$, is

- (a) $\frac{\pi}{3}$ (b) $\frac{\pi}{2}$
 (c) $\frac{2\pi}{3}$ (d) None of these

173. If two circles $(x - 1)^2 + (y - 3)^2 = r^2$ and $x^2 + y^2 - 8x + 2y + 8 = 0$ intersect in two distinct points, then

- (a) $2 < r < 8$ (b) $r = 2$
 (c) $r < 2$ (d) $r > 2$

174. The equation of circle passing through the points $(0, 0)$, $(0, b)$ and (a, b) is

- (a) $x^2 + y^2 + ax + by = 0$
 (b) $x^2 + y^2 - ax + by = 0$
 (c) $x^2 + y^2 - ax - by = 0$
 (d) $x^2 + y^2 + ax - by = 0$

175. Two circles

$$S_1 = x^2 + y^2 + 2g_1x + 2f_1y + c_1 = 0$$

$$\text{and } S_2 = x^2 + y^2 + 2g_2x + 2f_2y + c_2 = 0$$

cut each other orthogonally, then

- (a) $2g_1g_2 + 2f_1f_2 = c_1 + c_2$
 (b) $2g_1g_2 - 2f_1f_2 = c_1 + c_2$
 (c) $2g_1g_2 + 2f_1f_2 = c_1 - c_2$
 (d) $2g_1g_2 - 2f_1f_2 = c_1 - c_2$

176. The equation

$$13[(x - 1)^2 + (y - 2)^2] = 3(2x + 3y - 2)^2$$

represents

- (a) parabola (b) ellipse
 (c) hyperbola (d) None of these

177. Vertex of the parabola $9x^2 - 6x + 36y + 9 = 0$ is

- (a) $\left(\frac{1}{3}, -\frac{2}{9}\right)$ (b) $\left(-\frac{1}{3}, -\frac{1}{2}\right)$
 (c) $\left(-\frac{1}{3}, \frac{1}{2}\right)$ (d) $\left(\frac{1}{3}, \frac{1}{2}\right)$

178. If the foci and vertices of an ellipse be $(\pm 1, 0)$ and $(\pm 2, 0)$, then the minor axis of the ellipse is

- (a) $2\sqrt{5}$ (b) 2
 (c) 4 (d) $2\sqrt{3}$

179. The one of the curve which does not represent a hyperbola, is

- (a) $xy = 1$
 (b) $x^2 - y^2 = 5$
 (c) $(x - 1)(y - 3) = 0$
 (d) $x^2 - y^2 = 0$

180. Eccentricity of the conic $16x^2 + 7y^2 = 112$ is

- (a) $\frac{3}{\sqrt{7}}$ (b) $\frac{7}{16}$
 (c) $\frac{3}{4}$ (d) $\frac{4}{3}$

181. If f and g are continuous function on $[0, a]$ satisfying $f(x) = f(a - x)$ and

$$g(x) + g(a - x) = 2, \text{ then } \int_0^a f(x)g(x) \text{ is equal}$$

to

- (a) $\int_0^a f(x) dx$ (b) $\int_a^0 f(x) dx$
 (c) $2 \int_0^a f(x) dx$ (d) None of these

182. The value of α which satisfying $\int_{\pi/2}^{\alpha} \sin x \, dx = \sin 2\alpha$; $\alpha \in (0, 2\pi)$ are equal to
- (a) $\frac{\pi}{2}$ (b) $\frac{3\pi}{2}$
 (c) $\frac{7\pi}{6}$ (d) All of these

183. The value of $\int_0^{n\pi+0} |\sin x| \, dx$ is
- (a) $2n + 1 + \cos \theta$ (b) $2n + 1 - \cos \theta$
 (c) $2n + 1$ (d) $2n + \cos \theta$

184. The value of $\int_{\pi}^{2\pi} [2 \sin x] \, dx$ where $[\cdot]$ represents greatest integer function, is
- (a) $-\pi$ (b) -2π
 (c) $-\frac{5\pi}{3}$ (d) $\frac{5\pi}{3}$

185. By Simpson's rule, the value of $\int_1^7 \frac{dx}{x}$ is
- (a) 1.358 (b) 1.957
 (c) 1.625 (d) 1.458

186. The value of x_0 (the initial value of x) to get the solution in interval $(0.5, 0.75)$ of the equation $x^3 - 5x + 3 = 0$ by Newton-Raphson method is
- (a) 0.5 (b) 0.75
 (c) 0.625 (d) 0.60

187. By Bisection method, the real root of the equation $x^3 - 9x + 1 = 0$ lying between $x = 2$ and $x = 4$ is nearer to
- (a) 2.2 (b) 2.75
 (c) 5.5 (d) 4.0

188. By False-positioning, the second approximation of a root of equation $f(x) = 0$ is (where x_0, x_1 are initial and first approximations respectively)

- (a) $x_0 = \frac{f(x_0)}{f(x_1) - f(x_0)}$
 (b) $\frac{x_0 f(x_1) - x_1 f(x_0)}{f(x_1) - f(x_0)}$
 (c) $\frac{x_0 f(x_0) - x_1 f(x_1)}{f(x_1) - f(x_0)}$
 (d) $x_1 - \frac{f(x_0)}{f(x_1) - f(x_0)}$

189. Let $f(0) = 1, f(1) = 2.72$, then the Trapezoidal rule gives approximation value of $\int_0^1 f(x) \, dx$ is
- (a) 3.72 (b) 1.86
 (c) 1.72 (d) 0.86

190. If α and β are the imaginary cube roots of unity, then $\alpha^4 + \beta^4 + \frac{1}{\alpha\beta}$ is equal to
- (a) 3 (b) 0
 (c) 1 (d) 2

191. The complex number $z = x + iy$, which satisfy the equation $\left| \frac{z - 5i}{z + 5i} \right| = 1$ lies on
- (a) real axis
 (b) the line $y = 5$
 (c) a circle passing through the origin
 (d) None of the above

192. If $\left(\frac{1+i}{1-i} \right)^m = 1$, then the least integral value of m is
- (a) 2 (b) 4
 (c) 8 (d) None of these

193. If $1, \omega, \omega^2$ are the cube roots of unity, then $\frac{a + b\omega + c\omega^2}{c + a\omega + b\omega^2} + \frac{a + b\omega + c\omega^2}{b + c\omega + a\omega^2}$ is equal to
- (a) 1 (b) 0
 (c) 2 (d) -1

194. If ω is an imaginary cube root of unity, then $(1 + \omega - \omega^2)^7$ equals
- (a) 128ω (b) -128ω
 (c) $128 \omega^2$ (d) $-128 \omega^2$

195. The value of the sum $\sum_{n=1}^{13} (i^n + i^{n+1})$ where $i = \sqrt{-1}$, equals
- (a) i (b) $i - 1$
 (c) $-i$ (d) 0

196. The number of ways in which 6 rings can be worn on four fingers of one hand, is
- (a) 4^6 (b) 6C_4
 (c) 6^4 (d) 24

197. Number greater than 1000 but not greater than 4000 which can be formed with the digits 0, 1, 2, 3, 4, are (repetition of digits is allowed)
- (a) 350 (b) 375
 (c) 450 (d) 576

198. How many words can be formed from the letters of the word DOGMATIC, if all the vowels remain together
- (a) 4140 (b) 4320
 (c) 432 (d) 43

199. If $A = \sin^2 \theta + \cos^4 \theta$, then for all real values of θ

(a) $1 \leq A \leq 2$

(b) $\frac{3}{4} \leq A \leq 1$

(c) $\frac{13}{16} \leq A \leq 1$

(d) $\frac{3}{4} \leq A \leq \frac{13}{16}$

200. In triangle ABC , if $\angle A = 45^\circ$, $\angle B = 75^\circ$, then $a + c\sqrt{2}$ is equal to

(a) 0

(b) 1

(c) b

(d) $2b$

Answer – Key



101. c	102. b	103. c	104. c	105. a	106. b	107. b	108. a	109. b	110. b
111. c	112. a	113. a	114. a	115. c	116. d	117. b	118. b	119. d	120. c
121. c	122. d	123. b	124. b	125. d	126. c	127. b	128. b	129. b	130. c
131. b	132. a	133. c	134. b	135. b	136. b	137. c	138. c	139. c	140. c
141. a	142. c	143. c	144. d	145. b	146. d	147. b	148. b	149. d	150. c
151. a	152. b	153. c	154. c	155. b	156. a	157. a	158. d	159. b	160. d
161. b	162. a	163. a	164. a	165. b	166. c	167. c	168. b	169. d	170. b
171. b	172. b	173. a	174. c	175. a	176. c	177. a	178. d	179. d	180. c
181. a	182. d	183. b	184. c	185. b	186. b	187. b	188. b	189. b	190. b
191. a	192. b	193. d	194. d	195. b	196. a	197. b	198. b	199. b	200. d