सबसे उचित विकल्प चु...
...tions by selecting the most app...

91. If a, b and c are cube roots of unity, then $\begin{vmatrix} e^a & e^{2a} & e^{3a}-1 \\ e^b & e^{2b} & e^{3b}-1 \\ e^c & e^{2c} & e^{3c}-1 \end{vmatrix} =$

1) 0
2) e
3) e^2
4) e^3

92. A particle moves along the curve $6y = x^3 + 2$. The number of points on the curve at which the y-co-ordinate is changing eight times the x-co-ordinate is :

1) 4
2) 3
3) 2
4) 1

93. The length of perpendicular from the point (1, 2, 3) to the line $\frac{x-6}{3}=\frac{y-7}{2}=\frac{z-7}{-2}$ is :

1) 5 units

2) 7 units

3) 4 units

4) 3 units

94. The image of the point (1, 6, 3) in the line $\frac{x}{1}=\frac{y-1}{2}=\frac{z-2}{3}$ is :

1) (1, 1, 7)

2) (0, 1, 7)

3) (1, 0, 7)

4) (1, 7, 0)

95. If h is the height of a right circular cone of greatest volume of given slant height $2\sqrt{3}$ m, then h is equal to :

1) $\frac{2}{\sqrt{3}}$ m

2) $\frac{2}{\sqrt{2}}$ m

3) $\sqrt{3}\sqrt{2}$ m

4) $2\sqrt{2}$ m

96. If $|z + 1| = \sqrt{2}\,|z - 1|$, where $z = x + iy$, $x, y \in R$, then the locus described by the point z in the Argand plane is a :

1) Straight line

2) Circle

3) Parabola

4) Ellipse

Space For Rough Work

97. The equation of the plane passing through the point $(0, 7, -7)$ and containing the line $\frac{x+1}{-3} = \frac{y-3}{2} = \frac{z+2}{1}$ is :

1) $x + 7y + 7z = 0$

2) $x + 2y + z = 7$

3) $x + y + z = 0$

4) $x + y - z = 14$

98. A delegation of five students is to be formed from a group of 10 students. If three particular students want to remain together whereas two particular students do not want to remain together, then the number of selection is :

1) 10

2) 20

3) 30

4) 35

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99. If $\int \frac{\log_e x}{(1+\log_e x)^2} dx = \frac{f(x)}{(1+\log_e x)} + c$, then $f(x) =$

1) x
2) $-x$
3) x^2
4) $-x^2$

100. $\int_{10}^{100} \frac{\log_e x}{\log_e x + \log_e (110 - x)} dx =$

1) 90
2) 0
3) 45
4) 110

101. Area of the region bounded by the curves $y = x^2$, $y = x + 2$ and the x-axis is :

1) $\frac{4}{3}$
2) $\frac{5}{3}$
3) $\frac{5}{4}$
4) $\frac{5}{6}$

102. The sum of all numbers that can be formed with the digits 2, 3, 4, taken all at a time, is equal to :

1) 93324 2) 93328

3) 92324 4) 92328

103. If the trivial solution is the only solution of the system of equations

$x - ky + z = 0$

$kx + 3y - kz = 0$

$3x + y - z = 0$

Then, the set of all values of k is :

1) $\{2, -3\}$

2) $R - \{2, -3\}$

3) $R - \{2, 3\}$

4) $\{2, 3\}$

104. The expansion $[x + (x^3 - 1)^{\frac{1}{2}}]^5 + [x - (x^3 - 1)^{\frac{1}{2}}]^5$ is a polynomial of degree :

1) 5 2) 6

3) 7 4) 8

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105. If $\hat{a}$ and $\hat{b}$ are two unit vectors and θ is angle between them, then $\left|\frac{\hat{a}-\hat{b}}{2}\right|$ is equal to :

1) $\sin\left(\frac{\theta}{2}\right)$ 2) $\sin\theta$

3) $2\sin\theta$ 4) $\sin 2\theta$

106. The function $f(x) = xe^{-3x}$:

1) Increases on R

2) Decreases on R

3) Increases in $\left(-\infty, \frac{1}{3}\right)$

4) Decreases in $\left(-\infty, \frac{1}{3}\right)$

107. Let $\vec{a} = 2\hat{i} + \hat{j} + \hat{k}$, $\vec{b} = \hat{i} + 2\hat{j} + \hat{k}$ and $\vec{c} = 2\hat{i} - 3\hat{j} + 4\hat{k}$. A vector $\vec{r}$ satisfying $\vec{r} \times \vec{b} = \vec{c} \times \vec{b}$ and $\vec{r}.\vec{a} = 0$ is :

1) $-2\hat{i} + 2\hat{j} + 2\hat{k}$

2) $-2\hat{i} + \hat{j} + 3\hat{k}$

3) $-2\hat{i} - \hat{j} + 5\hat{k}$

4) $\hat{i} - 5\hat{j} + 3\hat{k}$

108. If $f(x)$ and $g(x)$ are two functions from R to R such that $(fog)(x) = (x^3 - x^2 + 2)^8$, then $f'(1)\, g'(1)$ is :

1) 8

2) 16

3) 12

4) 24

109. The value of 'a' such that the sum of the squares of the roots of the equation $x^2 - (a-2)x - a - 1 = 0$ assumes least value, is :

1) 0

2) -1

3) 2

4) 1

110. The value of 'a' for which $x^2 + ax + \sin^{-1}(x^2 - 4x + 5) + \cos^{-1}(x^2 - 4x + 5) = 0$ has at least one solution, is :

1) $\sqrt{2\pi}$

2) $-2 + \pi$

3) $-2 - \frac{\pi}{4}$

4) $-\frac{\pi}{4}$

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111. The ratio of the coefficient of x^{15} to the term independent of x in the expansion of $\left(x^2+\frac{2}{x}\right)^{15}$ is :

1) 12 : 32

2) 1 : 32

3) 32 : 12

4) 32 : 1

112. If a function is represented parametrically by the equations $x=\frac{1+t}{t^3}, y=\frac{3}{2t^2}+\frac{2}{t}$, then :

1) $x\left(\frac{dy}{dx}\right)^2=1+\frac{dy}{dx}$

2) $x\left(\frac{dy}{dx}\right)^3=1+\frac{dy}{dx}$

3) $\left(\frac{dy}{dx}\right)^3=x+\frac{dy}{dx}$

4) $x\left(\frac{dy}{dx}\right)^3=1+x\frac{dy}{dx}$

113. If $A_{3\times3}$ and $|A| = 6$, then $|2(\text{adj } A)| =$

1) 48

2) 8

3) 288

4) 12

114. The differential equation $\frac{dy}{dx} = \frac{\sqrt{1-y^2}}{y}$ determine family of circles with :

1) Variable radii and fixed centre at (0, 0).

2) Variable radii and fixed centre at (0, –1).

3) Fixed radius 1 and variables centres along x-axis.

4) Fixed radius 1 and variables centres along y-axis.

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115. The position vectors of the vertices A, B and C of Δ ABC are respectively $\hat{i}-\hat{j}-3\hat{k}$, $2\hat{i}+\hat{j}-2\hat{k}$ and $-5\hat{i}+2\hat{j}-6\hat{k}$. The length of the bisector AD of $\angle$ BAC, where D is on the line segment BC, is :

1) $\frac{15}{2}$

2) $\frac{\sqrt{11}}{2}$

3) $\frac{1}{4}$

4) $\frac{3\sqrt{10}}{4}$

116. An e-mail password must contain three characters. The password has to contain one numeral from 0 to 9, one upper case and one lower case character from the English alphabet. How many distinct passwords are possible ?

1) 6760 2) 13520

3) 40560 4) 105456

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117. A curve $y = f(x)$ passes through the point $P(1, 1)$. The equation of the normal at $P(1, 1)$ to the curve $y = f(x)$ is $(x - 1) + (y - 1) = 0$ and the slope of the tangent at any point on the curve is proportional to the ordinate of the point, then the equation of the curve is :

1) $x^2 + y^2 = 1$

2) $y^2 = x$

3) $(y - 1)^2 = (x - 1)$

4) $y = e^{x-1}$

118. The area enclosed between the curves $y^2 = 4x$ and $x^2 = 4y$ inside the square formed by the lines $x = 1$, $y = 1$, $x = 4$, $y = 4$ is :

1) $11/3$

2) $8/3$

3) $16/3$

4) $13/3$

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119. If $\int \frac{1}{1+\sin x}dx = \tan\left(\frac{x}{2}+p\right)+c$, then p =

1) $\frac{\pi}{4}$ 2) $\frac{\pi}{2}$

3) $-\frac{\pi}{2}$ 4) $-\frac{\pi}{4}$

120. $\int_{-1/2}^{1/2} \cos x \log_e\left(\frac{1+x}{1-x}\right)dx =$

1) 4
2) 0
3) 2
4) π

121. Four statements are given below regarding elements and subsets of the set {1, 2, {1, 2, 3}}. Only one of them is ***correct***. Which one is it ?

1) $\{1, 2\} \in \{1, 2, \{1, 2, 3\}\}$
2) {1, 2} is proper subset of {1, 2, {1, 2, 3}}
3) {1, 2, 3} is proper subset of {1, 2, {1, 2, 3}}
4) $3 \in \{1, 2, \{1, 2, 3\}\}$

122. Three fair cubical dice are thrown simultaneously. The probability that all three dice have the same number of dots on the faces showing up is :

1) $\frac{1}{108}$

2) $\frac{1}{72}$

3) $\frac{1}{36}$

4) $\frac{1}{54}$

123. If -5 is a root of the quadratic equation $2x^2 + px - 15 = 0$ and the quadratic equation $p(x^2 + x) + k = 0$ has equal roots, then the value of k is :

1) 7

2) 4

3) $\frac{7}{4}$

4) $\frac{4}{7}$

Space For Rough Work

124. Let a, b and c be positive integers such that $\frac{b}{a}$ is an integer. If a, b and c are in geometric progression and the arithmetic mean of a, b, c is $b+2$, then the value of $\frac{a^2+a-14}{a+1}$ is :

1) 6
2) 4
3) 1
4) 3

125. If the system of equations

$2x+3y=7$

$(p+q)x+(2p-q)y=21$

has infinitely many solutions, then :

1) $p=5, q=1$
2) $p=1, q=5$
3) $p=2, q=2$
4) $p=0, q=3$

126. If $x=\sqrt[3]{28}$ and $y=\sqrt[3]{27}$, then the value of $x+y-\frac{1}{x^2+xy+y^2}$ is :

1) 2
2) 6
3) 5
4) 1

127. The sum of first six terms of an arithmetic progression is 42. The ratio of its 10th term to its 30th term is 1 : 3. The thirteenth term of the arithmetic progression is :

1) 62

2) 26

3) 28

4) 82

128. The relation R defined in $A = \{1, 2, 3\}$ by aRb, *if* $|a^2 - b^2| \leq 5$, which of the following is ***not true*** ?

1) $R = \{(1, 1), (2, 2), (3, 3), (2, 1), (1, 2), (2, 3), (3, 2)\}$

2) $R^{-1} = R$

3) Domain of $R = \{1, 2, 3\}$

4) Range of $R = \{5\}$

129. The value of $\frac{\sin 55^\circ}{\cos 35^\circ} + \frac{\cot 1^\circ \cot 2^\circ \cot 3^\circ \ldots\ldots \cot 90^\circ}{1 + 2 + 3 + \ldots\ldots + 90}$ is :

1) -1

2) 1

3) 0

4) not defined

130. P and Q are points on sides AB and AC respectively of Δ ABC. If AP = 3 cm, PB = 6 cm, AQ = 5 cm and QC = 10 cm, then :

1) BC = 2 PQ

2) BC = 3 PQ

3) BC = 4 PQ

4) BC = 5 PQ

131. If the polynomial $6x^4+8x^3+17x^2+21x+7$ is divided by another polynomial $3x^2+4x+1$, the remainder comes out to be $ax+b$, then a^2+b^2 =

1) 3

2) 5

3) 9

4) 1

132. The sum of length, breadth and depth of a cuboid is 19 cm and the length of its diagonal is 11 cm. The surface area of the cuboid is :

1) 120 cm^2 2) 240 cm^2

3) 360 cm^2 4) 140 cm^2

133. From the top of a building 60 m high the angles of depression of the top and the bottom of a tower are observed to be 30° and 60°. The height of the tower is :

1) 40 m 2) 80 m

3) 60 m 4) 20 m

134. Suppose a girl throws a die. If she gets 5 or 6, she tosses a coin three times and notes the number of heads. If she gets 1, 2, 3, or 4, she tosses a coin once and notes whether a head or tail is obtained. If she obtained exactly one head, what is the probability that she threw 1, 2, 3, or 4 with the die ?

1) $11/24$ 2) $2/3$

3) $1/8$ 4) $8/11$

/ Space For Rough Work

135. A field in the shape of a trapezium whose parallel sides are 25 m and 10 m. The non-parallel sides are 14 m and 13 m. The area of the field is :

1) $84\ m^2$
2) $100\ m^2$
3) $196\ m^2$
4) $112\ m^2$

136. For any two sets S and T, $S \Delta T$ is defined as the set of all elements that belong to either S or T but not both, that is, $S \Delta T = (S \cup T) - (S \cap T)$. Let A, B and C be sets such that $A \cap B \cap C = \{\}$, and the number of elements in each of $A \Delta B$, $B \Delta C$ and $C \Delta A$ equals 100. Then the number of elements in $A \cup B \cup C$ equals :

1) 150
2) 300
3) 230
4) 210

137. A right circular cone is of height 8.4 cm and the radius of its base is 2.1 cm. It is melted and recast into a sphere. The radius of the sphere is :

1) 2.3 cm
2) 2.5 cm
3) 2.1 cm
4) 2.7 cm

138. If f and g are two functions defined as $f(x) = x + 2,\ x \leq 0$; $g(x) = 3,\ x \geq 0$, then the domain of $f + g$ is :

1) $\{0\}$
2) $[0, \infty)$
3) $(-\infty, \infty)$
4) $(-\infty, 0)$

139. A triangle and a parallelogram have the same base and the same area. If the sides of the triangles are 26 cm, 28 cm and 30 cm and the parallelogram stands on the base 28 cm, then the height of the parallelogram is :

1) 10 cm
2) 8 cm
3) 7 cm
4) 12 cm

Space For Rough Work

140. A train travels a distance of 480 km at a uniform speed. If the speed had been 8 km/h less, then it would have taken 3 hours more to cover the same distance. Formulate the quadratic equation in terms of the speed of the train :

1) $x^2 + 8x + 1280 = 0$

2) $x^2 - 8x + 1280 = 0$

3) $x^2 - 8x - 1280 = 0$

4) $x^2 + 8x - 1280 = 0$

141. If $3^{49}(x + iy) = \left(\frac{3}{2} + \frac{\sqrt{3}}{2}i\right)^{100}$ and $x = ky$, then k is :

1) $-\frac{1}{3}$

2) $\sqrt{3}$

3) $-\sqrt{3}$

4) $-\frac{1}{\sqrt{3}}$

= 4°

142. There are 100 students in a class. In an examination, 50 students of them failed in mathematics, 48 failed in physics and 40 failed in statistics, and 32 failed in exactly two of these three subjects. Only one student passed in all the three subjects. The number of students failing all the three subjects is :

1) 12

2) 4

3) 2

4) 5

143. If the median A and mode B of the following distribution satisfy the relation $7(B - A) = 6Q$, then the value of Q is :

Class Interval	0-30	30-60	60-90	90-120
Frequency	4	5	7	4

1) 6

2) 7

3) 9

4) 8

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144. Let $f : (4, 6) \to (6, 8)$ be a function defined by $f(x) = x + \left[\frac{x}{2}\right]$, where [.] denotes the greatest integer function, then $f^{-1}(x)$ is :

1) $x - \left[\frac{x}{2}\right]$ 2) $-x - 2$

3) $x - 2$ 4) $\frac{1}{x + \left[\frac{x}{2}\right]}$

145. The mean deviation of the data 2, 9, 9, 3, 6, 9, 4 from the mean is :

1) 0 2) 2.57

3) 1.57 4) 3.57

146. An exterior angle of a triangle is 108° and its interior opposite angles are in the ratio 4 : 5. The angles of the triangle are :

1) 48°, 60°, 72° 2) 50°, 60°, 70°

3) 52°, 56°, 72° 4) 42°, 60°, 76°

147. The range of the function $f(x) = \frac{\sin(\pi[x^2 + 1])}{x^4 + 1}$, where [.] is greatest integer function, is :

1) [0, 1] 2) {0}

3) [–1, 1] 4) {0, 1}

Space For Rough Work

148. If sum of all terms of an infinite geometric progression is $\left(\frac{1}{5}\right)$ times the sum of its odd terms, then common ratio is :

1) $\frac{1}{2}$ 2) $-\frac{1}{3}$

3) $-\frac{4}{5}$ 4) $\frac{1}{5}$

149. PQ is a chord of length 8 cm of a circle of radius 5 cm. The tangents at P and Q of the circle intersect at a point T. The length of TP is :

1) $\frac{16}{3}$ cm 2) $\frac{4}{3}$ cm

3) $\frac{5}{3}$ cm 4) $\frac{20}{3}$ cm

150. Medians of Δ ABC intersect at G. If area of Δ ABC = 27 cm^2, then area of Δ BGC =

1) 9 cm^2 2) 6 cm^2

3) 12 cm^2 4) 18 cm^2

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