उचित विकल्प चुनिए।
by selecting the **most appropriate** option.

**91.** The value of $9^{\frac{1}{3}} \times 9^{\frac{1}{9}} \times 9^{\frac{1}{27}} \times \ldots\ldots\infty$ is :

(1) 1

(2) 9

(3) 3

(4) 6

**92.** If $f(x) = x^{100} + x^{99} + \ldots\ldots + x + 1$, then $f'(1)$ is equal to :

(1) 5000

(2) 5051

(3) 5050

(4) 5049

93. If the angle between the vectors $5\hat{i}+3\hat{j}+4\hat{k}$ and $6\hat{i}-8\hat{j}-\hat{k}$ is $\theta$, then $\cos\theta$ is equal to :

(1) $-1$

(2) $\frac{8}{75}$

(3) $\frac{\sqrt{2}}{5\sqrt{101}}$

(4) $\frac{1}{\sqrt{2}}$

94. If $\vec{a}=\hat{i}+\hat{j}+2\hat{k}$ and $\vec{b}=3\hat{i}+2\hat{j}-\hat{k}$, then $(\vec{a}+3\vec{b}).(2\vec{a}-\vec{b})=?$

(1) 10

(2) $-15$

(3) 3

(4) 12

95. Evaluate : $\int_{-1}^{1}\frac{1}{x^2+2x+5}dx=?$

(1) $\frac{\pi}{8}$

(2) 0

(3) $-1$

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

Space For Rough Work

96. What is the modulus of complex number $\frac{i-1}{\cos\frac{\pi}{3}+i\sin\frac{\pi}{3}}$ ?

(1) $\frac{1}{\sqrt{2}}$

(2) $\sqrt{2}$

(3) $\frac{\sqrt{3}}{2}$

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

97. If the points $(-1, -1, 2)$, $(2, m, 5)$ and $(3, 11, 6)$ are collinear, then what is the value of $m$ ?

(1) 2

(2) 5

(3) 8

(4) $-1$

98. The solution set of the inequation $|x+2| \leq 5$ is :

(1) $(-7, 5)$

(2) $[-5, 5]$

(3) $[-7, 3]$

(4) $(-7, 6)$

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99. Function $f(x)=\frac{3}{x}+7$ for $x \in R-\{0\}$ is :

(1) Decreasing

(2) Increasing

(3) Neither increasing nor decreasing

(4) None of the above

100. What is the equation of the hyperbola, whose length of latus rectum is 8 and eccentricity is $3/\sqrt{5}$ ?

(1) $\frac{x^2}{4}-\frac{y^2}{9}=-1$

(2) $\frac{x^2}{25}-\frac{y^2}{20}=1$

(3) $\frac{x^2}{9}-\frac{y^2}{7}=1$

(4) $\frac{x^2}{\sqrt{3}}-\frac{y^2}{\sqrt{2}}=1$

ace For Rough Work

In what ratio, the line joining (–1, 1) and (5, 7) is divided by the line $x + y = 4$?

(1) 1 : 1

(2) 1 : 2

(3) 3 : 2

(4) 4 : 1

102. Evaluate : $\Delta = \begin{vmatrix} 10! & 11! & 12! \\ 11! & 12! & 13! \\ 12! & 13! & 14! \end{vmatrix}$

(1) 0

(2) $10! \times 11! \times 12!$

(3) $2(10! \times 11! \times 12!)$

(4) $10! \times 11!$

103. If 7th and 13th terms of an Arithmetic progression be 34 and 64 respectively, then its 18th term is :

(1) 87 (2) 88

(3) 89 (4) 90

104. What is the coefficient of $x^6y^3$ in the expansion of $(x+2y)^9$ ?

(1) 1365

(2) 672

(3) 5040

(4) 185

105. What is the area of the region bounded by the curve $y = x^3$ and the lines $y = x+6$ and $x = 0$ ?

(1) 20 sq. units

(2) 10 sq. units

(3) $\frac{1}{3}$ sq. units

(4) $\frac{21}{2}$ sq. units

**106.** If $f(x)=\begin{cases} 1, & \text{if } x \le 3 \\ ax+b, & \text{if } 3 < x < 5 \\ 7, & \text{if } 5 \le x \end{cases}$

determine the values of $a$ and $b$, so that $f(x)$ is continuous :

(1) $a = 2, b = 8$

(2) $a = 1, b = 1$

(3) $a = 0, b = -2$

(4) $a = 3, b = -8$

**107.** If the origin is the centroid of the triangle with vertices $P(2a, 2, 6)$, $Q(-4, 3b, -10)$ and $R(8, 14, 2c)$, what will be the values of $a$, $b$ and $c$ ?

(1) $a = -2, b = \frac{-16}{3}, c = 2$

(2) $a = 4, b = -2, c = 6$

(3) $a = 3, b = -2, c = -1$

(4) $a = 4, b = -5, c = 1$

108. Evaluate : $\lim_{x \to 2} \frac{x-2}{\sqrt[3]{x} - \sqrt[3]{2}}$

(1) $(2)^{1/3}$

(2) $3(2^{2/3})$

(3) $3^{2/3}.2$

(4) 0

109. If $y = \sqrt{\sin x + \sqrt{\sin x + \sqrt{\sin x + \ldots\ldots\infty}}}$,

then $\frac{dy}{dx} = ?$

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

(2) $\frac{\cos x}{1-2x}$

(3) $\frac{\cos x}{2y-1}$

(4) $\frac{\sin x}{2x-1}$

110.

11

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The value of $\frac{i^5 + i^6 + i^7 + i^8 + i^9}{(1+i)}$ is

(1) $\frac{1}{2}(1+i)$

(2) $\frac{1}{2}(1-i)$

(3) 1

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

**111.** How many permutations of the letter of the word 'APPLE' are there ?

(1) 60

(2) 50

(3) 55

(4) 100

**112.** Evaluate : $\lim_{n\to\infty} \frac{1+2+3+.....+n}{n^2}$

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

(2) 0

(3) $\frac{3}{2}$

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

What is the sum of series $\frac{1}{2}+\frac{1}{3^2}+\frac{1}{2^3}+\frac{1}{3^4}+\frac{1}{2^5}+\frac{1}{3^6}+\ldots\ldots\infty$ ?

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

(2) $\frac{1}{8}$

(3) 1

(4) $\frac{19}{24}$

**114.** What is the centre of circle $x^2+y^2+6x-4y+4=0$?

(1) (0, –2)

(2) (3, –3)

(3) (1, –2)

(4) (–3, 2)

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Space For Rough Work

115. The foci of an ellipse are $(\pm 2, 0)$ and its eccentricity is $\frac{1}{2}$. What is the equation of ellipse, if it is given that its centre is at origin and axes are along the coordinate axes ?

(1) $\frac{x^2}{36}+\frac{y^2}{11}=1$

(2) $\frac{x^2}{9}+\frac{y^2}{25}=1$

(3) $\frac{x^2}{16}+\frac{y^2}{12}=1$

(4) $\frac{x^2}{36}+\frac{y^2}{20}=1$

116. If $A=[a_{ij}]$ is a scalar matrix of order $n \times n$ such that $a_{ij}=k$ for all $i$, then trace of $A$ is equal to :

(1) $n+k$

(2) $n/k$

(3) $n^2$

(4) $nk$

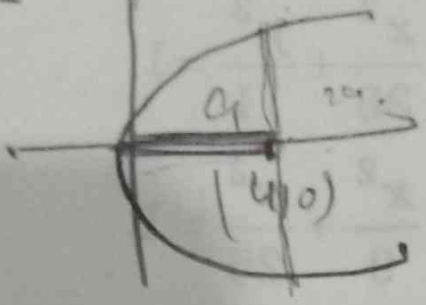
119. The focal distance of a point on the parabola $y^2 = 12x$ is 4. What is the abscissa of this point ?

(1) 1

(2) 0

(3) 2

(4) –2



118. If the straight line $2x + 3y + 4 + k(6x - y + 12) = 0$ is perpendicular to the line $7x + 5y - 4 = 0$, then what is the value of $k$ ?

(1) $\frac{-29}{37}$

(2) $\frac{-7}{5}$

(3) –3

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

**119.** Evaluate : $\int_{-1}^{1}(x-[x])dx = ?$

$[x]$ = greatest integer function.

(1) $x$

(2) $x-1$

(3) 0

(4) 1

**120.** What is the rate of change of volume of a sphere with respect to its surface area, when the radius is 2 cm ?

(1) 2

(2) 1

(3) 0

(4) 5

**121.** Let $A = \{x : x \in R,\ x > 4\}$ and $B = \{x \in R : x < 5\}$, then $A \cap B = ?$

(1) $(4, 5]$

(2) $(4, 5)$

(3) $[4, 5)$

(4) $[4, 5]$

122. A solid is in the form of a cone mounted on a hemisphere. The radius and height of the cone are 3 m and 4 m. Find the volume of the given solid :

(1) $93.2\ m^3$

(2) $94.2\ m^3$

(3) $84.2\ m^3$

(4) $82.2\ m^3$

123. If $a$, $b$ are the roots of equation $x^2 + x + 1 = 0$, then $\alpha^2 + \beta^2 = ?$

(1) 1

(2) $-1$

(3) 2

(4) 3

Space For Rough Work

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124. Let $f : R \to R$ be a function defined by $f(x) = [x]$, where $[x]$ is greatest integer function, then :

(1) $f$ is one-one

(2) $f$ is onto

(3) $f$ is one-one and onto

(4) $f$ is neither one-one nor onto

125. Solve :

$(a-b)^3 + (b-c)^3 + (c-a)^3 = ?$

(1) $(a+b+c)(a^2+b^2+c^2-ab-bc-ca)$

(2) $(a-b)(b-c)(c-a)$

(3) $3(a-b)(b-c)(c-a)$

(4) $abc$

126. The numerical value of a standard deviation can **never** be :

(1) Negative

(2) Zero

(3) Larger than variance

(4) None of the above

ce For Rough Work

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If the length of the shadow of a vertical tower is $\frac{1}{\sqrt{3}}$ times of its height, then the angle of elevation of the sun is :

(1) 45°
(2) 30°
(3) 90°
(4) 60°

**128.** Find :

$\cos 510° \cos 330° + \sin 390° \cos 120° = ?$

(1) 0
(2) –1
(3) $\frac{3}{4}$
(4) 1

**129.** The pair of equations $3x - 5y = 7$ and $-6x + 10y = 7$ have :

(1) A unique solution
(2) Infinitely many solutions
(3) No solution
(4) Two solutions

130. If the mean of 10 numbers is 96 and one of the number is 150, then what is the mean of the remaining nine numbers ?

(1) 60 (2) 75

(3) 81 (4) 90

131. Every point on a number line represents :

(1) A unique real number

(2) A natural number

(3) A rational number

(4) An irrational number

132. What is the mean deviation from the mean of the numbers 10, 9, 21, 16, 24 ?

(1) 5.0 (2) 4.5

(3) 3.5 (4) 5.2

133. If a cylinder is covered by two hemispheres shaped lid of equal shape, then the total curved surface area of new object will be :

(1) $4\pi rh + 2\pi r^2$

(2) $4\pi rh - 2\pi r^2$

(3) $2\pi rh + 4\pi r^2$

(4) $2\pi rh + 4\pi r$

134. There is a triangle ABC in which a median AD is drawn from A to side BC. Find out the area of the triangle ABC, if the length of sides AB, BC and AD are respectively 10 cm, 18 cm and $\sqrt{41}$ cm :

(1) $40\sqrt{2}$ cm$^2$

(2) $20\sqrt{2}$ cm$^2$

(3) 60 cm$^2$

(4) 30 cm$^2$

135. A man is known to speak truth 3 out of 4 times. He throws a die and reports that it is a six. What is the probability that the number on the die is actually 6 ?

(1) $\frac{3}{8}$

(2) $\frac{5}{8}$

(3) $\frac{2}{7}$

(4) $\frac{1}{8}$

136. If a set contains $n$-elements, then what are the number of elements in its power set ?

(1) $n$

(2) $2^{n-1}$

(3) $2^n$

(4) $n^2$

137. If the perimeter of the circle and square are equal, then the ratio of their areas will be equal to : (use $\pi = \frac{22}{7}$)

(1) 14 : 11

(2) 22 : 7

(3) 7 : 22

(4) 11 : 14

138. If the arcs of same length in two circles subtended angles of 60° and 75° at their centres, then what is the ratio of their radii ?

(1) 1 : 2 (2) 2 : 3

(3) 3 : 1 (4) 5 : 4

139. If the mean and mode of some data are 4 and 10 respectively, its median will be :

(1) 1.5 (2) 5.3

(3) 6 (4) 16

ce For Rough Work

$2\pi r = 4 \times$ side.

140. If $x - 2$ is a factor of $x^2 + 3ax - 2a$, then $a = ?$

(1) 2 (2) −2

(3) 1 (4) −1

141. What will be the domain of the function $f(x) = \sin^{-1}(2x - 3)$ ?

(1) $[0, \infty)$

(2) $(1, 2)$

(3) $[1, 2]$

(4) $[-1, 1]$

142. In a group of 50 persons, 14 drink tea but not coffee and 30 drink tea. How many drink tea and coffee both ?

(1) 15 (2) 16

(3) 20 (4) 30

143. If $\cos A + \cos^2 A = 1$, then the value of $\sin^2 A + \sin^4 A$ is :

(1) 1
(2) $\frac{1}{2}$
(3) 0
(4) $-1$

144. The range of the function $f(x) = \frac{x+2}{|x+2|}$, $x \neq -2$ is :

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

145. If the mean of a distribution is 25 and the standard deviation is 8. What is the value of the coefficient variation ?

(1) 35%
(2) 60%
(3) 32%
(4) 47%

146. If the mode of 8, 15, 7, 7, 9, 2, 9 and $x$ is 9, then '$x$' is :

(1) 7

(2) 8

(3) 9

(4) 15

147. Let $R$ be the relation on $N$ defined by $x + 2y = 8$, the domain of $R$ is :

(1) {2, 4, 8}

(2) {2, 4, 6, 8}

(3) {2, 4, 6}

(4) {1, 2, 3, 4}

148. If $f : [0, \infty) \to R$ and $g : R \to R$ be defined as $f(x) = \sqrt{x}$ and $g(x) = -x^2 - 1$, then find $gof$ :

(1) $\sqrt{x-1}$

(2) $-x-1$

(3) $x+1$

(4) $gof$ does not exist

**Space For Rough Work**

The sides of a triangle are 122 m, 22 m and 120 m respectively, then area of the triangle is :

(1) 1300 sq. m.

(2) 1320 sq. m.

(3) 1400 sq. m.

(4) 1420 sq. m.

**150.** If $A$ and $B$ are two mutually exclusive events with $P(A)=\frac{1}{3}$ and $P(B)=\frac{1}{4}$, then $P(\overline{A}\cap\overline{B})$ is :

(1) $\frac{4}{12}$

(2) $\frac{5}{12}$

(3) $\frac{6}{12}$

(4) $\frac{7}{12}$