

No of Questions: 100

Time: 2 (Hours)

- If x and y denote respectively, the area and the sum of the length of diagonals of a rectangle with length 1 unit and breadth $\frac{1}{2}$ unit, then which one on the following is correct?
 - x and y are rational
 - x is irrational and y is rational
 - x is irrational and y is rational
 - x and y are both irrational
- A number, when divided by 987, gives a remainder. When the same number is divided by 21, what is the remainder?
 - 21
 - 19
 - 17
 - 15
- Consider the following statements: A number a_1, a_2, a_3, a_4, a_5 is divisible by 9, if
 - $a_1 + a_2 + a_3 + a_4 + a_5$ is divisible by
 - $a_1 - a_2 + a_3 - a_4 + a_5$ is divisible byWhich of the above statements is/are correct?
 - Only I
 - Only II
 - Both I and II
 - Neither I nor II
- Which one of the following numbers is not a square of any natural numbers?
 - 5041
 - 9852
 - 1936
 - 6241
- The number 2784936 is divisible by which one of the following numbers?
 - 86
 - 87
 - 88
 - 89
- Which one of the following is a prime number?
 - 161
 - 171
 - 173
 - 221
- If the sum of an integer and its reciprocal is $\frac{10}{3}$, then the integer is equal to
 - 3
 - 6
 - 12
 - 13
- Consider the following statements: There is a finite number of rational numbers between any two. Which one of the following is a prime number?
 - 161
 - 171
 - 173
 - 221
- If the sum of an integer and its reciprocal is $\frac{10}{3}$, then the integer is equal to
 - 3
 - 6
 - 12
 - 13
- Consider the following statements:
 - There exists only one prime number p such that $(17p + 1)$ is a square.
- If x is the product of 10 consecutive prime numbers starting from 2, then $(x + 1)$ is also a prime number. Which of the above statements is/are correct?
 - 1 only
 - 2 only
 - Both 1 and 2
 - Neither 1 nor 2
- If n is a whole number greater than 1, then $n^2 (n^2 - 1)$ is always divisible by
 - 12
 - 24
 - 48
 - 60
- p, q and r are prime numbers such that $p < q < r < 13$. In how many cases would $(p + q + r)$ also be a prime number?
 - 1
 - 2
 - 3
 - None of these
- Consider the following statements:
 - There exists only one prime number p such that $(17p + 1)$ is a square.
 - If x is the product of 10 consecutive prime numbers starting from 2, then $(x + 1)$ is also a prime number.Which of the above statements is/are correct?
 - 1 only
 - 2 only
 - Both 1 and 2
 - Neither 1 nor 2
- LCM of two numbers is 16 times their HCF. The sum of LCM and HCF is 850. If one number is 50, then what is the other number?
 - 800
 - 1200
 - 1600
 - 2400
- If the HCF of $x^3 - 27$ and $x^4 + 4x^2 + 12x + k$ is a quadratic polynomial, then what is the value of k ?
 - 27
 - 9
 - 3
 - 3
- What is the least number of square tiles required to pave the floor of a room 9 m 99 m cm long and 4 m 7 cm broad?
 - 247
 - 277
 - 297
 - 307
- The product of HCF and LCM of 18 and 15 is
 - 120
 - 150
 - 175
 - 270
- The HCF of two natural numbers m and n is 24 and their product is 552. How many sets of values of m and n are possible?
 - 1
 - 2
 - 4
 - No set of m and n is possible satisfying the given

conditions

17. What is the value of $0.007\overline{17.83\ 310.0202}$?

- a) 327.86638 b) 327.86638
c) 327.86683 d) 327

18. Assertion a): $\sqrt{\frac{5041}{6889}}$ is rational

Reason (R): The square root of a rational number is always rational.

- a) A and R are correct and R is correct explanation of A
b) A and R are correct but R is not correct explanation of A
c) A is correct but R is wrong
d) A is wrong but R is correct

19. The number $\sqrt{0.0001}$ is

- a) a rational number less than 0.01
b) a rational number
c) an irrational number
d) neither a rational number nor an irrational number

20. If the height of a cone is increased by 50%, then what is the percentage increase in the volume of the cone?

- a) $100/3\%$ b) 40%
c) 50% d) $200/3\%$

21. 38L of milk was poured into a tub and the tub was found to be 5% empty. To completely fill the tub, what amount of additional milk must be poured?

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

22. X, Y and Z had taken a dinner together. The cost of the meal of Z was 20% more than that of Y and the cost of the meal of X was $5/6$ as much as the cost of the meal of Z. If Y paid Rs100, then what was the total amount that all the three of them had paid?

- a) Rs 285 b) Rs 300
c) Rs 355 d) None of these

23. A bag contains 50 paise, Rs 1 and Rs 2 coins in the ratio 2 : 3 : 4. If the total amount is Rs 240, what is the total number of coins?

- a) 90 b) 150
c) 180 d) 200

24. The wages of labourers in a factory has increased in the ratio 22: 25 and their number decreased in the ratio 3: 2. What was the original wages bill of the factory, if the present bill is Rs 5000?

- a) Rs 4000 b) Rs 6000
c) Rs 8000 d) None of these

25. Two vessels are full of milk with milk-water ratio 1: 3 and 3: 5 respectively. If both are mixed in the

ratio 3: 2, what is the ratio of milk and water in the new mixture?

- a) 4: 15 b) 3: 7
c) 6: 7 d) None of these

26. If A: B = 2: 3, B: C = 5: 7 and C: D = 3: 10, then what is A: D equal to?

- a) 1: 7 b) 2: 7
c) 1: 5 d) 5: 1

27. A person invested part of Rs 45000 at 4% and the rest at 6%. If his annual income from both are equal, then what is the average rate of interest?

- a) 4.6% b) 4.8%
c) 5.0% d) 5.2%

28. Ram had Rs 2 lakh, part of which he lent at 15% per annum and rest at 12% per annum. Yearly interest accrued was Rs 27600. How much did he lent at 15%?

- a) Rs 120000 b) Rs 100000
c) Rs 80000 d) Rs 60000

29. What is the least number of years in which a sum of money at 20% compound interest will be more than doubled?

- a) 7 b) 6
c) 5 d) 4

30. The difference between compound interest and simple interest at the same rate of interest R per cent per annum on Rs 15,000 for 2 years is Rs 96. What is the value of R?

- a) 8 b) 10
c) 12
d) Cannot be determined due to insufficient data

31. What the seller marked the printed price of a watch purchased at Rs 380, so that giving 5% discount, there is 25% profit?

- a) Rs 400 b) Rs 450
c) Rs 500 d) Rs 600

32. The cost of two articles are in the ratio 3: 5. If there is 30% loss on the first article and 20% gain on the second article, what is overall percentage of loss or gain?

- a) 2.25% gain b) 5.25% loss
c) 2% loss d) None of these

33. A scooterist completes a certain journey in 10 h. He covers half the distance at 30 km/h and the rest at 70 km/ h. What is total distance of the journey?

- a) 210 km b) 400 km
c) 420 km d) 500 km

34. Two men P and Q start from a place walking at 5 km/h and 6.5 km/h, respectively. What is the time they will take to be 92 km apart, if they walk in opposite directions?

- a) 2 h b) 4 h

- c) 6 h d) 8 h
35. A car travels along the four sides of a square at speeds v , $2v$, $3v$ and $4v$, respectively. If u is the average speed of the car in its travel around the square, then which one of the following is correct?
- a) $u = 2.25v$ b) $u = 3v$
c) $v < u < 2v$ d) $3v < u < 4v$
36. A train takes 10 s to cross a pole and 20 s to cross a platform of length 200 m. What is the length of the train?
- a) 50 m b) 100 m
c) 150 m d) 200 m
37. A person can do a job as fast as his two sons working together. If one son does the job in 6 days and the other in 12 days, how many days does it take the father to do the job?
- a) 9 days b) 6 days
c) 4 days d) 3 days
38. The mess charges for 35 students for 24 days in Rs6300. In how many days will the mess charges be Rs 3375 for 25 students?
- a) 12 b) 15
c) 18 d) 21
39. A can do a piece of work in 4 days and B can complete the same work in 12 days. What is the number of days required to do the same work together?
- a) 2 days b) 3 days
c) 4 days d) 5 days
40. X can complete a job in 12 days. If X and Y work together, they can complete the job in $20/3$ days. Y alone can complete the job in
- a) 10 days b) 12 days
c) 15 days d) 18 days
41. Pipe A can fill a tank in 3 h but there is a leakage also, due to which it takes 3.5 h for the tank to be filled. How much time will the leakage take in emptying the tank, if the tank is filled initially?
- a) 21 h b) 20 h
c) 18 h d) 10.5 h
42. If $(ab - b + 1 = 0)$ and $(bc - c + 1 = 0)$, then what is $(a - ac)$ equal to?
- a) -1 b) 0
c) 1 d) 2
43. When $(x^3 - 2x^2 + px - q)$ is divided by $(x^2 - 2x - 3)$, the remainder is $(x - 6)$. What are the values of p, q respectively?
- a) -2, -6 b) 2, -6
c) -2, 6 d) 2, 6
44. If the expression $(px^3 + x^2 - 2x - q)$ is divisible by $(x - 1)$ and $(x + 1)$, what are the values of p and q , respectively?
- a) 2, -1 b) -2, 1
- c) -2, -1 d) 2, 1
45. What is the value of k which will make the expression $4x^2 + 12x + k$ a perfect square?
- a) 5 b) 7
c) 8 d) 9
46. If $A = \{1, 2, 3, 4\}$, then what is the number of subsets of A with atleast three elements?
- a) 3 b) 4
c) 5 d) 10
47. In a class of 110 students, x students take both Mathematics and Statistics, $2x + 20$ students take Mathematics and $2x + 30$ students take Statistics. There are no students who take neither Mathematics nor Statistics. What is x equal to?
- a) 15 b) 20
c) 25 d) 30
48. What is the value of the expression:
- $$\cos^2 \frac{\pi}{8} + 4\cos^2 \frac{\pi}{4} - \sec \frac{\pi}{3} + 5\tan^2 \frac{\pi}{3} + \sin^2 \frac{\pi}{8}?$$
- a) 8 b) 10
c) 16 d) 18
49. The smallest side of a right-angled triangle has length 2 cm. The tangent of one acute angle is $\frac{3}{4}$. What is the hypotenuse of the triangle?
- a) 5 cm b) 2.5 cm
c) 1.25 cm d) $10/3$ cm
50. If $\cos A = \frac{5}{13}$, then what is the value of $\frac{\sin A - \cot A}{2 \tan A}$?
- a) $395/3644$ b) $395/3844$
c) $395/3744$ d) $385/3744$
51. What is $\log(\tan 1^\circ) + \log(\tan 2^\circ) + \log(\tan 3^\circ) + \dots + \log(\tan 89^\circ)$ equal to?
- a) 0 b) 1
c) 2 d) -1
52. $P = \tan^2 x + \cot^2 x$, then which one of the following is correct?
- a) $p \leq 2$ b) $p \geq 2$
c) $p < 2$ d) $p > 2$
53. If $0 < x < 45^\circ$ and $45^\circ < y < 90^\circ$ then which one of the following is correct?
- a) $\sin x = \sin y$ b) $\sin x < \sin y$
c) $\sin x > \sin y$ d) $\sin x \leq \sin y$
54. Which one of the following is correct?
- a) There is only one θ with $0^\circ < \theta < 90^\circ$ such that $\sin \theta = a$, where a is a real number.
b) There is more than one θ with $0^\circ < \theta < 90^\circ$ such that $\sin \theta = a$, where a is a real number.
c) There is no θ with $0^\circ < \theta < 90^\circ$ such that $\sin \theta = a$, where a is a real number.
d) There are exactly θ 's with $0^\circ < \theta < 90^\circ$ such that $\sin \theta = a$, where a is a real number.

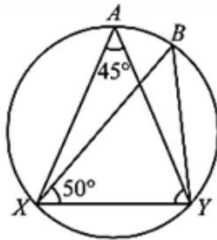
55. If α in an acute angle and $\sin \alpha = \sqrt{\frac{x-1}{2x}}$, then what is $\tan \alpha$ equal to?
- a) $\sqrt{\frac{x-1}{x+1}}$ b) $\sqrt{\frac{x+1}{x-1}}$
 c) $\sqrt{x^2-1}$ d) $\sqrt{x^2+1}$
56. If $\tan A = \frac{1-\cos B}{\sin B}$, then what is $\frac{2 \tan A}{1-\tan^2 A}$ equal to?
- a) $\frac{\tan B}{2}$ b) $2 \tan B$
 c) $\tan B$ d) $4 \tan B$
57. Consider the following:
 I. $\sin^2 1^\circ + \cos^2 1^\circ = 1$
 II. $\sec^2 33^\circ - \cot^2 57^\circ = \operatorname{cosec}^2 37^\circ - \tan^2 53^\circ$
 Which of the above statements is/are correct?
- a) Only I b) Only II
 c) Both I and II d) Neither I nor II
58. What is the value of $\sec(90-\theta)^0 \cdot \sin \theta \sec 45^\circ$?
- a) 1 b) $\frac{\sqrt{3}}{2}$
 c) $\sqrt{2}$ d) $\sqrt{3}$
59. A man is watching from the top of a tower a boat speeding away from the tower. The boat makes an angle of depression of 45° with the man's eye when at a distance of 60 m from the bottom of tower. After 5 s, the angle of depression becomes 30° . What is the approximate speed of the boat assuming that it is running in still water?
- a) 31.5 km/h b) 36.5 km/h
 c) 38.5 km/h d) 40.5 km/h
60. The angles of elevation of the top of a tower from two points P and Q at distances m and n respectively, from the base and in the same straight line with it are complementary. The height of the tower is
- a) $(mn)^{1/2}$ b) $mn^{1/2}$
 c) $m^{1/2}n$ d) mn
61. A wire is in the form of a circle of radius 42 cm. If it is bent into a square, then what is the side of the square?
- a) 66 cm b) 42 cm
 c) 36 cm d) 33 cm
62. The perimeter of a triangular field is 240 m. If two of its sides are 78 m and 50 m, then what is the length of the perpendicular on the side of length 50 m from the opposite vertex?
- a) 43 m b) 52.2 m
 c) 67.2 m d) 70 m
63. In the triangle ABC, the base BC is trisected at D and E. The line through D, parallel to AB, meets AC at F and the line through E parallel to AC meets AB at G. If EG and DF intersect at H, then what is the ratio of the sum of the area of parallelogram AGHF and the area of the triangle DHE to the area of the triangle ABC?
- a) $\frac{1}{2}$ b) $\frac{1}{3}$
 c) $\frac{1}{4}$ d) $\frac{1}{6}$
64. The area of a square inscribed in a circle of radius 8 cm is
- a) 32 sq cm b) 64 sq cm
 c) 128 sq cm d) 256 sq cm
65. One side of a parallelogram is 8.06 cm and its perpendicular distance from opposite side is 2.08 cm. What is the approximate area of the parallelogram?
- a) 12.56 cm² b) 14.56 cm²
 c) 16.76 cm² d) 22.56 cm²
66. If the diagonals of a rhombus are 4.8 cm and 1.4 cm, then what is the perimeter of the rhombus?
- a) 5 cm b) 10 cm
 c) 12 cm d) 20 cm
67. Four equal-sized maximum circular plates are cut off from a square paper sheet of area 784 square cm. The circumference of each plate is
- a) 11 cm b) 22 cm
 c) 33 cm d) 44 cm
68. The diameters of two right circular cones are equal. If their slant heights are in the ratio 3: 2, then what is the ratio of their curved surface areas?
- a) 9: 4 b) 3: 2
 c) 3: 2 d) 2: 3
69. If C_1 is a right circular cone with base radius r_1 cm and height h_1 cm and C_2 is a right circular cylinder with base radius r^2 cm and height h^2 cm and if $r_1 : r_2 = 1: n$ (where, n is a positive integer) and their volumes are equal, then which one of the following is correct?
- a) $h_1 = 3nh^2$ b) $h_1 = 3n^2h^2$
 c) $h_1 = 3h^2$ d) $h_1 = n^2h^2$
70. The diameter of the Moon is approximately one fourth of that of the Earth. What is the (approximate) ratio of the volume of the Moon to that of Earth?
- a) $\frac{1}{16}$ b) $\frac{1}{32}$
 c) $\frac{1}{48}$ d) $\frac{1}{64}$
71. The ratio of volumes of two cones is 4: 5 and the ratio of the radii of their bases is 2: 3. What is the ratio of their vertical heights?
- a) 5: 6 b) 6: 5
 c) 9: 5 d) 5: 9
72. The length, breadth and height of a rectangular parallelepiped are in ratio 6: 3: 1. If the surface area of a cube is equal to the surface area of this

- parallelepiped, then what is the ratio of the volume of the cube to the volume of the parallelepiped?
- a) 1:1 b) 5:4
c) 7:5 d) 3:2
73. The outer and inner diameters of a circular pipe are 6 cm and 4 cm, respectively. If its length is 10 cm, then what is the total surface area in sq cm?
- a) 35 pie b) 110 pie
c) 150 pie d) None of these
74. The radii of two cylinders are in the ratio 2: 3 and their curved surface areas are in the ratio 5: 3. What is the ratio of their volumes?
- a) 20: 27 b) 10: 9
c) 9: 10 d) 27: 20
75. What are the dimensions (length, breadth and height, respectively) of a cuboid with volume 720 cu cm, surface area 484 sq cm and the area of the base 72 sq cm?
- a) 9, 8 and 10 cm b) 12, 6 and 10 cm
c) 18, 4 and 10 cm d) 30, 2 and 12 cm
76. What is the quantity of cloth required to roll up to form a right circular tent whose base is of radius 12 m and height 5 m?
- a) 40p sq m b) 60p sq m
c) 78p sq m d) 156p sq m
77. If the total surface area of a cube is 6 sq units, then what is the volume of the cube?
- a) 1 cu unit b) 2 cu units
c) 4 cu units d) 6 cu units
78. The volume of a hollow cube is $216x^3$. What surface area of the largest sphere which be enclosed in it?
- a) $18px^2$ b) $27px^2$
c) $36px^2$ d) $72px^2$
79. The diameter of a metallic sphere is 6 cm. The sphere is melted and drawn into a wire of uniform circular cross-section. If the length of the wire is 36m, then what is its radius equal to?
- a) 0.1 cm b) 0.01 cm
c) 0.0001 cm d) 1.0 cm
80. Consider the following statements If two parallel lines are intersected by a transversal, then
- I. each pair of corresponding angles are equal.
II. each pair of alternate are unequal.
- Which of the statements given above is/are correct?
- a) Only I b) Only II
c) Both I and II d) Neither I nor II
81. Let A and B be two points. What is the locus of the point P such that $\angle APB = 90^\circ$?
- a) The line AB itself
b) The point P itself
c) The circumference of the circle with AB as diameter
d) The line perpendicular to AB and bisecting AB
82. BAC is triangle with angle A = 90° . From A, a perpendicular AD is drawn on BC. Which one of the following is correct?
- a) Only angle $\angle ABC \sim \angle DAC$
b) Only angle $\angle DAC \sim \angle DBA$
c) Only angle $\angle ABC \sim \angle DBA \sim \angle DAC$
d) Only angle $\angle ABC \sim \angle DAB$ where \sim stands for the notation of similarity.
83. If the medians of two equilateral triangles are in the ratio 3: 2, then what is the ratio of their sides?
- a) 1: 1 b) 2: 3
c) 3: 2 d) 3: 2
84. The centroid of a $\triangle ABC$ is 8 cm from the vertex A. What is the length of the median of the triangle through A?
- a) 20 cm b) 16 cm
c) 12 cm d) 10 cm
85. The side AC of a triangle ABC is produced to D such that $BC = CD$. If $\angle ACB = 70^\circ$, then what is $\angle ADB$ equal to?
- a) 35° b) 45°
c) 70° d) 110°
86. Consider the following statements in respect of an equilateral triangle:
- The altitudes are congruent.
 - The three medians are congruent.
 - The centroid bisects the altitude.
- Which of the above statements are correct?
- a) 1 and 2 b) 2 and 3
c) 1 and 3 d) 1,2 and 3
87. Consider the following statements in respect of a quadrilateral.
- The line segments joining the mid-points of the two pairs of opposite sides bisect each other at the point of intersection.
 - The area of the quadrilateral formed by joining the midpoints of the four adjacent sides is half of the total area of the quadrilateral.
- Which of the statements given above is/are correct?
- a) Only I b) Only II
c) Both I and II d) Neither I nor II
88. Read the following information carefully and answer the given questions that follow.
- A piece of land is in the form of a parallelogram and the perimeter of the land is 86m. The length of one side exceeds the other by 13 m and one of the diagonals is 41m. What is the area of the parallelogram?

- a) 63 m² b) 96 m²
- c) 126 m² d) 252 m²

89. The diagonals of a trapezium are at right angles, and the slant sides, if produced, form an equilateral triangle with the greater of the two parallel sides. If the area of the trapezium is 16 square cm, then the distance between the parallel sides is
- a) 2 cm
 - b) 4 cm
 - c) 8 cm
 - d) Cannot be determined due to insufficient data

90.



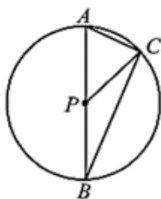
In the figure given above, what is $\angle BYX$ equal to?

- a) 85° b) 50°
- c) 45° d) 90°

91. A, B, C and D are four distinct points on a circle whose centre is at O. If angle OBD – angle CDB = angle CBD – angle ODB, then what is angle A equal to?
- a) 45° b) 60°
 - c) 120° d) 135°

92. What is the number of circles passing through a given pair of points?
- a) One
 - b) Two
 - c) More than two, but finite
 - d) Infinitely many

93. In the given figure, A and B are end points of diameter of a circle with centres at P and C is a point on the circumference of the circle such that $\angle ABC = 35^\circ$, then what is $\angle PCA$?



- a) 25° b) 30°
- c) 35° d) 55°

94. AC is the diameter of the circum circle of the cyclic quadrilateral ABCD. If $\angle BDC = 42^\circ$, then what is $\angle ACB$ equal to?

- a) 42° b) 45°
- c) 48° d) 58°

95. ABC is an equilateral triangle inscribed in a circle. D is any point on the arc BC. What is $\angle ADB$ equal to?
- a) 90° b) 60°
 - c) 45° d) None of the above

96. The cumulative frequency curve of a frequency distribution with 6 classes and total frequency 60 is a straight line.

Consider the following statements:

- I. The first and the last classes have a frequency of 10 each.
- II. Both the middle classes have a total frequency of 30.
- III. The frequency distribution does not have a mode.

Which of the above statements are correct?

- a) I and II b) I and III
- c) II and III d) I, II and III

97. The mean of 25 observations is 36. The mean of first 13 observations is 32 and that of last 13 observations is 39. What is the value of 13th observation?

- a) 20 b) 23
- c) 32 d) 40

98. With the help of histogram one can prepare

- a) frequency polygon
- b) frequency curve
- c) frequency distribution
- d) All of the above

99. Which one among the following statements is not correct?

- a) For size of readymade garments, mode is the best suitable measure
- b) For average rate of increase when the rate of population growth is given, geometric mean is best suitable
- c) For average rate of speed when different distances are covered by different rates of speed, harmonic mean is best suitable
- d) For average level of intelligence of students in a class, arithmetic mean is the best suitable

100. Which of the following are the examples of discrete variables?

- I. Number of errors per page in a book.
- II. Height of individuals measured in centimetre.
- III. Waiting time to failure of electric bulbs.
- IV. Number of leaves on branches of a tree.

Select the correct answer using the codes given below.

- a) Only I b) I and IV
- c) III and IV d) II and IV

ANSWER KEY

1.b	21.b	41.a	61.a	81.c
2.c	22.d	42.c	62.c	82.c
3.a	23.c	43.c	63.b	83.c
4.b	24.d	44.d	64.c	84.c
5.c	25.d	45.d	65.c	85.b
6.c	26.a	46.c	66.b	86.a
7.a	27.b	47.b	67.d	87.c
8.b	28.a	48.c	68.c	88.d
9.a	29.d	49.d	69.b	89.b
10.b	30.a	50.c	70.d	90.a
11.c	31.a	51.a	71.c	91.b
12.a	32.d	52.b	72.d	92.d
13.b	33.c	53.b	73.c	93.d
14.c	34.d	54.a	74.b	94.c
15.d	35.c	55.a	75.a	95.b
16.d	36.d	56.c	76.d	96.b
17.b	37.c	57.a	77.a	97.b
18.c	38.c	58.c	78.c	98.d
19.b	39.b	59.a	79.a	99.d
20.c	40.c	60.d	80.a	100.b

