MODEL TEST PAPER - 1

Direction: Consider the following for the next three (03) items :
A cube is inscribed in a sphere. A right circular cylinder is within the cube touching all the vertical faces. A right circular once is inside the cylinder. Their heights are same and the diameter of the cone is equal to that of the cylinder.

1.) What is the ratio of the volume of the sphere to that of cone?
(a) $6\sqrt{3} : 1$ (b) $7 : 2$
(c) $3\sqrt{3} : 1$ (d) $5\sqrt{3} : 1$

2.) What is the ratio of the volume of the cube to that of the cylinder?
(a) $4 : 3$ (b) $21 : 16$
(c) $14 : 11$ (d) $45 : 32$

3.) Consider the following statements:
1. The surface area of the sphere is $\sqrt{5}$ Times the curved surface area of the cone.
2. The surface area of the cube is equal to the curved surface area of the cylinder.

Which of the above statements is/are correct?
(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

Direction: Consider the following for the next three (03) items:
ABCD is a quadrilateral with AB = 9 cm, BC = 40 cm, CD = 28 cm, DA = 15 cm and angle ABC is a right – angle

4.) What is the area of triangle ADC?
(a) 126 cm^2 (b) 124 cm^2
(c) 122 cm^2 (d) 120 cm^2

5.) What is the area of quadrilateral ABCD?
(a) 300 cm^2 (b) 306 cm^2
(c) 312 cm^2 (d) 316 cm^2

6.) What is the difference between perimeter of triangle ABC and perimeter of triangle ADC?
(a) 4 cm (b) 5 cm
(c) 6 cm (d) 7 cm

Direction: Consider the following for the next two (02) items:
An equilateral triangle ABC is inscribed in a circle of radius $20\sqrt{3}$

7.) What is the length of the side of the triangle?
(a) 30 cm (b) 40 cm
(c) 50 cm (d) 60 cm

8.) The centroid of the triangle ABC is at a distance d from the vertex A. What is d equal to ?
(a) 15 cm^2 (b) 20 cm^2
(c) $20\sqrt{3}$ cm^2 (d) $30\sqrt{3}$ cm^2

Direction: Consider the following for the next two (02) items:
The sum of length, breadth and height of a cuboid is 22 cm and the length of its diagonal is 14 cm.

9.) What is the surface area of the cuboid?
(a) 288 cm^3 (b) 216 cm^3
(c) 144 cm^3 (d) Cannot be determined

10.) If S is sum of the cubes of the dimensions of the cuboid and V is its volume, then what is (S-3V) equal to?
(a) 572 cm^3 (b) 728 cm^3
(c) 1144 cm^3 (d) None

11.) A race has three parts. The speed and time required to complete the individual parts for a runner is displayed on the following chart:

	Part I	Part II	Part III
Speed (kmph	9	8	7.5
Time (minutes)	50	80	100

What is the average speed of this runner?

(a) 8.17 kmph (b) 8.00 kmph
(c) 7.80 kmph (d) 7.77 kmph

12.) If $\frac{a}{b+c} = \frac{b}{c+a} = \frac{c}{a+b}$, then which one of the following statements is correct?

(a) Each fraction is equal to 1 or -1.
(b) Each fraction is equal to 1/2 or 1.
(c) Each fraction is equal to 1/2 or -1.
(d) Each fraction is equal to 1.2 only.

13.) The number 3^{521} is divided by 8. What is the remainder?

(a) 1 (b) 3
(c) 7 (d) 9

14.) A prime number contains the digit X at unit's place. How many such digits of X are possible?

(a) 3 (b) 4
(c) 5 (d) 6

15.) If an article is sold at a gain of 6% instead of a loss of 6% the seller gets Rs. 6 more. What is the cost price of the article?

(a) Rs. 18 (b) Rs. 36
(c) Rs. 42 (d) Rs. 50

16.) A field can be reaped by 12 men or 18 women in 14 days. In how many days can 8 men and 16 women reap it?

(a) 26 days (b) 24 days
(c) 9 days (d) 8 days

17.) If $3^x = 4^y = 12^z$, then 'z' is equal to

(a) xy (b) $x + y$
(c) $\frac{xy}{x+y}$ (d) $4x + 3y$

18.) If $(4a + 7b)(4c - 7d) = (4a - 7b)(4c + 7d)$, then which one of the following is correct ?

(a) $\frac{a}{b} = \frac{c}{d}$ (b) $\frac{a}{d} = \frac{c}{b}$
(c) $\frac{a}{b} = \frac{d}{c}$ (d) $\frac{4a}{7b} = \frac{c}{d}$

19.) Given that the polynomial $(x^2 + ax + b)$ leaves that same remainder when by $(x - 1)$ or $(x + 1)$ What are the values of a and b respectively?

(a) 4 and 0 (b) 0 and 3
(c) 3 and 0 (d) 0 and any integer

20.) Tushar takes 6 hours to complete a piece of work, while Amar completes the same work in 10 hours. If both of them work together, then what is the time required to complete the work?

(a) 3 hours
(b) 3 hours 15 minutes
(c) 3 hours 30 minutes
(d) 3 hours 45 minutes

21.) What is the value of $2+\sqrt{2+\sqrt{2+\sqrt{\ldots\ldots}}}$?

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

22.) In an examination, 52% candidates failed in English and 42% failed in Mathematics. If 17% failed in both the subjects, then what percent passed in both the subjects?
(a) 77 (b) 58
(c) 48 (d) 23

23.) A man who recently died left a sum of Rs. 3,90,000 to be divided among his wife, five sons and four daughters. He directed that each son should receive 3 times as much as each daughter receives and that each daughter receives and that each daughter should receive twice as much as their mother receives. What was the wife's share?
(a) Rs 14, 000 (b) Rs 12, 000
(c) Rs 10, 000 (d) Rs 9, 000

24.) What is the least number of complete years in which a sum of money put out at 40% annual compound interest will be more than trebled?
(a) 3 (b) 4
(c) 5 (d) 6

25.) A person divided a sum of Rs. 17,200 into three parts and invested at 5%. 6% and 9^ per annum simple interest. At the end of two years, he got the same interest on each part of money. What is the money invested at 9%?
(a) Rs 3, 200 (b) Rs 4, 000
(c) Rs 4, 800 (d) Rs 5, 000

26.) The corners of a square of side 'a' are cut away so as to form a regular octagon. What is the side of the octagon?
(a) $a(\sqrt{2}-1)$ (b) $a(\sqrt{3}-1)$
(c) $\frac{a}{\sqrt{2}+2}$ (d) $a/3$

27.) Three consecutive integers form the lengths of a right-angled triangle. How many sets of such three consecutive integers is/are possible?
(a) Only one
(b) Only two
(c) Only three
(d) Infinitely many

28.) Two circles are drawn with the same centre. The circumference of the smaller circle is 44 cm and that of the bigger circle is double the smaller one. What is the area between these two circles?
(a) 154 cm^2 (b) 308 cm^2
(c) 462 cm^2 (d) 616 cm^2

29.) A rectangular red carpet of size 6 ft × 12 ft has a dark red border 6 inches wide. What is the area of the dark red border?
(a) 9 ft^2 (b) 15 ft^2
(c) 17 ft^2 (d) 18 ft^2

30.) The perimeter of a right-angled triangle is k times the shortest side. If the ratio of the other side to hypotenuse is 4 : 6, then what is the value of k?
(a) 2 (b) 3
(c) 4 (d) 5

31.) A 12 m long wire is cut into two pieces, one of which is bent into a circle and the other into a square enclosing the circle. What is the radius of the circle?
(a) $\frac{12}{\pi+4}$ (b) $\frac{6}{\pi+4}$
(c) $\frac{3}{\pi+4}$ (d) $\frac{6}{\pi+2\sqrt{2}}$

32.) The angles of a triangle are in the ratio 1 : 1 : 4. If the perimeter of the triangle is k times its largest side, then what is the value of k?

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

(c) $2+\frac{2}{\sqrt{3}}$ (d) 2

33.) The hypotenuse of a right-angled triangle 10 cm and its area is 24 cm^2. If the shorts side is halved and the longer side is double, the new hypotenuse becomes

(a) $\sqrt{245}$ cm (b) $\sqrt{255}$ cm

(c) $\sqrt{265}$ cm (d) $\sqrt{275}$ cm

34.) In a circle of radius 8 cm, AB and AC are two chords such that AB = AC = 12 cm. What is the length of chord BC?

(a) $2\sqrt{6}$ cm (b) $3\sqrt{6}$ cm

(c) $3\sqrt{7}$ cm (d) $6\sqrt{7}$ cm

35.) Consider the following statements:

1. An isosceles trapezium is always cyclic.
2. Any cyclic parallelogram is a rectangle.

Which of the above statements is/are correct?

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

36.) A ladder is resting against a vertical wall and its bottom is 2.5 m away from the wall. If it slips 0.8 m down the wall, then its bottom will move away from the wall by 1.4 m. What is the length of the ladder?

(a) 6.2 m (b) 6.5 m

(c) 6.8 m (d) 7.5 m

37.) Two equal circles intersect such that each passes through the centre of the other. If the length of the common chord of the circles is $10\sqrt{3}$ cm, then what is the diameter of the circle?

(a) 10 cm (b) 15 cm

(c) 20 cm (d) 30 cm

38.) Consider the following statements:

1. The number of circles that can be drawn through three non-collinear points is infinity.
2. Angle formed in minor segment of a circle is acute.

Which of the above statements is/are correct?

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

39.) Consider the following inequalities in respect of any triangle ABC:

1. AC – AB < BC
2. BC – AC < AB
3. AB – BC < AC

Which of the above are correct?

(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

40.) Consider the following statements:

1. The perimeter of a triangle is greater than the sum of its three medinas.
2. In any triangle ABC, if D is any point on BC, then AB + BC + CA > 2AD.

Which of the above statements is/are correct?

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

41.) Consider the following grouped frequency distribution:

x	f
0 - 10	8
10 - 20	12
20 - 30	10
30 - 40	P
40 - 50	9

If the mean of the above data is 25.2, then what is the value of p?

(a) 9 (b) 10
(c) 11 (d) 12

42.) Consider the following frequency distribution:

x	f
8	6
5	4
6	5
10	8
9	9
4	6
7	4

What is the median for the distribution?

(a) 6 (b) 7
(c) 8 (d) 9

43.) The average of 50 consecutive natural numbers is x. What will be the are average when the next four natural numbers are also included?

(a) $x + 1$ (b) $x + 2$
(c) $x + 4$ (d) $x + \frac{x}{54}$

44.) Consider two-digit numbers which remain the same when the digits interchange their positions. What is the average of such two-digit numbers?

(a) 33 (b) 44
(c) 55 (d) 66

45.) Diagrammatic representation of data includes which of the following?

1. Bar diagram
2. Pie-diagram
3. Pictogram

Select the correct answer using the code given below:

(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

46.) The data collected from which one of the following methods is not a primary data?

(a) By direct personal interviews
(b) By indirect personal interviews
(c) By schedules sent through enumerators
(d) From published thesis

47.) The monthly expenditure of a person is Rs. 6000. The distribution of expenditure on various items is as follows:

Item of expenditure	Amount (in Rs.)
Food	2000
Clothing	660
Fuel and rent	1200
Education	480
Miscellaneous	1660

If the above data is represented by a percentage bar diagram of height 15 cm, then what are the lengths of the two segments of the bar diagram corresponding to education and miscellaneous respectively?

(a) 1.25 cm and 5 cm
(b) 1.2 cm and 4.15 cm
(c) 1.2 cm and 3.5 cm
(d) 4.15 cm and 6 cm

48.) If the mean of m observations out of n observations is n and the mean of remaining observations is m, then what is the mean of all n observations?

(a) $2m - \frac{m^2}{n}$ (b) $2m + \frac{m^2}{n}$
(c) $m - \frac{m^2}{n}$ (d) $m + \frac{m^2}{n}$

49.) Which one of the following pairs is correctly matched?

(a) Median — Graphical location
(b) Mean— Graphical location
(c) Geometric mean — Ogive
(d) Mode — Ogive

50.) The following pairs relate to frequency distribution of a discrete variable and its frequency polygon.
Which one of the following pairs is not correctly matched?

(a) Base line of the polygon — X-axis
(b) Ordinates of the frequencies — Class vertices of the polygon
(c) Abscissa of the vertices of the polygon — Class marks of the frequency distribution
(d) Area of the polygon — Total frequency of the distribution

51.) In a rectangle, length is three times its breadth. If the length and the breadth of the rectangle are increased by 30% and 100% respectively, then its perimeter increases by

(a) $\frac{40}{3}$ % (b) 20%
(c) 25% (d) 27%

52.) What is the percentage decrease in the area of a triangle if its each side is halved?

(a) 75% (b) 50%
(c) 25% (d) No change

53.) The volume of a spherical balloon is increased by 700%. What is the percentage increase in its surface area?

(a) 300% (b) 400%
(c) 450% (d) 500%

54.) If the lengths of two parallel chords in a circle of radius 10 cm are 12 cm and 16 cm, then what is the distance between these two chords?

(a) 1 cm or 7 cm
(b) 2 cm or 14 cm
(c) 3 cm or 21 cm
(d) 4 cm or 28 cm

55.) Considering two opposite vertices of a square of side 'a' as centres, two circular arcs are drawn within the square joining the other two vertices, thus forming two sectors. What is the common area in these two sectors?

(a) $a^2(\pi + \frac{1}{2})$ (b) $a^2(\pi - \frac{1}{2})$
(c) $a^2(\frac{\pi}{2} - 1)$ (d) $a^2(\frac{\pi}{2} + 1)$

56.) What is $\frac{(x-y)^3+(y-2)^3+(z-x)^3}{3(x-y)(y-z)(z-x)}$ equal to?

(a) 1 (b) 0
(c) 1/3 (d) 3

57.) If $a^x = b^y = c^z$ and $b^2 = ac$, then what is $\frac{1}{x} + \frac{1}{z}$ equal to ?

(a) $1/y$ (b) $-1/y$
(c) $2/y$ (d) $-2/y$

58.) If p and q are the roots of the equation $x^2 - 15x + r = 0$ and $p - q = 1$, then what is the value of ?

(a) 55 (b) 56
(c) 60 (d) 64

59.) For the inequation $x^2 - 7x + 12 > 0$, which one of the following is correct ?

(a) $3 < x < 4$
(b) $-\infty < x < 3$ only
(c) $4 < x < \infty$ only
(d) $-\infty < x < 3$ or $4 < x < \infty$

60.) The expression 52n – 23n has a factor?

(a) 3 (b) 7
(c) 17 (d) None

61.) If $tan\ x = 1, 0 < x < 90^o$, then what is the value of $2\ sin\ x\ cos\ x$?

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

62.) What is the value of $sin\ 46°\ cos\ 44° + s\ 46°\ sin\ 44°$?

(a) $\sin 2^o$ (b) 0
(c) 1 (d) 2

63.) Suppose $0 < \theta < 90^o$, then for every θ 4 sin2 θ + 1 is greater than or equal to ?

(a) 2 (b) 4 sin θ
(c) 4 cos θ (d) 4 tan θ

64.) Consider a regular hexagon ABCDEF. Two towers are situated at B and C.
The angle of elevation from A to the top of the tower at B is 30^o, and the angle of elevation to the top of the tower at C is 45^o.
What is the ratio of the height of towers at B and C?

(a) $1 : \sqrt{3}$ (b) 1 : 3
(c) 1 : 2 (d) $1 : 2\sqrt{3}$

65.) What is the value of $\tan 1^o \tan 2^o \tan 3^o$ ..... Tan 89^o?

(a) 0 (b) 1
(c) 2 (d) ∞

66.) There are two parallel streets each directed north to south. A person in the first street travelling from south to north wishes to take the second street which is on his right side. At some place, he makes a 150^o turn to the right and he travels for 15 minutes at the speed of 20 km/hr. After that he takes a left turn of 60^o and travels for 20 minutes at the speed of 30 km/hr in order to meet the second street.
What is the distance between the two streets?

(a) 7.5 km (b) 10.5 km
(c) 12.5 km (d) 15 km

67.) If $3 \tan \theta = \cot \theta$ where $0 < \theta < \frac{\pi}{2}$, then what is the value of θ ?

(a) $\frac{\pi}{6}$ (b) $\frac{\pi}{4}$
(c) $\frac{\pi}{3}$ (d) $\frac{\pi}{2}$

68.) What is the value of $sin^2 25° + sin^2 65°$?

(a) 0 (b) 1
(c) 2 (d) 4

69.) What is the value of $sin^6\theta + cos^6\theta + 3\ sin^2\theta\ cos^2\theta - 1$?

(a) 0 (b) 1
(c) 2 (d) 4

70.) Consider the following for real numbers α, β, γ and δ ?

1. $\sec \alpha = 1/4$
2. $\tan \beta = 20$
3. $\operatorname{cosec} \gamma = 1/2$
4. $\cos \delta = 2$

How many of the above statements are not possible?

(a) one (b) two
(c) three (d) four

Direction: Consider the following for the next three (03) items:

In a certain town of population size 1,00,000 three types of newspapers (I, II and III) are available. The percentages of the people in the town who read these papers are as follows:

Newspaper	Proportion of readers
I	10%
II	30%
III	5%
Both I and II	8%
Both II and III	4%
Both I and III	2%
All the three (I, II and III)	1%

71.) What is the number of people who read only one newspaper?

(a) 20, 000 (b) 25, 000
(c) 30, 000 (d) 35, 000

72.) What is the number of people who read at least two newspaper?

(a) 12, 000 (b) 13, 000
(c) 14, 000 (d) 15, 000

73.) What is the number of people who do not read any of these three newspapers?

(a) 62,000 (b) 64, 000
(c) 66, 000 (d) 68, 000

74.) What is the unit place digit in the expansion of 7^{73} ?

(a) 1 (b) 3
(c) 7 (d) 9

75.) Suppose n is a positive integer such that $(n^2 + 48)$ is a perfect square. What is the number of such n?

(a) One (b) Two
(c) Three (d) Four

76.) For $x = \frac{4\sqrt{6}}{\sqrt{2}+\sqrt{3}}$, what is the value of $\frac{x+2\sqrt{2}}{x-2\sqrt{2}} + \frac{x+2\sqrt{3}}{x-2\sqrt{3}}$?

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

77.) x, y and z are three numbers such that x is 30% of z and y is 40% of z. If x is p% of y, then what is the value of p?

(a) 45 (b) 55
(c) 65 (d) 75

78.) A plane is going in circles around an airport. The plane takes 3 minutes to complete one round. The angle of elevation of the plane from a point P on the ground at time t seconds is equal to that at time (t + 30) seconds. At time (t + x) seconds, the plane flies vertically above the point P. What is x equal to?

(a) 75 s (b) 90 s
(c) 105 s (d) 135 s

79.) Consider the following statements in respect of two integers p and q (both > 1) which are relatively prime:

1. Both p and q may be prime numbers.
2. Both p and q may be composite numbers
3. one of p and q may be prime and the other composite.

Which of the above statements are correct?

(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

80.) In a class of 100 students, the average weight is 30 kg. If the average weight of the girls is 24 kg and that of the boys is 32 kg, then what is the number of girls in the class?

(a) 25 (b) 26
(c) 27 (d) 28

81.) For any two real numbers a and b. $\sqrt{(a-b)^2} + \sqrt{(b-a)^2}$ is

(a) always zero
(b) never zero
(c) positive only if $a \neq b$
(d) positive if an only if $a > b$

82.) If $a : b = c : d = 1 : 6$, then what is the value of $\frac{a^2+c^2}{b^2+d^2}$?

(a) 1/600 (b) 1/60
(c) 1/36 (d) 1/6

83.) What is $0.\overline{53} + 0.\overline{53}$ equal to ?

(a) $1.0\overline{68}$ (b) $1.06\overline{8}$
(c) $1.\overline{068}$ (d) 1.068

84.) The inequality $3^N > N^3$ holds when

(a) N is any natural number
(b) N is natural number greater than 2
(c) N is a natural number greater than 3
(d) N is a natural number except 3

85.) Which one of the following is an irrational number?

(a) $\sqrt{59049}$
(b) $\frac{231}{593}$
(c) 0.45454545.....
(d) 0.12112211122211111222222 .....

86.) What is the remainder when $(17^{29} + 19^{29})$ is divided by 18 ?

(a) 6 (b) 2
(c) 1 (d) 0

87.) What is the largest value of n such that 10^n divides the product $2^5 \times 3^3 \times 4^8 \times 4^3 \times 6^7 \times 7^6 \times 8^{12} \times 9^9 \times 10^6 \times 15^{12} \times 20^{14} \times 22^{11} \times 25^{15}$?

(a) 65 (b) 55
(c) 50 (d) 45

88.) How many pairs (A, B) are possible in the number 479865AB if the number is divisible by 9 and it is given that the last digit of the number is odd?

(a) 5 (b) 6
(c) 9 (d) 11

89.) Consider the multiplication 999 × abc = def132 in decimal notation, where a, b, c, d, e and f are digits. What are the values of a, b, c, d, e and f respectively?

(a) 6, 6, 8, 6, 8, 7
(b) 8, 6, 8, 6, 7, 8
(c) 6, 8, 8, 7, 8, 6
(d) 8, 6, 8, 8, 6, 7

90.) Three cars A, B and C started from a point at 5 pm, 6 pm and 7 pm respectively and travelled at uniform speeds of 60 km/hr, 80 km/hr and x km/hr respectively in the same direction. If all the three met at another point at the same instant during their journey, then what is the value of x?

(a) 120 (b) 110
(c) 105 (d) 100

91.) Priya's age was cube of an integral number (different from 1) four years ago and square of an integral number after four years. How long should she wait so that her age becomes square of a number in the previous year and cube of a number in the next year?

(a) 7 years (b) 12 years
(c) 14 years (d) 21 years

92.) Which of the following statements is not true?

(a) The difference of two prime numbers, both greater than 2, is divisible by 2.
(b) For two different integers m, n and a prime number p, if p divides the product m × n, then p divides either m or n.
(c) If a number is of the form 6n – 1 (n being a natural number), then its is a prime number.
(d) There is only one set of three prime numbers such that there is a gap of 2 between two adjacent prime numbers.

93.) For $x > 0$, what is the minimum value of $x + \frac{x+2}{2x}$?

(a) 1
(b) 2
(c) $2\frac{1}{2}$
(d) cannot be determined

94.) If $\frac{1+px}{1-px}\sqrt{\frac{1-qx}{1+qx}} = 1$, then what are the non-zero solutions of x?

(a) $\pm\frac{1}{p}\sqrt{\frac{2p-q}{q}}, 2p \neq q$
(b) $\pm\frac{1}{pq}\sqrt{p-q}, p \neq q$
(c) $\pm\frac{p}{q}\sqrt{p-q}, p \neq q$
(d) $\pm\frac{p}{q}\sqrt{2p-q}, 2p \neq q$

95.) In a hostel the rent per room is increased by 20%. If number of rooms in the hostel is also increased by 20% and the hostel is always full, then what is the percentage change in the total collection at the cash counter?

(a) 30% (b) 40%
(c) 44% (d) 48%

96.) Radha and Hema are neighbours and study in the same school. Both of them use bicycles to go to the school. Radha's speed is 8 km/hr whereas Hema's speed is 10 km/hr. Hema takes 9 minutes less than Radha to reach the school. How far is the school from the locality of Radha and Hema?

(a) 5 km (b) 5.5 km
(c) 6 km (d) 6.5 km

97.) Which of the following pair of numbers is the solution of the equation $3^{x+2} + 3^{-x} = 10$?

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

98.) It is given that $\log_{10} 2 = 0.301$ and $\log_{10} 3 = 0.477$. How many digits are there in $(108)^{10}$?

(a) 19 (b) 20
(c) 21 (d) 22

99.) The sum of three prime numbers is 100. If one of them exceeds another by 36, then one of the numbers is

(a) 17 (b) 29
(c) 43 (d) None

100.) If a, b and c are positive integers such that $\frac{1}{1+\frac{1}{b+\frac{1}{c+\frac{1}{2}}}} = \frac{16}{23}$ then what is the mean of a, b and c?

(a) 1 (b) 2
(c) 1.33 (d) 2.33

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

MODEL TEST PAPER - 2

1.) The highest four-digit number which is divisible by each of the numbers 16, 36, 45, 48 is
(a) 9180 (b) 9360
(c) 9630 (d) 9840

2.) If $x = y^a$, $y = z^b$ and $z = x^c$, then the value of abc is
(a) 1 (b) 2
(c) -1 (d) 0

3.) If $x = 2 + 2^{\frac{2}{3}} + 2^{\frac{1}{2}}$, then the value of the expression $x^3 - 6x^2 + 6x$ will be
(a) 2 (b) 1
(c) 0 (d) -2

4.) How many five-digit numbers of the form $XXYXX$ is/are divisible by 33?
(a) 1 (b) 3
(c) 5 (d) Infinite

5.) A five-digit number $XY235$ is divisible by 3 where X and Y are digits satisfying $X + y \leq 5$. What is the number of possible pairs of values of (X, Y) ?
(a) 5 (b) 6
(c) 7 (d) 9

6.) If $x^2 - 6x - 27 > 0$, then which one of the following is correct?
(a) $-3 < x < 9$
(b) $x < 9$ or $x > -3$
(c) $x > 9$ or $x < -3$
(d) $x < -3$ only

7.) The number of divisors of the number 38808, exclusive of the divisors 1 and itself, is
(a) 74 (b) 72
(c) 70 (d) 68

8.) HCF and LCM of two polynomials are (x+3) and (x^3 - $9x^2$ - x + 105) respectively. If one of the two polynomials is x^2 - 4x -21, then the other is
(a) $x^2 + 2x - 21$ (b) $x^2 + 2x - 15$
(c) $x^2 - 2x - 15$ (d) $x^2 - x - 15$

9.) If α and β are two real numbers such that $\alpha + \beta = -\frac{p}{q}$ and $\alpha\beta = \frac{r}{q}$, where $1 < p < q < r$, then which one of the following is the greatest?
(a) $\frac{1}{\alpha+\beta}$ (b) $\frac{1}{\alpha} + \frac{1}{\beta}$
(c) $-\frac{1}{\alpha\beta}$ (d) $\frac{\alpha\beta}{\alpha+\beta}$

10.) Two workers 'A' and 'B' working together completed a job in 5 days. Had 'A' worked twice as efficiently as he actually did and 'B' worked one-third as efficiently as the actually did, the work would have completed in 3 days. In how many days could 'A' alone complete the job?
(a) $3\frac{1}{2}$ days (b) $4\frac{1}{6}$ days
(c) $5\frac{1}{2}$ days (d) $6\frac{1}{4}$ days

11.) If $x^6 + \frac{1}{x^6} = k\left(x^2 + \frac{1}{x^2}\right)$, then k is equal to

(a) $\left(x^2 - 1 + \frac{1}{x^2}\right)$

(b) $\left(x^4 - 1 + \frac{1}{x^4}\right)$

(c) $\left(x^4 + 1 + \frac{1}{x^4}\right)$

(d) $\left(x^4 - 1 - \frac{1}{x^4}\right)$

12.) If the sum of the squares of three consecutive natural numbers is 110, then the sum of their cubes is

(a) 625 (b) 654
(c) 684 (d) 725

13.) The product of two integers p and q, where $p > 6$ and $q > 60$, is 7168 and their HCF is 16. The sum of these two integers is

(a) 256 (b) 184
(c) 176 (d) 164

14.) If $\log_{10} 2 = 0.3010$ and $\log_{10} 3 = 0.4771$, then the value of $\log_{100}(0.722)$ is equal to

(a) 0.9286 (b) $\bar{1}$.9286
(c) 1.8572 (d) $\bar{1}$.8572

15.) If $a^x = b^y = c^x$ and $abc = 1$, then the value of $\frac{1}{x} + \frac{1}{y} + \frac{1}{z}$ will be equal to

(a) -1 (b) 0
(c) 1 (d) 3

16.) If α and β are the roots of the equation $ax^2 + bx + c = 0$, then the value of $\frac{1}{a\alpha+b} + \frac{1}{a\beta+b}$ is

(a) $\frac{a}{bc}$ (b) $\frac{b}{ac}$
(c) $\frac{c}{ab}$ (d) $\frac{1}{abc}$

17.) Consider the following statements in respect of three 3-digit numbers XYZ, YZX and ZXY :

1. The sum of the numbers is not divisible by (X + Y + Z).
2. The sum of the numbers is divisible by 111.

Which of the above statements is/are correct?

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

18.) The number of all pairs (m, n), where m and n are positive integers, such that $\frac{1}{m} + \frac{1}{n} - \frac{1}{mn} = \frac{2}{5}$ is

(a) 6 (b) 5
(c) 4 (d) 2

19.) If $a = xy^{p-1}$, $b = yz^{q-1}$, $c = zx^{r-1}$, the $a^{q-r}\, b^{r-q} c^{p-q}$ is equal to

(a) abc (b) xyz
(c) 0 (d) None

20.) The number of sides of two regular polygons are in the ratio 5 : 4. The difference between their interior angles is 9o. Consider the following statements :

1. One of them is a pentagon and the other is a rectangle.
2. One of them is a decagon and the other is an octagon.
3. The sum of their exterior angles is 720°.

Which of the above statements is/are correct?

(a) 1 only (b) 2 only
(c) 1 and 3 (d) 2 and 3

21.) The minimum value of the expression $2x^2 + 5x + 5$ is
(a) 5 (b) 15/8
(c) -15/8 (d) 0

22.) If H is the harmonic mean of P and Q then the value of $\frac{H}{P} + \frac{H}{Q}$ is
(a) 1 (b) 2
(c) $\frac{P+Q}{PQ}$ (d) $\frac{PQ}{P+Q}$

23.) The sum of all possible products taken two at a time out of the numbers ± 1, ± 2, ± 3, ± 4 is
(a) 0 (b) -30
(c) 30 (d) 55

24.) The remainder when $3x^3 - 2x^2y - 13xy^2 + 10y^3$ is divided by $(x - 2y)$ is equal to
(a) Zero (b) y
(c) $y - 5$ (d) $y + 3$

25.) If $ab + bc + ca = 0$, then the value of $\frac{(b^2-ca)(c^2-ab) + (a^2-bc)(b^2-ca)}{(a^2-bc)(b^2-ca)(c^2-ab)}$ is
(a) -1 (b) 0
(c) 1 (d) 2

26.) What is the principal amount which earns ₹ 210 as compound interest for the second year at 5% per annum?
(a) ₹ 2000 (b) ₹ 3200
(c) ₹ 4000 (d) ₹ 4800

27.) In an examination, 50% of the candidates failed in English, 40% failed in Hindi and 15% failed in both the subjects. The percentage of candidates who passed in both English and Hindi is
(a) 20% (b) 25%
(c) 60% (d) 75%

28.) A train 100 m long passes a platform 100 m long in 10 seconds. The speed of the train is
(a) 36 kmph (b) 45 kmph
(c) 54 kmph (d) 72 kmph

29.) A cyclist covers his first 20 km at an average speed of 40 kmph, another 10 km at an average speed of 10 kmph and the last 30 km at an average speed of 40 kmph. Then the average speed of the entire journey is
(a) 20 kmph (b) 26.67kmph
(c) 28.24 kmph (d) 30 kmph

30.) In a race of 1000 m, A beats B by 150 m, while in another race of 3000 m, C beats D by 400 m. Speed of B is equal to that of D. (Assume that A, B, C and D run with uniform speed in all the events). If A and C participate in a race of 6000 m, then which one of the following is correct?
(a) A beats C by 250 m
(b) C beats A by 250 m
(c) A beats C by 115.38 m
(d) C beats A by 115.38 m

31.) The sum of ages of a father, a mother, a son Sonu and daughters Savita and Sonia is 96 years. Sonu is the youngest member of the family. The year Sonu was born, the sum of the ages of all the members of the family was 66 years. If the father's age now is 6 times that of Sonu's present age, then 12 years hence, the father's age will be

(a) 44 years (b) 45 years
(c) 46 years (d) 48 years

32.) 'A' is thrice as good a workman as 'B' and takes 10 days less to do a piece of work than 'B' takes. The number of days taken by 'B' alone to finish the work is

(a) 12 (b) 15
(c) 20 (d) 30

33.) Out of 85 children playing badminton or table tennis or both, the total number of girls in the group is 70% of the total number of boys in the group. The number of boys playing only badminton is 50% of the number of boys and the total number of boys playing badminton is 60% of the total number of boys. The number of children playing only table tennis is 40% of the total number of children and a total of 12 children play badminton and table tennis both. The number of girls playing only badminton is

(a) 14 (b) 16
(c) 17 (d) 35

34.) A person bought two articles X and Y from a departmental store. The sum of prices before sales tax was Rs. 130. There was no sales tax on the article X and 9% sales tax on the article Y. The total amount the person paid, including the sales tax was Rs. 136.75. What was the price of the article Y before sales tax?

(a) Rs. 75 (b) Rs. 85
(c) Rs. 122 (d) Rs. 125

35.) According to Mr. Sharma's will, half of his property goes to his wife and the rest is equally divided between his two sons, Ravi and Raj. Some years later, Ravi dies and leaves half of his property to his widow and rest to his brother Raj. When Raj dies he leaves half of his property to his widow and remaining to his mother, who is still alive. The mother now owns Rs. 88,000 worth of the property. The total worth of the property of Mr. Sharma was

(a) Rs 1,00,000 (b) Rs 1,24,000
(c) Rs 1,28,000 (d) Rs 1,32,000

36.) X bought 4 bottles of lemon juice and Y bought one bottle of orange juice. Orange juice per bottle costs twice the cost of lemon juice per bottle. Z bought nothing but contributed Rs. 50 for his share of the drink which they mixed together and shared the cost equally. If Z's Rs. 50 is covered from his share, then what is the cost of one bottle of orange juice?

(a) Rs. 75 (b) Rs. 50
(c) Rs. 46 (d) Rs. 30

37.) Ten (10) years before, the ages of a mother and her daughter were in the ratio 3:1. Ion another 10 years from now, the ratio of their ages will be 13:7. What are their present ages?

(a) 39 years,21 years
(b) 55 years, 25 years
(c) 75 years, 25 years
(d) 49 years, 31 years

38.) In a class of 60 boys, there are 45 bots who play chess and 30 boys who play carrom. If every boy of the class plays at least one of the two games, then how many boys play carrom only?

(a) 30 (b) 20
(c) 15 (d) 10

39.) Two equal amounts were borrowed at 5% and 4% simple interest. The total interest after 4 years amounted to ₹ 405. What was the total amount borrowed?

(a) ₹ 1075 (b) ₹ 1100
(c) ₹ 1125 (d) ₹ 1150

40.) Twelve (12) men work 8 hours per day and require 10 days to build a wall. If 8 men are available, how many hours per day must they work to finish the work in 8 days?

(a) 10 hours (b) 12 hours
(c) 15 hours (d) 18 hours

41.) A milk vendor bought 28 litres of milk at the rate of ₹ 8.50 per litre. After adding some water he sold the mixture at the same price. If his gain is 12.5%, how much water did he add?

(a) 4.5 litres (b) 4 litres
(c) 3.5 litres (d) 3 litres

42.) The minute hand of a clock overtakes the hour hand after every 72 minutes of correct time. How much time does the clock lose or gain in a day of normal time?

(a) Lose $121\frac{9}{11}$ minutes
(b) Lose $157\frac{1}{11}$ minutes
(c) Gain $121\frac{9}{11}$ minutes
(d) Gain $157\frac{1}{11}$ minutes

43.) A thief steals a car parked in a house and goes away with a speed of 40 kmph. The theft was discovered after half an hour and immediately the owner sets off in another car with a speed of 60 kmph. When will the owner meet the thief?

(a) 55 km from the owner's house and one hour after the theft.
(b) 60 km from the owner's house and 1.5 hours after the theft
(c) 60 km from the owner's house and 1.5 hours after the discovery of the theft
(d) 55 km from the owner's house and 1.5 hours after the theft

44.) X and Y together can finish a job in 6 days. X can alone do the same job in 12 days. How long will Y alone take to do the same job?

(a) 16 days (b) 12 days
(c) 10 days (d) 8 days

45.) Twelve (12) persons can paint 10 identical rooms in 16 days. In how many days can 8 persons paint 20 such rooms?
(a) 12 (b) 24
(c) 36 (d) 48

46.) There are n zeros appearing immediately after the decimal point in the value of $(0.2)^{25}$. It is given that the value of $\log_{10} 2 = 0.30103$. The value of n is
(a) 25 (b) 19
(c) 18 (d) 17

47.) The ratio of the sum and difference of the ages of the father and the son is 11 : 3. Consider the following statements :
1. The ratio of their ages is 8 : 5.
2. The ratio of their ages after the son attains twice the present age will be 11 : 8.

Which of the statements given above is/are correct?
(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

48.) The solution of linear inequalities $x + y \geq 5$ and $x - y \leq 3$ lies
(a) Only in the first quadrant
(b) In the first and second quadrants
(c) In the second and third quadrants
(d) In the third and fourth quadrants

49.) It is given that the equations $x^2 - y^2 = 0$ and $(x-a)^2 + y^2 = 1$ have single positive solution. For this, the value of 'a' is
(a) $\sqrt{2}$ (b) 2
(c) $-\sqrt{2}$ (d) 1

50.) If α, β and γ are the zeros of the polynomial $f(x) = ax^3 + bx^2 + cx + d$, then $\propto^2 + \beta^2 + \gamma^2$ is equal to
(a) $\frac{b^2-ac}{a^2}$ (b) $\frac{b^2-2ac}{a}$
(c) $\frac{b^2-2ac}{b^2}$ (d) $\frac{b^2-2ac}{a^2}$

Consider the following for the next 04 (four) items that follow :

In an examination of Class XII, 55% students passed in Biology, 62% passed in Physics, 60% passed in Chemistry, 25% passed in Physics and Biology, 30% passed in Physics and Chemistry, 28% passed in biology and Chemistry. Only 2% failed in all the subjects.

51.) What percentage of students passed in all the three subjects?
(a) 6 (b) 5
(c) 4 (d) 3

52.) What percentage of students passed in exactly one subject?
(a) 21 (b) 23
(c) 25 (d) 27

53.) If the number of students is 360, then how many passed in at least two subjects?
(a) 270 (b) 263
(c) 265 (d) 260

54.) What is the ratio of number of students who passed in both Physics and Chemistry to number of students who passed in both Biology and Physics but not Chemistry?
(a) 7 : 10 (b) 10 : 7
(c) 9 : 7 (d) 7 : 9

55.) Data on ratings of hotels in a city is measured on
(a) Normal scale
(b) Ordinal scale
(c) Interval scale
(d) Ratio scale

56.) The average marks of section A are 65 and that of section B are 70. If the average marks of both the sections combined are 67, then the ratio of number of students of section A to that of section B is
(a) 3 : 2 (b) 1 : 3
(c) 3 : 1 (d) 2 : 3

57.) The median of 19 observations is 30. Two more observations are made and the values of these are 8 and 32. What is the median of the 21 observations?
(a) 32
(b) 30
(c) 20
(d) Cannot be determined due to insufficient data

58.) As the number of observations and classes increases, the shape of a frequency polygon
(a) Tends to become jagged
(b) Tends to become increasingly smooth
(c) Stays the same
(d) Varies only if data become more reliable

59.) Let $\bar{x}_1$ and $\bar{x}_2$ (where $\bar{x}_2 > \bar{x}_1$) be the means of two sets comprising n_1 and n_2 (where $n_2 < n_1$) observations respectively. If $\bar{x}$ is the mean when they are pooled, then which one of the following is correct?
(a) $\bar{x}_1 < \bar{x} < \bar{x}_2$
(b) $\bar{x} > \bar{x}_2$
(c) $\bar{x} < \bar{x}_1$
(d) $(\bar{x}_1 - \bar{x}) + (\bar{x}_2 - \bar{x}) = 0$

60.) Consider the following statements :
Statement I :
Median can be computed even when the end intervals of a frequency distribution are open.
Statement II :
Median is a positional average.
Which one of the following is correct in respect of the above statements?
(a) Both Statement I and Statement II are true and Statement II is the correct explanation of Statement I
(b) Both Statement I and Statement II are true and Statement II is not the correct explanation of Statement I
(c) Statement I is true but Statement II is false.
(d) Statement I is false but Statement II is true.

61.) If $cos\ \theta = \frac{1}{\sqrt{5}}$, where $0 < \theta < \frac{\pi}{2}$, then $\frac{2 \tan \theta}{1-tan^2\theta}$ is equal to
(a) 4/3 (b) -4/3
(c) 1/3 (d) -2/3

62.) If $0 < \theta < 90^o, 0 < \phi < 90^o$ and $cos\ \theta < cos\ \phi$, then which one of the following is correct ?
(a) $\theta < \phi$
(b) $\theta > \phi$
(c) $\theta + \phi = 90^o$
(d) No conclusion can be drawn

63.) On the top of a hemispherical dome of radius r, there stands a flag of height h. From a point on the ground, the elevation of the top of the flag is 30^o. After moving a distance d towards the dome, when the flag is just visible, the elevation is 45^o. The ratio of h to r is equal to
(a) $\sqrt{2}$ - 1
(b) $\frac{(\sqrt{3}+1)}{2\sqrt{2}}$
(c) $\frac{(\sqrt{3}+1)}{2\sqrt{2}}d$
(d) $\frac{(\sqrt{3}+1)(\sqrt{2}-1)}{2\sqrt{2}}d$

64.) Let $sin(A + B) = \frac{\sqrt{3}}{2}$ and $cos\ B = \frac{\sqrt{3}}{2}$, where A, B are acute angles. What is tan $(2A - B)$ equal to ?
(a) 1/2 (b) $\sqrt{3}$
(c) $\frac{1}{\sqrt{3}}$ (d) 1

65.) Consider the following statements :
1. If $\frac{\cos\theta}{1-\sin\theta} + \frac{\cos\theta}{1+\sin\theta} = 4$, where $0 < \theta < 90^o$, then $\theta = 60^o$.
2. If $3\ tan\ \theta + cot\ \theta = 5\ cosec\ \theta$, where $0 < \theta < 90^o$, then $\theta = 60^o$.

Which of the statements given above is/are correct?
(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

66.) Consider the following statements :
1. $cos^2\theta = 1 - \frac{p^2+q^2}{2pq}$, where p, q are non-zero real numbers, is possible only when p = q.
2. $tan^2\theta = \frac{4pq}{(p+q)^2}$ - 1, where p, q are non-zero real numbers, is possible only when p = q.

Which of the statements given above is/are correct?
(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

67.) Consider the following statements :
1. $cos\ \theta + sec\ \theta$ can never be equal to 1.5.
2. $sec^2\theta + cosec^2\theta$ can never be less than 4.

Which of the statements given above is/are correct?
(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

68.) If $sin^2x + sin\ x = 1$, then what is the value of $cos^{12}x + 3cos^{10}x + 3cos^3x + cos^6x$?
(a) -1 (b) 0
(c) 1 (d) 8

69.) If $3\ sin\ \theta + 5\ cos\ \theta = 4$, then what is the value of $(3\ cos\ \theta - 5\ n\ \theta)^2$?

(a) 9 (b) 12
(c) 16 (d) 18

70.) If $cot\ \theta\ (1 + sin\ \theta) = 4n$ and $cot\ \theta\ (1 - sin\ \theta) = 4n$, then which one of the following is correct?

(a) $(m^2 + n^2)^2 = mn$
(b) $(m^2 - n^2)^2 = mn$
(c) $(m^2 - n^2)^2 = m^2n^2$
(d) $(m^2 + n^2)^2 = m^2n^2$

71.) If base and hypotenuse of a right triangle are $(u^2 - v^2)$ and $(u^2 + v^2)$ respectively and the area of the triangle is 2016 square units, then the perimeter of the triangle may be

(a) 224 units (b) 288 units
(c) 448 units (d) 576 units

72.) A circle is inscribed in an equilateral triangle of side of length l. The area of any square inscribed in the circle is

(a) $\frac{l^2}{2}$ (b) $\frac{\sqrt{3}l^2}{4}$
(c) $\frac{l^2}{4}$ (d) $\frac{l^2}{6}$

73.) Walls (excluding roofs and floors) of 5 identical rooms having length, breadth and height 6 m, 4 m and 2.5 m respectively are to be painted. Out of five rooms, two rooms have one square window each having a side of 2.5 m. Paints are available only in cans of 1 litre; and 1 litre of paint can be used for painting 20 square metres. The number of cans required for painting is

(a) 10 (b) 12
(c) 13 (d) 14

74.) Let S be the parallelogram obtained by joining the mid-points of the parallelogram T. Consider the following statements :

1. The ratio of area of T so that of S is 2 : 1.
2. The perimeter of S is half of the sum of diagonals of T.

Which of the above statements is/are correct?

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

75.) The sides of a triangle are 5 cm, 6 cm and 7 cm. The area of the triangle is approximately

(a) 14.9 cm^2 (b) 14.7 cm^2
(c) 14.5 cm^2 (d) 14.3 cm^2

76.) There is path of width 5 m around a circular plot of land whose area is 144π m^2. The total area of the circular plot including the path surrounding it is

(a) 349π m^2 (b) 289π m^2
(c) 209π m^2 (d) 149π m^2

77.) The lateral surface area of a cone is 462 cm^2. Its slant height is 35 cm. The radius of the base of the cone is

(a) 8.4 cm (b) 6.5 cm
(c) 4.2 cm (d) 3.2 cm

78.) A semi-circular plate is rolled up to form a conical surface. The angle between the generator and the axis of the cone is

(a) 60° (b) 45°
(c) 30° (d) 15°

79.) A solid right cylinder is of height π cm. If its lateral surface area is half its total surface area, then the radius of its base if

(a) $\pi/2$ cm (b) π cm
(c) $1/\pi$ cm (d) $2/\pi$ cm

80.) A rectangular block of length 20 cm, breadth 15 cm and height 10 cm is cut up into exact number of equal cubes. The least possible number of cubes will be

(a) 12 (b) 16
(c) 20 (d) 24

81.) If the diagonal of a cube is of length l, then the total surface area of the cube is

(a) $3l^2$ (b) $\sqrt{3}l^2$
(c) $\sqrt{2}l^2$ (d) $2l^2$

82.) An equilateral triangle, a square and a circle have equal perimeter. If T, S and C denote the area of the triangle, area of the square and area of the circle respectively, then which one of the following is correct?

(a) $T < S < C$ (b) $S < T < C$
(c) $C < S < T$ (d) $T < C < S$

83.) The areas of two similar triangles are $(7 - 4\sqrt{3})$ cm^2 and $(7 + 4\sqrt{3})$ cm^2 respectively. The ratio of their corresponding sides is

(a) $(7 - 4\sqrt{3})$ (b) $7 - 3\sqrt{3}$
(c) $5 - \sqrt{3}$ (d) $5 + \sqrt{3}$

84.) The chord of a circle is $\sqrt{3}$ times its radius. The angle subtended by this chord at the minor arc is k times the angle subtended at the major arc. What is the value of k?

(a) 5 (b) 2
(c) 1/2 (d) 1/5

85.) In a triangle ABC, the sides AB, AC are produced and the bisectors of exterior angles of ∠ABC and ∠ACB intersect at D. If ∠BAC = 50°, then ∠BDC is equal to

(a) 115° (b) 65°
(c) 55° (d) 40°

86.) Two cones have their heights in the ratio 1 : 3. If the radii of their bases are in the ratio 3 : 1, then the ratio of their volumes will be

(a) 1 : 1 (b) 2 : 1
(c) 3 : 1 (d) 9 : 1

87.) If two lines AB and OD intersect at O such that ∠AOC = 5 ∠AOD, then the four angles at O are

(a) 40°, 40°, 140°, 140°
(b) 30°, 30°, 150°, 150°
(c) 30°, 45°, 75°, 210°
(d) 60°, 60°, 120°, 120°

88.) If a point P moves such that the sum of the squares of its distances from two fixed points A and B is a constant, then the locus of the point P is

(a) A straight line
(b) A circle
(c) Perpendicular bisector of AB
(d) An arbitrary curve

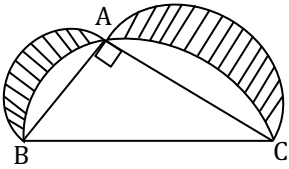
89.) If ABC is a right-angled triangle with AC as its hypotenuse, then which one of the following is correct?

(a) $AC^3 < AB^3 + BC^3$
(b) $AC^3 > AB^3 + BC^3$
(c) $AC^3 \leq AB^3 + BC^3$
(d) $AC^3 \geq AB^3 + BC^3$

90.) The area of the region bounded externally by a square of side $2a$ cm and internally by the circle touching the four sides of the square is

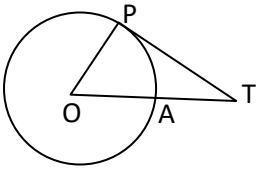
(a) $(4 - \pi)a^2$ (b) $(\pi - 2)a^2$
(c) $(8 - \pi)a^2/2$ (d) $(\pi - 2)\, a^2/2$

91.) In the figure given below, ABC is a right-angled triangle where $\angle A = 90^\circ$, AB = p cm and AC = q cm. On the three sides as diameters semicircles are drawn as shown in the figure. The area of the shaded portion, in square cm, is



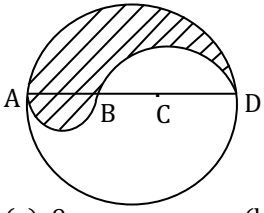
(a) pq (b) $\pi(p^2+q^2)/2$
(c) $\pi(p^2+q^2)$ (d) $pq/2$

92.) In the figure given below, the radius of the circle is 6 cm and AT = 4 cm. The length of tangent PT is



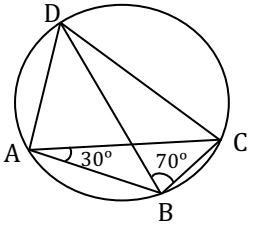
(a) 6 cm (b) 8 cm
(c) 9 cm (d) 10 cm

93.) In the figure given below, ABCD is the diameter of a circle of radius 9 cm. The lengths AB, BC and CD are equal. Semicircles are drawn on AB and BD as diameters as shown in the figure. What is the area of the shaded region?



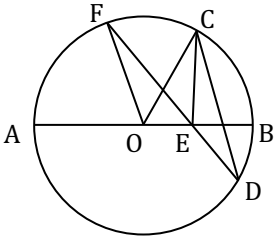
(a) 9π (b) 27π
(c) 36 π (d) 81 π

94.) In the figure given below, what is ∠BCD equal to?



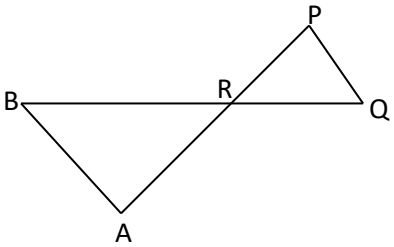
(a) 70° (b) 75°
(c) 80° (d) 90°

95.) In the figure given below, AB is the diameter of the circle whose centre is at O. Given that $\angle ECD = \angle EDC = 32^\circ$, then ∠CEF and ∠COF respectively are



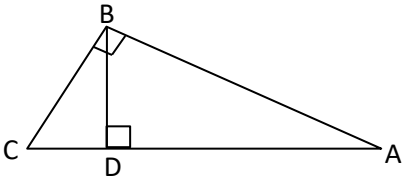
(a) 32°, 64° (b) 64°, 64°
(c) 32°, 32° (d) 64°, 32°

96.) In the figure given below, $\Delta ABR \sim PQR$. If PQ = 3 cm, AB = 6 cm, BT = 8.2 cm and PR = 5.2 cm, then QR and AR are respectively



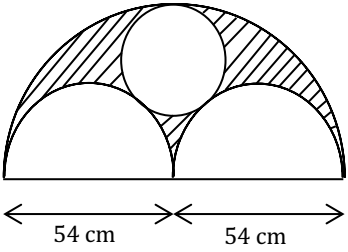
(a) 8.2 cm, 10.4 cm
(b) 4.1 cm, 6 cm
(c) 2.6 cm, 5.2 cm
(d) 4.1 cm, 10.4 cm

97.) In the figure given below, ABC is a triangle with AB perpendicular to BC. Further BD is perpendicular to AC. If AD = 9 cm and DC = 4 cm, then what is the length of BD?



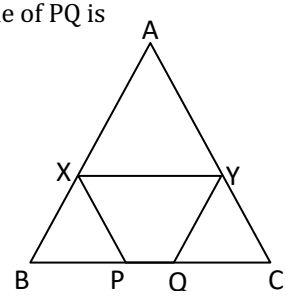
(a) 13.36 cm (b) 36/13 cm
(c) 13/2 cm (d) 6 cm

98.) In the figure given below, the diameter of bigger semicircle is 108 cm. What is the area of the shaded region?



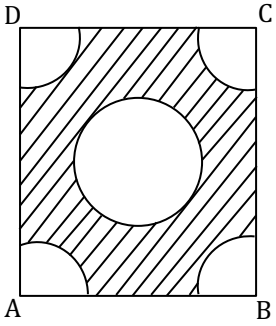
(a) 20π cm^2 (b) 186.3π cm^2
(c) 405π cm^2 (d) 769.5π cm^2

99.) In the figure given below, ABC is an equilateral triangle with each side of length 30 cm. XY is parallel to BC, XP is parallel to AC and YQ is parallel to AB. If XY + XP + YQ is 40 cm, then the value of PQ is



(a) 5 cm (b) 12 cm
(c) 15 cm (d) 10 cm

100.) In the figure given below, ABCD is a square of side 4 cm. Quadrants of a circle of diameter 2 cm are removed from the four corners and a circle of diameter 2 cm is also removed. What is the area of the shaded region?



(a) $5\frac{7}{9}$ cm^2 (b) $7\frac{7}{9}$ cm^2

(c) $9\frac{5}{7}$ cm^2 (d) $9\frac{5}{6}$ cm^2

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

MODEL TEST PAPER - 3

1.) $5^{17} + 5^{18} + 5^{19} + 5^{20}$ is divisible by
(a) 7 (b) 9
(c) 11 (d) 133

2.) If $a + b = 2c$, then what is the value of $\frac{a}{a-c} + \frac{c}{b-c}$?
(a) -1 (b) 0
(c) 1 (d) 2

3.) If $x = y^{1/a}$, $y = z^{1/b}$ and $z = x^{1/c}$ where $x \neq 1$, $y \neq 1$, $z \neq 1$, then what is the value of abc?
(a) -1 (b) 1
(c) 0 (d) 3

4.) If $2b = a + c$ and $y^2 = xz$, then what is $x^{b-c}\, y^{c-a}\, z^{a-b}$ equal to ?
(a) 3 (b) 2
(c) 1 (d) -1

5.) Which one of the following is correct?
(a) Decimal expansion of a rational number is terminating.
(b) Decimal expansion of a rational number is non-terminating.
(c) Decimal expansion of an irrational number is terminating.
(d) Decimal expansion of an irrational number is non-terminating and nonrepeating.

6.) If the roots of the equation $px^2 + x + r = 0$ are reciprocal to each other, then which one of the following is correct?
(a) $p = 2r$ (b) $p = r$
(c) $2p = r$ (d) $p = r$

7.) If $65x - 33y = 97$ and $33x - 65y = 1$, then what is xy equal to?
(a) 2 (b) 3
(c) -2 (d) -3

8.) If $\frac{b}{y} + \frac{z}{c} = 1$ and $\frac{c}{z} + \frac{x}{a} = 1$, then what is $\frac{ab+xy}{bx}$ equal to ?
(a) 1 (b) 2
(c) 0 (d) -

9.) If $\frac{a^2-1}{a} = 5$, then what is the value of $\frac{a^6-1}{a^3}$?
(a) 125 (b) -125
(c) 140 (d) -140

10.) If $x + y + z = 0$, then what is $(y + z - x)^3 + (z + x - y)^3 + (x + y - z)^3$ equal to?
(a) $(x + y + z)^3$
(b) $3(x + y)(y + z)(z + x)$
(c) 24xyz
(d) -24xyz

11.) If $(x + 3)$ is a factor of $x^3 + 3x^2 + 4x + k$, then what is the value of k?
(a) 12 (b) 24
(c) 36 (d) 72

12.) The smallest integer with 4 digits which is a perfect square is
(a) 1000 (b) 1024
(c) 1089 (d) None

13.) Which one of the following is a zero of the polynomial $3x^3 + 4x^2 - 7$?
(a) 0 (b) 1
(c) 2 (d) -1

14.) There are two numbers which are greater than 21 and their LCM and HCF are 3003 and 21 respectively. What is the sum of these numbers?
(a) 504 (b) 508
(c) 514 (d) 528

15.) If and are the roots of the equation $ax^2 + bx + c = 0$, then what is the value of the expression $(\alpha + 1)(\beta + 1)$?
(a) $\frac{a+b+c}{a}$ (b) $\frac{b+c-a}{a}$
(c) $\frac{a-b+c}{a}$ (d) $\frac{a+b-c}{a}$

16.) The remainder when $3x^3 + kx^2 + 5x - 6$ is divided by $(x + 1)$ is -7. is the value of k?
(a) -14 (b) 14
(c) -7 (d) 7

17.) If f(x) and g(x) are pol5m.omials of degree and q respectively, then the degree
{f(x) ± g(x)} (if it is non-zero) is
(a) Greater than min(p, q)
(b) Greater than max(p, q)
(c) Less than or equal to max (p, q)
(d) Equal to min(p, q)

18.) What is the value of $\frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}+\sqrt{3}} - \frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}}$?
(a) $-2\sqrt{15}$ (b) $2\sqrt{15}$
(c) $\sqrt{15}$ (d) $-\sqrt{15}$

19.) What is the value of $\frac{1}{1+x^{b-a}+x^{c-a}} + \frac{1}{1+x^{a-b}+x^{c-b}} + \frac{1}{1+x^{a-c}+x^{b-c}}$ where $x \neq 0$?
(a) -1 (b) 0
(c) 1 (d) 3

20.) The sum of a number and its square is 20. Then the number is
(a) -5 or 4 (b) 2 or 3
(c) -5 only (d) 5 or -4

21.) If the price of wheat rises by 25%, then by how much percent must a man reduce his consumption in order to keep his budget the same as before?
(a) 15% (b) 20%
(c) 25% (d) 30%

22.) 1/25 of the students who registered did not appear for the examination, 11/20 of those who appeared passed. If the number of registered students is 2000, the number who passed is
(a) 1920 (b) 1056
(c) 1020 (d) 864

23.) What is the difference between $0.\bar{9}$ and 0-9?
(a) 0 (b) 0.099
(c) 0.1 (d) 0.09

24.) If $A : B = 1 : 2$, $B : C = 3 : 4$, $C : D = 2 : 3$ and $D : E = 3 : 4$, then what is B : E equal to?
(a) 3 : 2 (b) 1 : 8
(c) 3 : 8 (d) 4 : 1

25.) A work when done by 10 women is completed in 12 days. The same work can be completed in 8 days when done by 5 men. How many days will it take to complete when 6 women and 3 men are employed to perform the same job?
(a) 12 (b) 10
(c) 8 (d) 5

26.) A man undertakes to do a certain work in 150 days. He employs 200 men. He finds that only a quarter of the work is done in 50 days. How many additional men should he employ so that the whole work is finished in time?
(a) 75 (b) 85
(c) 100 (d) 120

27.) A train moving with a speed of 60 km per hour crosses an electric pole in 30 seconds. What is the length of the train in metres?
(a) 300 (b) 400
(c) 500 (d) 600

28.) ₹ 120 is distributed among A, B and C so that A's share is ₹ 20 more than B's and W 20 less than C's. What is B's share?
(a) ₹ 10 (b) ₹ 5
(c) ₹ 20 (d) ₹ 25

29.) In the following table of inverse variation, what are the values of A, B and C respectively?

M	15	-6	2	C
N	-4	A	B	60

(a) 10, -20, -1 (b) 10, -1, 30
(c) -30, 10, -1 (d) -1, -30, 10

30.) A person borrowed ₹ 5,000 at 5% rate of interest per annum and immediately lent it at 5.5%. After two years he collected the amount and settled his loan. What is the amount gained by him in this transaction?
(a) ₹ 25 (b) ₹ 50
(c) ₹ 100 (d) ₹ 200

31.) At present the average of the ages of a father and a son is 25 years. After seven years the son will be 17 years old. What will be the age of the father after 10 years?
(a) 44 years (b) 45 years
(c) 50 years (d) 52 years

32.) If 5 tractors can plough 5 hectares of land in 5 days, then what is the number of tractors required to plough 100 hectares in 50 days?
(a) 100 (b) 20
(c) 10 (d) 5

33.) A merchant commences with a certain capital and gains annually at the rate of 25%. At the end of 3 years he has ₹ 10,000. What is the original amount that the merchant invested?
(a) ₹ 5, 120 (b) ₹ 5, 210
(c) ₹ 5, 350 (d) ₹ 5, 500

34.) Which one of the following decimal numbers is a rational number with denominator 37?
(a) 0-459459459 . . .
(b) 0-459459459
(c) 0-0459459459 . . .
(d) 0-00459459 . . .

35.) The annual income of a person decreases by ₹ 64 if the annual rate of interest decreases from 4% to 3.75%. What is his original annual income?
(a) ₹ 24, 000 (b) ₹ 25, 000
(c) ₹ 25, 600 (d) ₹ 24, 600

36.) For $0 < m < 1$, which one of the following is correct?
(a) $\log_{10} m < m^2 < m < m^{-1}$
(b) $m < m^{-1} < m^2 < \log_{10} m$
(c) $\log_{10} m < m < m^{-1} < m^2$
(d) $\log_{10} m < m^{-1} < m < m^2$

37.) A gentleman left a sum of 39,000 to be distributed after his death among his widow, five sons and four daughters. If each son receives 3 times as much as a daughter receives, and each daughter receives twice as much as their mother receives, then what is the widow's share?

(a) ₹ 1, 000 (b) ₹ 1, 200
(c) ₹ 1, 500 (d) ₹ None

38.) Three numbers which are co-prime to each other, are such that the product of the first two is 286 and that of the last two is 770. What is the sum of the three numbers?

(a) 85 (b) 80
(c) 75 (d) 70

39.) The age of a woman is a two-digit integer. On reversing this integer, the new integer is the age of her husband who is elder to her. The difference between their ages is one-eleventh of their sum. What is the difference between their ages?

(a) 8 years (b) 9 years
(c) 10 years (d) 11 years

40.) A passenger train and a goods train are running in the same direction on parallel railway tracks. If the passenger train now takes three times as long to pass the goods train, as when they are running in opposite directions, then what is the ratio of the speed of the passenger train to that of the goods train?
(Assume that the trains nm at uniform speeds)

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

41.) All odd prime numbers upto 110 are multiplied together. What is the unit digit in this product?

(a) 0 (b) 3
(c) 5 (d) None

42.) An alloy A contains two elements, copper and tin in the ratio of 2 : 3, whereas an alloy B contains the same elements in the ratio of 3 : 4. If 20 kg of alloy A, 28 kg of alloy B and some more pure copper are mixed to form a third alloy C which now contains copper and tin in the ratio of 6 ; 7, then what is the quantity of pure copper mixed in the alloy C?

(a) 3 kg (b) 4 kg
(c) 5 kg (d) 7 kg

43.) A quadratic polynomial $ax^2 + bx + c$ is such that when it is divided by x, (x - 1) and (x + 1), the remainders are 3, 6 and 4 respectively. What is the value of (a + b)?

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

44.) If the average of 9 consecutive positive integers is 55, then what is the largest integer?

(a) 57 (b) 58
(c) 59 (d) 60

45.) The average of the ages of 15 students in a class is 19 years. When 5 new students are admitted to the class, the average age of the class becomes 18-5 years. What is the average age of the 5 newly admitted students?

(a) 17 years (b) 17.5 years
(c) 18years (d) 18.5 years

46.) A»man can row at a speed of $x\ km/hr$ in still water. If in a stream which is flowing at a speed of $y\ km/hr$ it takes him z hours to row to a place and back, then what is the distance between the two places?

(a) $\frac{z(x^2-y^2)}{2y}$ (b) $\frac{z(x^2-y^2)}{2x}$

(c) $\frac{z(x^2-y^2)}{2zx}$ (d) $\frac{z(x^2-y^2)}{x}$

47.) A water tank has been fitted with two taps P and Q and a drain pipe R. Taps P and Q fill at the rate of 12 litres per minute and 10 litres per minute respectively.

Consider the following statements SI, S2 and S3 :

S1 : Pipe R drains out at the rate of 6 litres per minute.

S2 : If both the taps and the drain pipe are opened simultaneously, then the tank is filled in 5 hours 45 minutes.

S3 : Pipe R drains out (fully) the filled tank in 15 hours 20 minutes.

To know what is the capacity of the tank, which one of the following is correct?

(a) S2 is only sufficient
(b) S1, S2 and S3 are necessary
(c) Any two out of SI, S2 and S3 are sufficient
(d) None of the above

48.) A car has an average speed of 60 km per hour while going from Delhi to Agra and has an average speed of y km per hour while returning to Delhi from Agra (by travelling the same distance). If the average speed of the car for the whole journey is 48 km per hour, then what is the value of y?

(a) 30 km/hr (b) 35 km/hr
(c) 40 km/hr (d) 45 km/hr

49.) An article is sold at a profit of 32%. If the cost price is increased by 20% and the sale price remains the same, then the profit percentage becomes

(a) 10% (b) 12%
(c) 15% (d) 20%

50.) A, B, C, D and E start a partnership firm. Capital contributed by A is three times that contributed by D. E contributes half of A's contribution, B contributes one-third of E's contribution and C contributes two-third of A's contribution. If the difference between the combined shares of A, D and E and the combined shares of B and C in the total profit of the firm is ₹ 13,500, what is the combined share of B, C and E? (The shares are supposed to be proportional to the contributions)

(a) ₹ 13, 500 (b) ₹ 18, 000
(c) ₹ 19, 750 (d) ₹ 20, 250

51.) A Pie Chart is drawn for the following data :

Sector	Percentage
Agriculture and Rural Development	12.9
Irrigation	12.5
Energy	27.2
Industry & Minerals	15.4
Transport & Communication	15.9
Social Services	16.1

What is the angle (approximately) subtended by the Social Services Sector at the centre of the circle?

(a) 45° (b) 46°
(c) 58° (d) 98°

52.) The arithmetic mean of two numbers is 10 and their geometric mean is 8. What are the two numbers?
(a) 15, 5 (b) 12, 8
(c) 16, 4 (d) 18, 2

53.) The arithmetic mean of 11 observations is 11. The arithmetic mean of the first 6 observations is 10-5 and the arithmetic mean of the last 6 observations is 11.5. What is the sixth observation?
(a) 10.0 (b) 10.5
(c) 11.0 (d) 11.5

54.) What is $\sin^4\theta - \cos^4\theta$ equal to for any real number θ?
(a) 1 (b) $1 - 2\sin^2\theta$
(c) $2\cos^2\theta + 1$ (d) $1 - 2\cos^2\theta$

55.) What is $\cot 1^o \cot 23^\circ \cot 45^o \cot 67^\circ \cot 89^\circ$ equal to?
(a) 0 (b) 1
(c) 1/2 (d) 1/3

56.) What angle does the hour hand, of a clock describe in 10 minutes of time?
(a) 1^o (b) 5^o
(c) 6^o (d) 10^o

57.) Consider the following statements :
1. $(\sec^2\theta - 1)(1 - \text{cosec}^2\theta) = 1$
2. $\sin\theta(1 + \cos\theta)^{-1} + (1 + \cos\theta)(\sin\theta^{-1}) = 2\,\text{cosec}\,\theta$

Which of the above is/are correct?
(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

58.) Each side of a square subtends an angle of 60° at the tip of a tower of height h metres standing at the centre of the square. If l is the length of each side of the square, then what is h^2 equal to?
(a) $2l^2$ (b) $\frac{l^2}{2}$
(c) $\frac{3l^2}{2}$ (d) $\frac{2l^2}{3}$

59.) From a height of h units, a man observes the angle of elevation as α and angle of depression as p of the top and the bottom respectively of a tower of height H (> 4h). To what further height should he climb so that the values of angle of elevation and angle of depression get interchanged for the top and bottom of the tower?
(a) H - h units (b) H -2h units
(c) H -3h units (d) H -4h units

60.) If $sec\,x\,cosec\,x = 2$,then what is $tan^n x + cot^n x$ equal to?
(a) 2 (b) 2^{n+1}
(c) 2^n (d) 2^{n-1}

61.) If $cos\,x + cos^2 x = 1$, then what is $sin^2 x + sin^4 x$ equal to ?
(a) 1 (b) 1.5
(c) 2 (d) 3

62.) If $\sin A + \cos A = p$ and $\sin^3 A + \cos^3 A = q$, then which one of the following is correct?
(a) $p^3 - 3p + q = 0$
(b) $q^3 - 3p + 2q = 0$
(c) $p^3 - 3p + 2q = 0$
(d) $p^3 + 3p + 2q = 0$

63.) If $x = \frac{sec^2\theta - \tan\theta}{sec^2\theta + \tan\theta}$ then which one of the following is correct ?

(a) $\frac{1}{3} < x < 3$ (b) $x \notin \left[\frac{1}{3}, 3\right]$

(c) $-3 < x < -\frac{1}{3}$ (d) $\frac{1}{3} \leq x \leq 3$

64.) ABC is a right angled triangle with base BC and height AB. The hypotenuse AC is four times the length of the perpendicular drawn to it from the opposite vertex. What is tan C equal to?

(a) $2-\sqrt{3}$ (b) $\sqrt{3} - 1$

(c) $2+\sqrt{3}$ (d) $\sqrt{3}+1$

65.) ABC is a triangle right angled at C with BC = a and AC = b. If p is the length of the perpendicular from C on AB, then which one of the following is correct?

(a) $a^2b^2 = p^2(a^2 + b^2)$

(b) $a^2b^2 = p^2(b^2 - a^2)$

(c) $2a^2b^2 = p^2(a^2 + b^2)$

(d) $a^2b^2 = 2p^2(a^2 + b^2)$

66.) The radius and slant height of a right circular cone are 5 cm and 13 cm respectively. What is the volume of the cone?

(a) 100π cm^3 (b) 50π cm^3

(c) 65π cm^3 (d) 169π cm^3

67.) Two equal circular regions of greatest possible area are cut off from a given circular sheet of area A. What is the remaining area of the sheet?

(a) A/2 (b) A/3

(c) 3A/5 (d) 2A/5

68.) If the ratio of the radius of the base of a right circular cone to its slant height is 1 : 3, what is the ratio of the total surface area to the curved surface area?

(a) 5 : 3 (b) 3 : 1

(c) 4 : 1 (d) 4 : 3

69.) A right circular cone is sliced into a smaller cone and a frustum of a cone by a plane perpendicular to its axis. The volume of the smaller cone and the frustum of the cone are in the ratio 64 : 61. Then their curved surface areas are in the ratio

(a) 4 : 1 (b) 16 : 9

(c) 64 : 61 (d) 81 : 64

70.) In a room whose floor is a square of side 10 m, an equilateral triangular table of side 2 m is placed. Four book-shelves of size 4 m x 1 m x 9 m are also placed in the room. If half of the rest of the area in the room is to be carpeted at the rate of ₹ 100 per square metre, what is the cost of carpeting (approximately)?

(a) ₹ 7, 600 (b) ₹ 5, 635

(c) ₹ 4, 113 (d) ₹ 3, 200

71.) A region of area A bounded by a circle C is divided into n regions, each of area A/n, by drawing circles of radii $r_1, r_2, r_3, \ldots, r_{n-1}$ such that $r_1 < r_2 < r_3 \ldots r_{n-1}$ concentric with the circle C. If $p_m = \frac{r_m + 1}{r_m}$ where $m = 1, 2, 3, \ldots (n-2)$, then which one of the following is correct?

(a) p increases as m increases

(b) p decreases as m increases

(c) p remains constant as m increases

(d) p increases for some values of m as m increases and then decreases thereafter

72.) What is the volume of a cone of maximum volume cut out from a cube of edge 2a such that their bases are on the same plane?

(a) πa^2 (b) $\frac{\pi a^3}{3}$

(c) $\frac{2\pi a^3}{3}$ (d) $\frac{3\pi a^3}{4}$

73.) The radii of two circles are 4.5 cm and 3.5 cm respectively. The distance between the centres of the circles is 10 cm. What is the length of the transverse common tangent?

(a) 4 cm (b) 5 cm

(c) 6 cm (d) 7 cm

74.) There are as many square centimetres in the surface area of a sphere as there are cubic centimetres in its volume. What is the radius of the sphere?

(a) 4 cm (b) 3 cm

(c) 2 cm (d) 1 cm

75.) The length of a line segment AB is 2 cm. It is divided into two parts at a point C such that $AC^2 = AB \times CB$. What is the length of CB?

(a) $3\sqrt{5}$ cm (b) $3\text{-}\sqrt{5}$ cm

(c) $5\sqrt{3}$ cm (d) $\sqrt{5} - 1$ cm

76.) The locus of the mid-points of the radii of length 16 cm of a circle is

(a) A concentric circle of radius 8 cm

(b) A concentric circle of radius 16 cm

(c) The diameter of the circle

(d) A straight line passing through the centre of the circle

77.) The curved surface area of a right circular cone is 1-76 m^2 and its base diameter is 140 cm. What is the height of the cone?

(a) 10 cm (b) $10\sqrt{2}$ cm

(c) $20\sqrt{2}$ cm (d) $10\sqrt{15}$cm

78.) Consider the following statements :

1. The orthocentre of a triangle always lies inside the triangle.
2. The centroid of a triangle always lies inside the triangle.
3. The orthocentre of a right angled triangle lies on the triangle.
4. The centroid of a right angled triangle lies on the triangle.

Which of the above statements are correct?

(a) 1 and 2 (b) 1 and 4

(c) 2 and 3 (d) 2 and 4

79.) The locus of a point equidistant from two intersecting lines is

(a) A straight line

(b) A circle

(c) A pair of straight lines

(d) None of the above

80.) Consider the following statements :

Two triangles are said to be congruent, if

1. Three angles of one triangle are equal to the corresponding three angles of the other triangle.
2. Three sides of one triangle are equal to the corresponding three sides of the other triangle,
3. Two sides and the included angle of one triangle are equal to the corresponding two sides and the included angle of the other triangle.

4. Two angles and the included side of one triangle are equal to the corresponding two angles and the included side of the other triangle.

Which of the above statements are correct?

(a) 1, 2 and 3 (b) 1, 3 and 4
(c) 1, 2 and 4 (d) 2, 3 and 4

81.) Given that the angles of a polygon are all equal and each angle is a right angle.
Statement-1 : The polygon has exactly four sides.
Statement-2: The sum of the angles of a polygon having n sides is (3n - 8) right angles.
Which one of the following is correct in respect of the above statements?

(a) Both Statement-1 and Statement-2 are true and Statement-2 is the correct explanation of Statement-1
(b) Both Statement-1 and Statement-2 are true but Statement-2 is not the correct explanation of Statement-1
(c) Statement-1 is true but Statement-2 is false
(d) Statement-1 is false but Statement-2 is true

82.) If the length of a side of a square is increased by 8 cm, its area increases by 120 square cm. What is the length of a side of the square?

(a) 2.5 cm (b) 3.5 cm
(c) 4.5 cm (d) 5.5 cm

83.) What is the largest power of 10 that divides the product 1 x 2 x 3 x 4 . . . x 23 x 24 x 25?

(a) 2 (b) 4
(c) 5 (d) None

84.) Walls (excluding their roofs and floors) of 5 identical rooms having length, breadth and height 6 m, 4 m and 2.5 m respectively are to be painted. Paints are available only in cans of 1 L and one litre of paint can be used for painting 20 square metres. What is the number of cans required for painting?

(a) 10 (b) 12
(c) 13 (d) 14

85.) A rectangular pathway having width 4.5 m and length 10 m will have to be tiled using square tiles of side 50 cm. Each packet of such tiles contains 20

pieces and costs ₹ 100. What will be the total cost of tiles for the pathway?

(a) ₹ 1, 200 (b) ₹ 1, 100
(c) ₹ 1, 000 (d) ₹ 900

86.) A cube of maximum volume (each corner touching the surface from inside) is cut from a sphere. What is the ratio of the volume of the cube to that of the sphere?

(a) $3 : 4\pi$ (b) $\sqrt{3} : 2\pi$
(c) $2:\sqrt{3}\pi$ (d) $4 : 3\pi$

87.) If the ratio of the circumference of the base of a right circular cone of radius r to its height is 3 : 1, then what is the area of the curved surface of the cone?

(a) $3\pi r^2$ (b) $\frac{2\pi r^2\sqrt{4\pi^2+9}}{3}$
(c) $\frac{\pi r^2\sqrt{\pi^2+9}}{3}$ (d) $\frac{\pi r^2\sqrt{4\pi^2+9}}{3}$

88.) A wire is in the form of a circle of radius 98 cm. A square is formed out of the wire. What is the length of a side of the square? (Use $\pi = 22/7$)

(a) 146 cm (b) 152 cm
(c) 154 cm (d) 156 cm

Consider the following for the next two (02) questions:

In a triangle ABC, a, b and c are the lengths of the sides and p, q and r are the lengths of its medians.

89.) Which one of the following is correct?

(a) $2(p + q + r) = (a + b + c)$
(b) $2(p + q + r) > 3(a + b + c)$
(c) $2(p + q + r) < 3(a + b + c)$
(d) $11(p + q + r) > 10(a + b + c)$

90.) Which one of the following is correct?

(a) $(a + b + c) < (p + q + r)$
(b) $3(a + b + c) < 4(p + q + r)$
(c) $2(a + b + c) < 3(p + q + r)$
(d) $3(a + b + c) < 4(p + q + r)$

91.) What is the area of the largest circular disc cut from a square of side $\frac{2}{\sqrt{\pi}}$ units?

(a) π square units
(b) 1 square units
(c) π^2 square units
(d) 2 square units

92.) The product of the lengths of the diagonals of a square is 50 square units. What is the length of a side of the square?

(a) $5\sqrt{2}$ units (b) 5 units
(c) 10 units (d) $2\sqrt{5}$ units

93.) The surface area of a closed cylindrical box is 352 square cm. If its height is 10 cm, then what is its diameter? (Use $\pi = 22/7$)

(a) 4 cm (b) 8 cm
(c) 9.12 cm (d) 19.26 cm

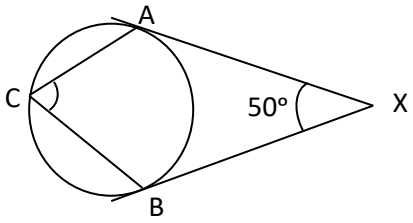
94.) A square and an equilateral triangle have the same perimeter. If the diagonal of the square is $6\sqrt{2}$ cm, then what is the area of the triangle?

(a) $12\sqrt{2}$ cm^2 (b) $12\sqrt{3}$ cm^2
(c) $16\sqrt{2}$ cm^2 (d) $16\sqrt{3}$ cm^2

95.) What is the area of the region bounded internally by a square of side of length 'a' and externally by a circle passing through the four comers of the square?

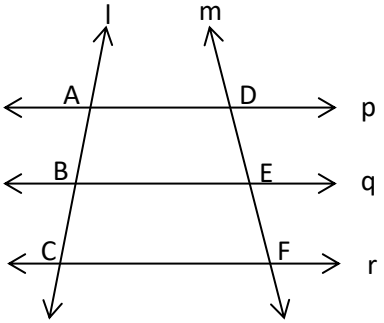
(a) $(\pi - 1)a^2$ square units
(b) $\frac{(\pi-1)a^2}{2}$ square units
(c) $(\pi - 2)a^2$ square units
(d) $\frac{(\pi-2)a^2}{2}$ square units

96.) In the figure given below, XA and XB are two tangents to a circle, If $\angle AXB = 50^\circ$ and AC is parallel to XB, then what is $\angle ACB$ equal to ?



(a) 70° (b) 65°
(c) 60° (d) 55°

97.) In the figure given below, p, q, r are parallel lines; l and m are two transversals.

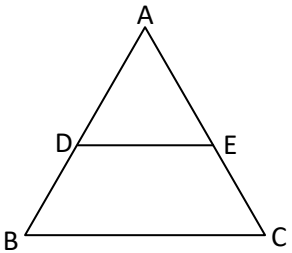


1. AB : AC = DE : DF
2. AB × EF = BC × DE

Which of the above is/are correct?

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

98.) In the equilateral triangle ABC given below, AD = DB and AE = EC. If l is the length of a side of the triangle, then what is the area of the shaded region?

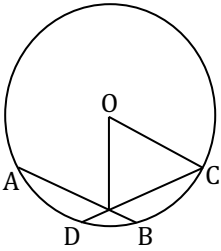


(a) $\frac{3\sqrt{3}l^2}{16}$ (b) $\frac{3l^2}{16}$
(c) $\frac{3\sqrt{3}l^2}{32}$ (d) $\frac{3l^2}{32}$

99.) In the figure given below, SPT is a tangent to the circle at P and O is the centre of the circle. If ∠QPT = α, then what is ∠POQ equal to?

(a) α (b) 2α
(c) 90° - α (d) 180° - 2 α

100.) In the figure given below, two equal chords cut at point P. If AB = CD = 10 cm, OC = 13 cm (O is the centre of the circle) and PB = 3 cm, then what is the length of OP?



(a) 5 cm (b) 6 cm
(c) $6\sqrt{29}$ cm (d) $2\sqrt{37}$ cm

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