H–3–C

Roll No. .....

Total No. of Questions : **40+20+20]** [Total No. of Printed Pages : **24**

XAPBIKD22

6803–C

MATHEMATICS

Time : 3 Hours] [Maximum **Marks : 80**

NOTE :— The questions in the question paper are based on revised/pre-revised and old course syllabus marked as "**New Course**", "**Old Course**" and "**Old II Course**" respectively and candidates are advised to appear in the relevant course meant for them. Candidates who may attempt the questions partly from "**New Course**", partly from "**Old Course**" and partly from "**Old II Course**" will not be awarded. Candidates are also advised to record "**New Course**" or "**Old Course**" or "**Old II Course**" as the case may be, on the front page of the answer-book.

Note :— Q. Nos. **1** to **10** are MCQs of 1 mark each. Select the correct option.

1. L.C.M. of 12, 32 and 36 is :

(A) 300 (B) 350

(C) 400 (D) None of these

2. The mid-point of the line segment joining the points A(4, 2) and B(6, 8) is :

(A) (5, 5) (B) (5, 4)

(C) (1, 3) (D) None of these

3. If the product of the roots of equation $Px^2 + 3x - 8 = 0$ is -4, then :

(A) $P = -2$ (B) $P = 8$

(C) $P = 2$ (D) None of these

4. Probability can take values from :

(A) $-\infty$ to $+\infty$ (B) $-\infty$ to $+1$

(C) 0 to $+1$ (D) -1 to $+1$

5. A quadratic polynomial whose zeroes are -4 and -5 is :

(A) $x^2 - 9x + 20$ (B) $x^2 + 9x + 20$

(C) $x^2 - 9x - 20$ (D) $x^2 + 9x - 20$

6. The mean of the first five prime numbers is :

(A) 5.0 (B) 4.5

(C) 5.6 (D) 6.5

7. The value of $\frac{2\tan 30°}{1-\tan^2 30°}$ is :

(A) cos 60° (B) sin 60°

(C) tan 60° (D) sin 30°

8. 30th term of the A.P. : 10, 7, 4, ... is :

(A) 97 (B) 77

(C) -77 (D) -87

9. The number of tangents that can be drawn from a point lying on the circle is :

(A) 0 (B) 1

(C) 2 (D) Infinite

10. Area of a circle with radius 5 cm is :

(A) 60 sq. cm (B) 78.5 sq. cm

(C) 10.5 sq. cm (D) None of these

Note :— Q. Nos. **11** to **15**, carry 1 mark each.

11. A ..... is a proven statement used for proving another statement.

12. The sum of the first 100 positive integers is ..... .

Or

11th term of the A.P. $-3, -\frac{1}{2}, 2,$ ..... is ..... .

13. The value of sin A or cos A never exceeds ..... .

14. The roots of the equation $(x + 2)^2 - 9 = 0$ is :

(A) 1, –5 (B) 1, 5

(C) 1, 3 (D) None of these

15. The equations $2x + 3y = 9$ and $4x + 6y = 18$ have infinitely many solutions. (True/False)

Note :— Q. Nos. **16** to **20** are short answer type questions of 1 mark each.

16. State fundamental theorem of arithmetic.

17. Define Sure Event.

18. What is the formula for finding the area of a ΔABC with vertices as $A(x_1, y_1)$, $B(x_2, y_2)$ and $C(x_3, y_3)$?

Or

What is the distance between the pair of points (2, 3) and (4, 1) ?

19. State the converse of basic proportionality theorem.

20. Write all the trigonometric ratios of 90°.

Section–B

Note **:—** Q. Nos. **21** to **26** carry 2 marks each.

21. A cone of height 24 cm and radius of base 6 cm is made up of modelling clay. A child reshapes it in the form of a sphere. Find the radius of the sphere. https://www.jkboseonline.com

Or

The radii of the ends of a frustum of a cone 45 cm high are 28 cm and 7 cm. Find its volume.

22. Use Euclid's division algorithm to find the H.C.F. of 867 and 255.

23. The difference between two numbers is 26 and one number is three times the other. Find them.

24. If sec 4A = cosec (A – 20°) where 4A is an acute angle, find the value of A.

Or

Evaluate :

$$\frac{\sin^2 63° + \sin^2 27°}{\cos^2 17° + \cos^2 73°}$$

25. A die is thrown once. Find the probability of getting a number greater than 2.

26. The marks obtained by 30 students of Class X of a certain school in a Mathematics paper consisting of 100 marks are presented in the table below. Find the mean of the marks obtained by the students :

Mark Obtained (x_i)	No. of Students (f_i)
10	1
20	1
36	3
40	4
50	3
56	2
60	4
70	4
72	1
80	1
88	2
92	3
95	1

Section–C

Note :— Q. Nos. **27** to **34** carry 3 marks each.

27 Find the zeroes of the quadratic polynomial $x^2 - 3$ and verify the relationship between the zeroes and the co-efficients.

Or

Divide the polynomial $x^4 - 3x^2 + 4x + 5$ by $x^2 + 1 - x$ and find the quotient and the remainder.

28. Solve the pair of linear equations by using cross multiplication method :

$$3x - 9y = 2, \; -3y + x = 3$$

29. Find the roots of the quadratic equation $3x^2 - 2\sqrt{6}x + 2 = 0$ by factorization method.

30. Check whether 301 is a term of the list of numbers 5, 11, 17, 23, ...

Or

How many terms of the A.P : 24, 21, 18 ..... must be taken so that their sum is 78 ?

31. Prove that the tangents drawn at the ends of a diameter of a circle are parallel.

Or

Prove that the parallelogram circumscribing a circle is a rhombus.

32. Prove that :

$$(\text{cosec}\,\theta - \cot\theta)^2 = \frac{1-\cos\theta}{1+\cos\theta}$$

33. Find the area of a sector of a circle with radius 6 cm, if angle of the sector is 60°.

34. A toy is in the form of a cone of radius 3.5 cm mounted on a hemisphere of same radius. The total height of the toy is 15.5 cm. Find the total surface area of the toy.

Section–D

Note :— Q. Nos. **35** to **40** carry 4 marks each.

35. Find the roots of the quadratic equation $2x^2 - 5x + 3 = 0$ by the method of completing the square.

Or

Find two consecutive odd positive integers, the sum of whose squares is 290.

36. Draw a circle of radius 6 cm. From a point 10 cm away from its centre, construct the pair of tangents to the circle and measure their lengths (No steps of construction required).

37. In what ratio does the point (–4, 6) divides the line segment joining the points A(–6, 10) and B(3, –8).

Or

Find the co-ordinates of the point of trisection of the line segment joining the points P(2, –2) and Q(–7, 4).

38. An observer 1.5 m tall is 28.5 m away from a chimney. The angle of elevation of the top of the chimney from her eyes is 45°. What is the height of the chimney.

39. Prove that in a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

Or

Prove that ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides.

40. The distribution below gives the weights of 30 students of a class. Find the median weight of the students :

Weight (in kg)	Number of Students
40—45	2
45—50	3
50—55	8
55—60	6
60—65	6
65—70	3
70—75	2

B–3–X

Roll No..... .....

Total No. of Questions : **40]**

[Total No. of Printed Pages : **15**

10th SZJDAR22

6203–X

MATHEMATICS

Time : 2.30 Hours]

[Maximum Marks : 80

General Instructions :–

(i) This question paper comprises four Sections–A, B, C and D. This question paper carries 40 questions. All questions are compulsory.

(ii) Section–A (Q. No. **1** to **20**) comprises of *twenty* questions of 1 mark each.

(iii) Section–B (Q. No. **21** to **26**) comprises of *six* questions of 2 marks each.

(iv) Section–C (Q. No. **27** to **34**) comprises of *eight* questions of 3 marks each.

(v) Section–D (Q. No. **35** to **40**) comprises of *six* questions of **4 marks each.**

Section–A

1 each

Question No. **1** to **10** are MCQs of 1 mark each. Select the correct option :

1. The common difference of an A.P. –5, –1, 3, 7, ... is :

(A) 4 (B) –4

(C) 2 (D) None of these

2. $41\sqrt{2}$ is :

(A) Rational (B) Irrational

(C) Even (D) None of these

3. The zero of a linear polynomial $ax + b$ is :

(A) $-\frac{b}{a}$

(B) $-\frac{a}{b}$

(C) $\frac{b}{a}$

(D) None of these

4. Sum of the roots of the quadratic equation $3x^2 - 5x + 2 = 0$ is :

(A) $-\frac{5}{3}$

(B) $\frac{3}{5}$

(C) $\frac{5}{3}$

(D) None of these

5. A line intersecting a circle in two points is called a :

(A) Tangent

(B) Chord

(C) Secant

(D) None of these

6. Length of an arc of a sector is given by :

(A) $\frac{\theta}{360} \times 2\pi r$

(B) $\frac{\theta}{360} \times \pi r$

(C) $\frac{\theta}{180} \times 2\pi r$

(D) None of these

7. The midpoint of the line segment joining the points (2, 3) and (–4, 7) is :

(A) (–1, 5)

(B) (3, 5)

(C) (5, −1)

(D) None of these

8. The probability of getting a number less than 4 in a single throw of a die is :

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

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

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

(D) None of these

9. The value of cos 72° − sin 18° is :

(A) −1

(B) 0

(C) 1

(D) None of these

10. The graph of the equation $x = 2$ is :

(A) A line parallel to x-axis

(B) A line parallel to y-axis

(C) y-axis

(D) None of these

In Q. No. **11** to **15**, fill in the blanks. Each question is of 1 mark each.

11. LCM of 6 and 20 is ..... . (20, 60)

12. If angle between two tangents drawn from a point P to a circle of radius a and centre O is 90°, then OP = $a\sqrt{2}$. (True/False)

13. The 6th term of the A.P. 5, 8, 11, 14, ... is 21.

(True/False)

Or

The sum of all natural numbers from 1 to 100 is 5050.

(True/False)

14. If ΔABC is right angled at C, then the value of $\cos(A + B)$ is 1. (Yes/No)

15. Any two ..... triangles are similar. (Isosceles/Equilateral)

Q. No. **16** to **20** are very short answer type questions of 1 mark each.

16. Define Collinear points.

Or

Write a formula for finding the distance between two points $A(x_1, y_1)$ and $B(x_2, y_2)$.

17. What is the line of sight ?

18. State AA similarity criterion for two triangles.

19. If P(E) = 1, find P(not E).

20. Given r = 7 cm, find the circumference of circle. $\left(\text{Take, } \pi = \frac{22}{7}\right)$

Section–B

2 each

Q. No. **21** to **26** carry 2 marks each.

21. Find the H.C.F. of 26 and 91.

22. 2 cubes each of volume 64 cm^3 are joined end to end. Find the surface area of the resulting cuboid.

23. Solve the pair of equations by the substitution method :

$$x + y = 14$$

$$x - y = 4$$

24. If $\sin A = \frac{3}{4}$, calculate cos A and tan A.

Or

Find the value of :

$$\frac{1 - \tan^2 45°}{1 + \tan^2 45°}$$

25. A die is thrown once. Find the probability of getting :

(i) a prime number

(ii) an odd number

26. The following table gives the literacy rate (in percentage) of 35 cities. Find the mean literacy rate :

Literacy rate (in %)	45–55	55–65	65–75	75–85	85–95
Number of Cities	3	10	11	8	3

Section–C

3 each

Q. No. **27** to **34** carry 3 marks each.

27. Find the zeroes of the quadratic polynomial $3x^2 - x - 4$ and verify the relationship between the zeroes and the coefficients.

Or

On dividing $x^3 - 3x^2 + x + 2$ by a polynomial $g(x)$, the quotient and remainder were $x - 2$ and $-2x + 4$ respectively. Find $g(x)$.

28. Five years hence, the age of Jacob will be three times that of his son. Five years ago, Jacob's age was seven times that of his son. What are their present ages ?

29. Find the roots of the quadratic equation $2x^2 - 7x + 3 = 0$ by applying the quadratic formula.

30. How many multiples of 4 lie between 10 and 250 ?

Or

Find the sum of first 51 terms of an A.P. whose second and third terms are 14 and 18 respectively.

31. Prove the identity :

$$\frac{1 + \sec A}{\sec A} = \frac{\sin^2 A}{1 - \cos A}$$

32. The length of a tangent from a point A at distance 5 cm from the centre of the circle is 4 cm. Find the radius of the circle.

Or

Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that :

$$\angle PTQ = 2\angle OPQ$$

33. The radii of two circles are 8 cm and 6 cm respectively. Find the radius of the circle having area equal to the sum of the areas of the two circles. https://www.jkboseonline.com

34. A 20 m deep well with diameter 7 m is dug and the earth from digging is evenly spread out to form a platform 22 m by 14 m. Find the height of the platform.

Section–D

4 each

Q. No. **35** to **40** carry 4 marks each.

35. Find two consecutive positive integers, sum of whose squares is 365.

Or

Find the value of 'K' for which the quadratic equation $Kx(x - 2) + 6 = 0$ has two equal roots.

36. The angle of elevation of the top of a tower from a point on the ground, which is 30 m away from the foot of the tower, is 30°. Find the height of the tower.

37. If (1, 2), (4, y), (x, 6) and (3, 5) are the vertices of a parallelogram taken in order, find x and y.

Or

Find the area of the triangle whose vertices are (–5, –1), (3, –5) and (5, 2).

38. In a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides. Prove it.

Or

Diagonals AC and BD of a trapezium ABCD with AB ∥ DC intersect each other at the point O. Using a similarity criterion for two triangles, show that :

$$\frac{OA}{OC} = \frac{OB}{OD}$$

39. Draw a right triangle in which the sides (other than hypotenuse) are of lengths 4 cm and 3 cm. Then construct another triangle whose sides are $\frac{5}{3}$ times the corresponding sides of the given triangle.

40. The distribution below gives the weight of 30 students of a class. Find the median weight of the students :

Weight (in kg)	No. of Students
40–45	2
45–50	3
50–55	8
55–60	6
60–65	6
65–70	3
70–75	2

E–3–C

Roll No..

Total No. of Questions : **40**] [Total No. of Printed Pages : **8**

XKDAR21

5503–C

MATHEMATICS

Time : 3 Hours] **[Maximum Marks : 80**

Section–A 1 each

1. The prime factors of 39 are :

(A) 3, 11 (B) 3, 13

(C) 9, 13 (D) None of these

2. A polynomial of degree 3 is called :

(A) Quadratic polynomial (B) Zero polynomial

(C) Linear polynomial (D) None of these.

3. A quadratic equation $ax^2 + bx + c = 0$ ($a \neq 0$) has two non-real roots if :

(A) D = 0 (B) D < 0

(C) D > 0 (D) None of these

4. The common difference of the A.P. series 1, 3, 5, 7, ... is :

(A) 2 (B) -2

(C) 0 (D) None of these

5. A(–4, 5) lies in :

(A) 1st quadrant (B) 3rd quadrant

(C) 4th quadrant (D) None of these

6. A tangent to a circle intersects it in :

(A) No point (B) One point

(C) Two points (D) None of these

7. Area of a circle of radius 2 cm is :

(A) 8π (B) 6π

(C) 4π (D) None of these

8. Which of the following can not be the probability of an event ?

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

(C) $\frac{4}{3}$ (D) 0

9. tan A is not defined at :

(A) $45°$ (B) $30°$

(C) $90°$ (D) $0°$

10. Class mark is always equal to :

(A) $\frac{\text{Upper classmark} - \text{Lower classmark}}{2}$

(B) $\frac{\text{Upper classmark} + \text{Lower classmark}}{2}$

(C) $\frac{\text{Upper classmark} \times \text{Lower classmark}}{2}$

(D) None of these

11. $\sqrt{3}$ is an ..... number. (Fill in the blank)

12. For unique solution in $a_1x + b_1y = c_1$ and $a_2x + b_2y = c_2$ if $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$. (True/False)

13. If $a_n = 5n + 2$, find a_2.

Or

What is the 10th term of the A.P. : 2, 7, 12, ... ?

14. The value of cos θ increases as θ increases. (True/False)

15. All squares are ..... (similar/congruent)
(Choose correct word)

16. The distance between $P(x_1, y_1)$, and $Q(x_2, y_2)$ is ..... .
(Fill in the blank)

Or

Write the formula for find the area of a triangle whose vertices are $P(x_1, y_1)$, $Q(x_2, y_2)$ and $R(x_3, y_3)$.

17. Write one application of Trigonometry.

18. Define Concentric circles.

19. If P(A) = 0, write $P(\bar{A})$/P(Not A).

20. Length of an arc of a circle with radius r and angle with degree measure θ is ..... . (Fill in the blank)

Section–B 2 each

21. Find H.C.F. and L.C.M. of 26 and 91 using prime factorisation.

22. A toy is in the form of a cone of radius 3.5 cm mounted on a hemisphere of same radius. The total height of the toy is 15.5 cm. Find the total suruface area of the toy.

23. Find whether the pair of linear equations are consistent or inconsistent :

$$2x - 3y = 8$$

$$4x - 6y = 9$$

24. Find the value of $\frac{2\tan 30°}{1+\tan^2 30°}$.

Or

Find the value of $\frac{\tan 65°}{\cot 25°}$.

25. One card is drawn from a well shuffled deck of 52 cards. Calculate the probability that the card will : http://www.jkboseonline.com

(i) be an ace

(ii) not be an ace

26. The marks obtained by 30 students of class 'X' of a certain school in a Mathematics paper consisting of 100 marks are presented in table below. Find the mean of the marks obtained by the students :

Marks Obtained (x_i)	10	20	36	40	50	56	60	70	72	80	88	92	95
Number of Studnets (f_i)	1	1	3	4	3	2	4	4	1	1	2	3	1

Section–C

3 each

27. Find the zeroes of the quadratic polynomial $x^2 + 7x + 10$ and verify the relationship between zeroes and the coefficients.

Or

Divide $2x^2 + 3x + 1$, by $x + 2$ and find the quotient and the remainder.

28. Solve the pair of linear equations by substitution method :

$$7x - 15y = 2$$

$$x + 2y = 3$$

29. Find the roots of the quadratic equation using the quadratic formulae $3x^2 - 5x + 2 = 0$.

30. How many terms of the A.P. : 24, 21, 18, ... must be taken so that their sum is 78.

Or

Find the sum of the odd numbers between 0 and 50.

31. Prove the identity :

$$\frac{\cos A}{1+\sin A} + \frac{1+\sin A}{\cos A} = 2\sec A$$

32. Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

Or

Prove that the parallelogram circumscribing a circle is a rhombus.

33. Find the area of the sector of a circle with radius 4 cm and of angle 30°. Also find the area of the corresponding major sector (using $\pi = 3.14$).

34. A metallic sphere of radius 4.2 cm is melted and recast into a shape of a cylinder of radius 6 cm. Find the height of cylinder.

Section–D

4 each

35. Find the roots of the equation $5x^2 - 6x - 2 = 0$ by the method of completing the square.

Or

The difference of squares of two numbers is 180. The square of the smaller number is 8 times the larger number. Find the two numbers.

36. From the top of a 7 m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of the foot is 45°. Determine the height of the tower.

37. Find the point on the Y-axis which is equidistant from the points A(6, 5) and B(–4, 3).

Or

Find the value of k if the points A(2, 3), B(4, k) and C(6, –3) are collinear.

38. In a right angled triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides. Prove it.

Or

In an equilateral triangle ABC, D is the point on side BC such that $BD = \frac{1}{3}BC$. Prove that $9(AD)^2 = 7(AB)^2$.

39. Construct a triangle of sides 4 cm, 5 cm and 6 cm and then a triangle similar to it whose sides are $\frac{2}{3}$ of the corresponding sides of the first triangle.

40. A survey conducted on 20 households in a locality by a group of students resulted in the following frequency table for the number of family members in a household :

Family Size	1–3	3–5	5–7	7–9	9–11
Number of Families	7	8	2	2	1

Find the mode of this data.

C–3–C

Roll No.....

Total No. of Questions : **20**] [Total No. of Printed Pages : 7

XBAMKD20

1303–C

MATHEMATICS

Time : 3 Hours] **[Maximum Marks : 10**

1. In each of the following write down the correct answer on your answer-book :

(i) A line which intersects a circle in two distinct points is called :

(A) A Secant

(B) A Tangent

(C) A Chord

(D) None of these

(ii) The value of 'm' for which the quadratic equation $x^2 - mx + 4 = 0$ has equal roots is :

(A) ± 4

(B) $+4$

(C) -4

(D) None of these

8. Find the value of 'P' for which the given system of equations :

$$2x + 3y - 5 = 0 \text{ and}$$

$$Px - 6y - 8 = 0$$

has a unique solution. 4

9. Find a quadratic polynomial, the sum and product of its zeroes are $-\frac{1}{4}, \frac{1}{4}$ respectively. 4

10. A die is thrown once, find the probability of getting :

(a) A prime number

(b) A number lying between 2 and 6 4

11. Find two numbers whose sum is 27 and product is 182.

Or

Find the roots of the quadratic equation $2x^2 - 7x + 3 = 0$ by the method of completing the square. 6

12. The difference of squares of two numbers is 180. The square of the smaller number is 8 times the larger number. Find the two numbers.

Or

Find the nature of the roots of the quadratic equation $3x^2 + 4\sqrt{3}x + 4 = 0$. If real roots exists, then find them. 6

13. If the areas of two similar triangles are equal, then prove that they are congruent.

Or

Diagonals of a trapezium ABCD with AB parallel to CD intersect each other at point O. If AB = 2 CD, find the ratio of the areas of triangles AOB and COD. 6

14. ABC is an equilateral triangle of side $2a$. Find each of its altitudes.

Or

Prove that in a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides. 6

15. Find the co-ordinates of a point A, where AB is the diameter of a circle whose centre is (2, –3) and B is (1, 4).

Or

Find the value of 'K' for which the points (8, 1), (K, –4) and (2, –5) are collinear. 6

16. Prove that :

$$\frac{\cos A}{1+\sin A}+\frac{1+\sin A}{\cos A}=2\sec A$$

(iii) From the letters of the word "MOBILE", a letter is selected. The probability that the selected letter is a vowel is :

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

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

(C) $\frac{1}{6}$

(D) None of these 1

(iv) Curved surface area of the cylinder is :

(A) Perimeter of the base × Height

(B) Area of the base × Height

(C) 3 × Area of base

(D) None of these 1

(v) If $x^2 = 0.4$, then 'x' is a :

(A) Rational number

(B) Irrational number

(C) Composite number

(D) None of these 1

(vi) If three numbers a, b, c in order are in A.P., then :

(A) $2b = a + c$

(B) $2a = b + c$

(C) $2c = a + b$

(D) None of these 1

2. Find the distance between the points A$(-a, -b)$ and B(a, b). 2

3. If $\sin A = \frac{3}{4}$ calculate cos A and tan A. 2

4. Express 156 and 140 as a product of its prime factors. 2

5. AB is the diameter. TB is the tangent to the circle. If Q is a point on TB, then find QA. 4

6. Find the 31st term of an A.P. whose 11th term is 38 and the 16th term is 73.

7. Solve the following pair of linear equations by the method of elimination :

$$3x + 4y - 10 = 0$$

$$2x - 2y - 2 = 0$$

Or

If 15 cot A = 8, calculate all other trigonometric ratios. 6

17. Evaluate :

$$\frac{5\cos^2 60° + 4\sec^2 30° - \tan^2 45°}{\sin^2 30° + \cos^2 30°}$$

Or

From a point on the ground, the angles of elevation of the bottom and top of a transmission tower fixed at the top of a 20 m high building are 45° and 60° respectively. Find the height of the tower. 7

18. Construct a triangle with sides 5 cm, 6 cm and 7 cm and then another triangle whose sides are $\frac{7}{5}$ of the corresponding sides of the first triangle. Also write down steps of construction.

Or

Draw a circle of radius 3 cm. Take two points at a distance 7 cm from its centre. Draw tangents to the circle from these two points. Also write down steps of construction. 7

19. Prove that the tangents drawn at the ends of a diameter of a circle are parallel.

Or

Prove that the lengths of tangents drawn from an external point to a circle are equal. 7

20. 2 cubes each of volume 64 cm^3 are joined end to end. Find the surface area of the resulting cuboid.

Or

A drinking glass is in the shape of a frustum of a cone of height 14 cm. The diameters of its two circular ends are 4 cm and 2 cm. Find the capacity of the glass. 7

A–3–X

Roll No.....

Total No. of Questions : **20]**

[Total No. of Printed Pages : **7**

XRSZJF19

22103-X

MATHEMATICS

Time : 3 Hours]

[Maximum Marks : 100

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1. (i) Define a prime number.

(ii) Give an example of linear polynomial.

(iii) Which of the following is not an A.P. ?

(A) 5, 15, 25, 35, ...

(B) 3, 5, 8, 11, ...

(C) $\frac{1}{2}, 1, \frac{3}{2}, 2, \ldots\ldots$

(D) None of these

(iv) A card is drawn at random from a well shuffled deck of 52 cards. The probability of getting a queen is :

(A) 1/4

(B) 1/13

(C) 2/13

(4) None of these

(v) Volume of frustum of a cone is equal to :

(A) $\frac{1}{3}\pi r^2 h$

B) $\frac{1}{3}\pi h\ (r_1^2 + r_2^2 + r_1 r_2)$

(C) $\frac{1}{3}\pi h\ (r_1 + r_2 + r_1 r_2)$

(D) None of these

(vi) Sides of two similar triangles are in the ratio 4 : 9. Areas of these triangles are in the ratio :

(A) 2 : 3

(B) 16 : 81

(C) 81 : 16

(D) None of these

2. Find the distance between the points (0, 0) and (36, 15).

3. Express sin 67° + cos 75º in terms of trigonometric ratios of angles between 0° and 45°.

4. A tangent PQ at a point P of a circle of radius 5 cm meets a line through the centre O at a point Q so that OQ = 12 cm. Find PQ. https://www.jkboseonline.com

5. How many three-digit numbers are divisible by 7 ?

6. Given that HCF (306, 657) = 9, find LCM (306, 657).

7. Solve the following pair of linear equations by the substitution method :

x + y = 14

x - y = 4

8. For what values of k will the following pair of linear equations have infinitely many solutions ?

$kx + 3y - (k - 3) = 0$

$12x + ky - k = 0$

9. Find the zeroes of the quadratic polynomial $6x^2 - 3 - 7x$.

10. A die is thrown once. Find the probability of getting :

(i) a prime number

(ii) an odd number

11. The altitude of a right triangle is 7 cm less than its base. If the hypotenuse is 13 cm, find the other two sides.

Or

Find the roots of the quadratic equation $2x^2 + x = 4 = 0$, by the method of completing the square. https://www.jkboseonline.com

12. Rohan's mother is 26 years older than him. The product of their ages (in years) 3 years from now will be 360. Find Rohan's present age.

Or

Find the nature of the roots of the quadratic equation :

$3x^2 - 4\sqrt{3}x + 4 = 0$.

If the real roots exist, find them.

13. Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then the other two sides are divided in the same ratio.

Or

A vertical pole of length 6 m casts a shadow 4 m long on the ground and at the same time a tower casts a shadow 28 m long, Find the height of the tower.

14. D and E are points on the sides CA and CB respectively of a triangle ABC right-angled at C. Prove that :

$AE^2 + BD^2 = AB^2 + DE^2$

Or

Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding medians.

15. If (1, 2), (4, y), (x, 6) and (3, 5) are the vertices of a parallelogram taken in order, find x and y.

Or

Find the area of the triangle whose vertices are (2, 3), (-1, 0) and (2, 4).

16. In triangle ABC, right-angled at B, if $\tan A = \frac{1}{\sqrt{3}}$, find the value of :

sin A cos C + cos A sin C

OR

Write all the other trigonometric ratios of $\angle A$ in terms of sec A.

17. From the top of a 7 m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 45º. Determine the height of the tower.

Or

Find all trigonometric ratios of 45° geometrically.

18. Prove that the parallelogram circumscribing a circle is a rhombus.

Or

Prove that the lengths of tangents drawn from an external point to a circle are equal.

19. Draw a triangle ABC with side BC = 6 cm, AB = 5 cm and ∠ABC = 60°. Then construct a triangle whose sides are 3/4 of the corresponding sides of the triangle ABC.

OR

Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60°.

20. A 20 m deep well with diameter 7 m is dug and the earth from digging is evenly spread out to form a platform 22 m by 14 m. Find the height of the platform.

Or

A solid is in the shape of a cone standing on a hemisphere with both their radii being equal to 1 cm and the height of the cone is equal to its radius. Find the volume of the solid in terms of π.

Roll No.....

A–3–Y

Total No. of Questions : 20] [Total No. of Printed Pages : 7

XRSZJF19

22103-Y

MATHEMATICS

Time : 3 Hours] **[Maximum Marks : 100**

1. (i) Define odd number.

(ii) Give an example of a cubic polynomial.

(iii) Which of the following is an A.P. ?

(A) –2, 4, –8, 16, ...

(B) 5, 15, 35, 65, ...

(C) –3, –6, –9, –12, ...

(D) None of these

(iv) If E is an event such that $P(E) = \frac{3}{5}$, then $P(\bar{E})$ is equal to :

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

(B) $\frac{3}{5}$

(C) $\frac{4}{5}$

(D) None of these

(v) The curved surface area of the frustum of the cone is :

(A) $\pi(r_1 + r_2)$

(B) $\pi l(r_1 + r_2)$

(C) πrl

(D) None of these

(vi) A line segment of length 50 cm is divided in the ratio of 2 : 3 internally, the measure of two parts (in cm) in the given ratio respectively would be :

(A) 20 : 15

(B) 30 : 20

(C) 20 : 30

(D) None of these $1 \times 6 = 6$

2. Find the distance between the points (0, 0) and (36, 15). 2

3. Evaluate :

$$\frac{\tan 65°}{\cot 25°}$$ 2

4. From an external point T, a tangent PT is drawn to a circle whose centre is O. If PT = 21 cm, OT = 29 cm, then find OP. 2

5. Which term of the A.P. :

3, 8, 13, 18, ...

is 78 ? 4

6. Given that HCF (306, 657) = 9, find LCM (306, 657). 4

7. Solve the following pair of linear equations by the substitution method :

$$3x - y = 3$$

$$9x - 3y = 9$$ 4

8. For which value of k will the following pair of linear equations have no solution ?

$$3x + y = 1$$

$$(2k - 1)x + (k - 1)y = 2k + 1$$ 4

9. Find a quadratic polynomial, the sum and product of whose zeroes are 0 and $\sqrt{5}$ respectively. 4

10. A bag contains 3 red balls and 5 black balls. A ball is drawn at random from the bag. What is the probability that the ball drawn is :

(i) red

(ii) not red ? 4

11. The altitude of a right triangle is 7 cm less than its base. If the hypotenuse is 13 cm, find the other two sides.

Or

Find the roots of the quadratic equation $2x^2 + x - 4 = 0$, by the method of completing the square. 6

12. Rohan's mother is 26 years older than him. The product of their ages (in years) 3 years from now will be 360. Find Rohan's present age.

Or

Find the nature of the roots of the quadratic equation :

$$3x^2 - 4\sqrt{3}x + 4 = 0.$$

If the real roots exist, find them. 6

13. Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then the other two sides are divided in the same ratio.

Or

A vertical pole of length 6 m casts a shadow 4 m long on the ground and at the same time a tower casts a shadow 28 m long. Find the height of the tower. 6

14. D and E are points on the sides CA and CB respectively of a triangle ABC right-angled at C. Prove that :

$$AE^2 + BD^2 = AB^2 + DE^2$$

Or

Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding medians. 6

15. If (1, 2), (4, y), (x, 6) and (3, 5) are the vertices of a parallelogram taken in order, find x and y.

Or

Find the area of the triangle whose vertices are (2, 3), (−1, 0) and (2, −4). 6

16. In triangle ABC, right-angled at B, if $\tan A = \frac{1}{\sqrt{3}}$, find the value of :

$$\sin A \cos C + \cos A \sin C$$

Or

Write all the other trigonometric ratios of $\angle A$ in terms of sec A. 6

17. From the top of a 7 m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 45°. Determine the height of the tower.

Or

Find all trigonometric ratios of 45° geometrically. 7

18. Prove that the parallelogram circumscribing a circle is a rhombus.

Or

Prove that the lengths of tangents drawn from an external point to a circle are equal. 7

https://www.jkboseonline.com

19. Draw a triangle ABC with side BC = 6 cm, AB = 5 cm and $\angle ABC = 60°$. Then construct a triangle whose sides are $\frac{3}{4}$ of the corresponding sides of the triangle ABC.

Or

Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60°. 7

20. A 20 m deep well with diameter 7 m is dug and the earth from digging is evenly spread out to form a platform 22 m by 14 m. Find the height of the platform.

Or

A solid is in the shape of a cone standing on a hemisphere with both their radii being equal to 1 cm and the height of the cone is equal to its radius. Find the volume of the solid in terms of π. 7

Roll No.....

C–3–B

Total No. of Questions : **20]** [Total No. of Printed Pages : **7**

10^{th} BAKDF-M19

22503–B

MATHEMATICS

Time : 3 Hours] **[Maximum Marks : 100**

1. (i) 11 is a/an :

   (A) Composite number (B) Odd number

   (C) Even number (D) None of these

   (ii) Sum of the zeroes of the polynomial $x^2 - 7x + 10$ is :

   (A) –7 (B) 10

   (C) 7 (D) None of these

   (iii) A card is drawn from a pack of 52 cards. What is the probability of getting the ace of spades ?

   (A) $\frac{1}{52}$ (B) $\frac{12}{52}$

   (C) $\frac{26}{52}$ (D) None of these

(iv) Sum of the first 10 terms of natural numbers is :

(A) 50 (B) 55

(C) 45 (D) None of these

(v) The slant height of a cone whose radius 'r' and height 'h' is :

(A) $\sqrt{r^2 - h^2}$ (B) $\sqrt{r^2 + h^2}$

(C) $\sqrt{r + h}$ (D) None of these

(vi) If a point P divides a line segment AB in the ratio of 1 : 3, then the ratio of BP to AB will be :

(A) 3 : 4 (B) 3 : 1

(C) 1 : 4 (D) None of these $1 \times 6 = 6$

2. TP and TQ are the two tangents to a circle with centre O such that $\angle POQ = 110°$. Find $\angle PTQ$. 2

3. Find the area of a triangle whose vertices are (2, 3), (–1, 0) and (2, –4). 2

4. If $\tan 2A = \cot (A - 18°)$, where 2A is an acute angle, find the value of A. 2

5. Find the sum of $7 + 10\frac{1}{2} + 14 + \ldots\ldots\ldots + 84$. 4

6. Find the HCF and LCM of 6, 72 and 120, using the prime factorization method. 4

7. The difference of two numbers is 26 and one number is three times the other. Find them. 4

8. Solve the pair of linear equations $3x - 5y = 4$ and $9x - 2y = 7$ by the elimination method. 4

9. Divide $x^3 - 3x^2 + 5x - 3$ by $x^2 - 2$. 4

10. A bag contains 3 red balls and 5 black balls. A ball is drawn at random from the bag. What is the probability that the ball drawn is (i) red, (ii) not red ? 4

11. Rohan's mother is 26 years older than him. The product of their ages (in years) 3 years from now will be 360. Find Rohan's present age.

Or

Find the roots of the quadratic equation $100x^2 - 20x + 1 = 0$ by factorization. 6

12. Find two consecutive odd positive integers, sum of whose squares is 290.

Or

Find the roots of the quadratic equation $4x^2 + 4\sqrt{3}x + 3 = 0$, by the method of completing the square. 6

13. If a line intersects AB and AC of a ΔABC at D and E respectively and is parallel to BC, prove that :

$$\frac{AD}{AB} = \frac{AE}{AC}$$

Or

Let $\Delta ABC \sim \Delta DEF$ and their areas be, respectively, 64 cm^2 and 121 cm^2. If EF = 5.4 cm, find BC. 6

14. Prove that in a triangle, if square of one side is equal to the sum of the squares of the other two sides, then the angle opposite the first side is a right angle.

Or

If AD and PM are medians of triangles ABC and PQR, respectively, where $\Delta ABC \sim \Delta PQR$, prove that :

$$\frac{AB}{PQ} = \frac{AD}{PM}$$ 6

15. Find a relation between x and y such that the point (x, y) is equidistant from the points $(3, 6)$ and $(-3, 4)$.

Or

Find the ratio in which the line segment joining the points $(-3, 10)$ and $(6, -8)$ is divided by $(-1, 6)$. 6

16. If $\cot \theta = \frac{7}{8}$, evaluate :

$$\frac{(1+\sin\theta)(1-\sin\theta)}{(1+\cos\theta)(1-\cos\theta)}$$

Or

Prove the identity :

$$\frac{\sin\theta - 2\sin^3\theta}{2\cos^3\theta - \cos\theta} = \tan\theta$$ 6

17. From a point on a bridge across a river, the angles of depression of the banks on opposite sides of the river are 30° and 45°, respectively. If the bridge is at a height of 3 m from the banks, find the width of the river.

Or

A kite is flying at a height of 60 m above the ground. The string attached to the kite is temporarily tied to a point on the ground. The inclination of the string with the ground is 60°. Find the length of the string, assuming that there is no slack in the string. 7

18. Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact.

Or

The length of a tangent from a point A at distance 5 cm from the centre of the circle is 4 cm. Find the radius of the circle. 7

19. Construct an isosceles triangle whose base is 8 cm and altitude 4 cm and then another triangle whose sides are $1\frac{1}{2}$ times the corresponding sides of the isosceles triangles.

Or

Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60°. 7

20. Metallic spheres of radii 6 cm, 8 cm and 10 cm, respectively, are melted to form a single solid sphere. Find the radius of the resulting sphere.

Or

A fez, the cap used by the Turks, is shaped like the frustum of a cone. If its radius on the open side is 10 cm, radius at the upper base is 4 cm and its slant height is 15 cm, find the area of material used for making it. 7

C–3–A

Roll No. .....

Total No. of Questions : 20] [Total No. of Printed Pages : 7

SSERKDO18

20203-A

MATHEMATICS

Time : 3 Hours] **[Maximum Marks : 100**

Note :– Attempt all questions.

1. Choose the correct answer :

   (i) The number 1·732 is :

   (a) an integer

   (b) a rational number

   (c) an irrational number

   (d) none of these

   (ii) The zeroes of the polynomial $x^2 - \sqrt{2}x - 12$ are :

   (a) $\sqrt{2}, -\sqrt{2}$

   (b) $3\sqrt{2}, -2\sqrt{2}$

   (c) $-3\sqrt{2}, 2\sqrt{2}$

   (d) None of these

Turn Over

(iii) The common difference of the A.P.

$$\frac{1}{P}, \frac{1-P}{P}, \frac{1-2P}{P}, \ldots\ldots\ldots\ldots$$

is :

(a) 1 (b) -1

(c) $-P$ (d) None of these

(iv) Draw an angle of 45° with the help of compass and ruler.

(v) Total surface area of the frustum of a cone is :

(a) $\pi l(r_1 + r_2)$ (b) πrl

(c) $\pi l(r_1 + r_2) + \pi r_1^2$ (d) None of these

(vi) The probability of getting 8 in a single throw of a die is

(a) 0 (b) 1

(c) -1 (d) None of these

2. From a point A the length of the tangent to a circle is 24 cm and the distance of A from the centre is 25 cm. Find the radius of the circle.

3. Find the distance between the points A$(-a, -b)$ and B(a, b).

4. Express the trigonometric ratio's sin A and tan A in terms of cot A.

5. Define Algorithm and use Euclid's division algorithm to find the H.C.F. of 135 and 225.

6. Find the zeroes of the polynomial $x^2 - 2x - 8$ and also verify the relationship between the zeroes and the co-efficients. 4

How many three-digit numbers are divisible by 7 ? 4

8. Solve the following pair of linear equations by substitution method :

$$s - t = 3$$

$$\frac{s}{3} + \frac{t}{2} = 6$$

9. For which values of P does the pair of equations

$$4x + Py + 8 = 0$$

and

$$2x + 2y + 2 = 0$$

have unique solution.

10. One card is drawn from a well-shuffled deck of 52 cards. Calculate the probability that the card will :

(i) be an ace

(ii) not be an ace.

11. The altitude of a right triangle is 7 cm less than its base. If the hypotenuse is 13 cm, find the other two sides.

Or

Find the roots of the quadratic equation $2x^2 - 5x + 3 = 0$ by the method of completing the square.

12. Find the discriminant of the quadratic equation $9x^2 - 6x + 1 = 0$ and hence find the nature of its roots. Find them if they are real.

Or

The difference of squares of two numbers is 180. The square of the smaller number is 8 times the larger number. Find the two numbers.

13. ABCD is a trapezium in which AB $\parallel$ DC and its diagonals intersect each other at a point O. Show that :

$$\frac{AO}{BO} = \frac{CO}{DO}$$

Or

D, E and F are respectively the mid-points of sides AB, BC and CA of Δ ABC. Find the ratio of areas of ΔDEF and ΔABC.

14. In a triangle if square of one side is equal to the sum of the squares of the other two sides, prove that the angle opposite to the first side is a right angle.

Or

PQR is a triangle right angled at P and M is a point on QR such that PM is perpendicular to QR. Show that :

$$PM^2 = QM \cdot MR$$

15. Find a relation between x and y such that the point (x, y) is equidistant from the points $(3, 6)$ and $(-3, 4)$.

Or

Find the co-ordinates of the points of trisection of the line segment joining $(4, -1)$ and $(-2, -3)$.

16. Prove that :

$$\frac{\sin\theta - 2\sin^3\theta}{2\cos^3\theta - \cos\theta} = \tan\theta$$

Or

Given $\sec\theta = \frac{13}{12}$. Calculate all other trigonometric ratios. 6

17. From a point on the ground, the angle of elevation of the bottom and the top of a transmission tower fixed at the top of a 20 m high building are 45° and 60° respectively. Find the height of the tower.

Or

Evaluate :

$$\frac{\sin 30° + \tan 45° - \operatorname{cosec} 60°}{\sec 30° + \cos 60° + \cot 45°}$$

18. Prove that the lengths of the tangents drawn from an external point to a circle are equal.

Or

Prove that the tangents drawn at the ends of a diameter of a circle are parallel. https://www.jkboseonline.com

19. Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60°.

Or

Draw a triangle ABC with sides BC = 7 cm, $\angle B = 45°$, $\angle A = 105°$. Then construct a triangle whose sides are $\frac{4}{3}$ times the corresponding sides of ΔABC. 7

20. A metallic sphere of radius 4·2 cm is melted and recast into the shape of a cylinder of radius 6 cm. Find the height of the cylinder.

Or

A container opened from the top and made up of a metal sheet, is in the form of a frustum of a cone of height 16 cm with radii of its lower and upper ends 8 cm and 20 cm respectively. Find the cost of the milk which can completely fill the container at the rate of Rs. 20 per litre.

Roll No.:

Total No. of Questions : 20

Total No. of Printed Pages : 8

G-4
S-2

XRKN15

6303–B

MATHEMATICS

Annual Class – 10th

Session – November, 2015

Time : 3 hours **Maximum Marks : 100**

1. Do as directed :

(i) The Probability of an event cannot be less than

(a) 1

(b) 0.3

(c) -1

(d) None of these.

(Choose the correct one)

(ii) Define an Odd number. V

(iii) If the radius of a hemisphere is 2 cm, its curved surface area will be

(a) 2π cm^2

(b) 4π cm^2

(c) 8π cm^2

(d) None of these.

(Choose the correct one)

(iv) A polynomial of degree 3 is called a

(a) Cubic polynomial

(b) Zero polynomial

(c) Quadratic polynomial

(d) None of these.

(Choose the correct one)

(v) The next term of – 3.2, - 5.2, - 7.2 is

(a) 9.2

(b) – 9.24

(c) 11.2

(d) None of these.

(Choose the correct one)

(vi) Bisect a line segment of length 5 cm.

2. A tangent PQ at a point 'P' of a circle of radius 5 cm meets a line through the centre 'O' at a point ‘Q’ so that PQ = 12 cm. Find OQ.

3. Find the area of the triangle whose vertices are (- 5, -1), (3, - 5) and (5, 2).

4. If sec 4A = cosec (A - 20°), where 4A is an acute angle, find the value of A.

5. Find the HCF and LCM of 6, 72 and 120, using the prime factorization method.

6. Find the zeroes of the Polynomial $4S^2 – 4S+1$.

7. Find the sum of the first 1000 positive integers.

8. If we add 1 to the numerator and subtract 1 from the denominator, a fraction reduces to 1. It becomes 1/2 if we only add 1 to the denominator. What is the fraction ?

9. Solve the following pair of equations by substitution method :

$3x – y = 3$

$9x – 3y = 9$.

10. Eleven bags of wheat flour, each marked 5 kg, actually contained the following weights of flour (in kg) : https://www.jkboseonline.com

4.97, 5.05, 5.08, 5.03, 5.00, 5.06, 5.08, 4.98, 5.04, 5.07, 5.00.

Find the probability that any of these bags chosen at random contain more than 5 kg of flour.

11. Two water taps together can fill a tank in $9\frac{3}{8}$ hours. The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill in the tank.

Or

Find the roots of the quadratic equation $2x^2 - 7x+3 = 0$ by applying the quadratic formula.

12. Find the roots of the equation $5x^2 - 6x + 2 = 0$ by the method of completing the square.

OR

Find the roots of the quadratic equation $2x^2 - x + \frac{1}{8} = 0$ by factorization.

13. If AD and PM are medians of triangle ABC and PQR, respectively where Δ ABC~ ΔPQR, prove that $\frac{AB}{PQ} = \frac{AD}{PM}$.

OR

If a line divides any two sides of a triangle in the same ratio, then the line is parallel to the third side. Prove it.

14. In an equilateral triangle ABC, D is a point on side BC such that BD =1/3 BC. Prove that $9AD^2 = 7AB^2$.

OR

A ladder is placed against a wall such that its foot is at a distance of 2.5 m from the wall and its top reaches a window 6 m above the ground. Find the length of the ladder.

15. Find a relation between x and y such that the point (x, y) is equidistant from the points (7, 1) and (3,5).

OR

Find the co-ordinates of the point which divides the join of (-1, 7) and (4, -3) in the ratio 2 : 3.

16. If $\cot\theta = \frac{7}{8}$, evaluate

$$\frac{(1+\sin\theta)\,(1-\sin\theta)}{(1+\cos\theta)\,(1-\cos\theta)}$$

Or

Prove the identity :

$$\frac{\sin\theta - 2\sin^3\theta}{2\cos^3\theta - \cos\theta)} = tan\theta$$

17. From a point on a bridge across a river, the angles of depression of the banks on opposite sides of the river are 30° and 45°, respectively. If the bridge is at a height of 3 m from the banks, find the width of the river.

Or

From a point on the ground, the angles of elevation of the bottom and the top of a transmission tower fixed at the top of a 20 m high building are 45º and 60° respectively. Find the height of the tower. https://www.jkboseonline.com

18. Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact.

OR

Two concentric circles are of radii 5 cm and 3 cm. Find the length of the Chord of the larger circle which touches the smaller circle.

19. Construct a triangle with sides 5 cm, 6 cm and 7 cm and then another triangle whose sides are 7/5 of the corresponding sides of the first triangle.

OR

Draw a circle of radius 6 cm. From a point 10 cm away from its centre, construct the pair of tangents to the circle.

20. A fez, the cap used by the Turks, is shaped like the frustum of a cone. If its radius on the open side is 10 cm, radius at the upper base is 4 cm and its slant height is 15 cm, find the area of material used for making it.

Or

A metallic sphere of radius 4.2 cm is mud and recast into the shape of a cylinder of radius 6 cm. Find the height of the cylinder.