

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.

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B-3-X

Turn Over

- (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. $-5, -1, 3, 7, \dots$ 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 $\cos 72^\circ - \sin 18^\circ$ 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 $\triangle ABC$ 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 $P(\text{not } E)$. $\bigcirc$

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 :

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

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.jkbosenonline.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 $AB \parallel DC$ 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

B-3-Y

Roll No... ..

Total No. of Questions : **40**

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10th SZJDAR22

6203-Y

MATHEMATICS

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3 marks each.

10th SZJDAR22—6203-Y

B-3-Y

Turn Over

(2)

(v) Section-D (Q. No. 35 to 40) comprises of six questions of 4 mark 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. $\frac{1}{3}, \frac{5}{3}, \frac{9}{3}, \frac{13}{3}, \dots$ is :

~~(A)~~ $\frac{4}{3}$

(B) 4

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

(D) None of these

2. 4 is :

(A) A prime number

~~(B)~~ A rational number

(C) An irrational number

(D) None of these

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B-3-Y

3. The zeroes of the quadratic polynomial $x^2 - 1$ are :

(A) 2, 1

(B) 1, 1

(C) 1, -1

(D) None of these

4. How many tangents can a circle have ?

(A) 1

(B) 2

(C) Infinitely many

(D) None of these

Turn Over

5. Product of the roots of the quadratic equation $5x^2 - 6x - 2 = 0$ is

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

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

(C) $\frac{6}{5}$

(D) None of these

6. Circumference of a circle is given by :

(A) $2\pi r$

(B) $-2\pi r$

(C) πr

(D) None of these

7. The midpoint of the line segment joining the points (x_1, y_1) and (x_2, y_2) is

(A) $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$

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(B) $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$

(C) $\left(\frac{x_1 x_2}{2}, \frac{y_1 y_2}{2} \right)$

(D) None of these

8. Which of the following cannot be the probability of an event :

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

(B) 0.7

(C) -1.5

(D) None of these

9. $\sin (90 - \theta)$ is equal to :

(A) $\cos \theta$

(B) $-\cos \theta$

(C) $\sin \theta$

(D) None of these

10. If the lines represented by the equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ are intersecting, then :

(A) $\frac{a_1}{a_2} = \frac{b_1}{b_2}$

(B) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$

(C) $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

(D) None of these

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

11. HCF of 6 and 20 is~~2~~..... . (2, 6)

12. If angle between two tangents drawn from a point P to a circle of radius a and centre O is 60° , then $OP = a\sqrt{3}$ (True/~~False~~)

13. If the first term of an A.P. is -5 and the common difference is 2 , then the 10th term is -13 . (True/False)

Or

The sum of first 10 odd natural numbers is 100. (True/False)

14. $\sin \theta = \cos \theta$ for all values of θ . (True/False)

15. All circles are (Congruent/Similar)

16. Define x -coordinate of a point.

Or

Write a formula for finding the coordinates of the point

$P(x, y)$ which divides the line segment joining the points $A(x_1, y_1)$

and $B(x_2, y_2)$, internally, in the ratio $m_1 : m_2$.

17. What is the angle of depression ?
18. State SAS similarity criterion for two triangles.
19. If $P(E) = 0.5$, what is the probability of 'not E' ?
20. If $r = 1$ unit, find the volume of sphere.

2 each

Section-B

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

21. Express 140 as a product of its prime factors.
22. 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.

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 :

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

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

(i) a prime number

(ii) an odd number

Turn Over

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 :

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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.

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.

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Find the value of 'K' for which the quadratic equation $Kx(x - 2) + 6 = 0$ has two equal roots. <https://www.jkboseonline.com>

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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 $AB \parallel DC$ intersect each other at the point O. Using a similarity criterion for two triangles, show that :

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

Find the median weight of the students :

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45-50	3
50-55	8
55-60	6
60-65	6
65-70	3
70-75	2

B-3-Z

Roll No. _____

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10th SZJDAR22

6203-Z

MATHEMATICS

Time : 2.30 Hours]

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10th SZJDAR22-6203-Z

B-3-Z

Turn Over

(2)

(v) Section-D (Q. No. 35 to 40) comprises of six questions of 4 mark 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. $\frac{5}{2}, 3, \frac{7}{2}, \dots$ is :

(A) 2

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

☒ (C) $\frac{1}{2}$

(D) None of these

2. 5 is :

(A) An even number

☒ (B) A prime number

(C) A composite number

(D) None of these

3. $2 - x^3$ is :

(A) A linear polynomial

(B) A quadratic polynomial

☒ (C) A cubic polynomial

(D) None of these

4. Sum of the roots of the quadratic equation $ax^2 + bx + c = 0$,

$a \neq 0$ is :

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

☒ (B) $-\frac{b}{a}$

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

(D) None of these

5. A line which touches a circle at one point is called :

- (A) ☒ Tangent
- (B) Secant
- (C) Chord
- (D) None of these

6. Area of the sector is given by :

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

(B) ☒ $\frac{\theta}{360} \times \pi r^2$

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

- (D) None of these

7. The distance of the point A(x, y) from the origin O(0, 0) is :

(A) $\sqrt{x^2 - y^2}$

(B) $\sqrt{x^2 + y^2}$

(C) $\sqrt{x+y}$

(D) None of these

8. The probability of getting a number less than 7 in a single throw of a die is :

(A) 1

(B) 0

(C) $\frac{6}{7}$

(D) None of these

9. The value of $\frac{\tan 65^\circ}{\cot 25^\circ}$ is :

(A) 1

(B) -1

(C) 0

(D) None of these

(6)

The solution of the pair of linear equations $x + 2y = 3$ and $x + y = 3$ is :

(A) $x = 0, y = 3$

(B) $x = -3, y = 0$

(C) $x = 3, y = 0$

(D) None of these

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

11.. H.C.F. of 42 and 63 = (42, 21)

12. If angle between two radii of a circle is 130° , then angle between the tangents at the ends of the radii is 50° . (True/False)

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B-3-Z

13. The next term of the A.P. $\sqrt{27}, \sqrt{48}, \sqrt{75}, \dots$ is $\sqrt{106}$.

(True/False)

Or

The sum of first 3 terms of the A.P. whose n th term is given by

$$a_n = 2n + 1 \text{ is } 15.$$

(True/False)

14. $\sin^2 \theta + \cos^2 \theta = 1$ for all values of θ .

(Yes/No)

15. Any two are similar.

(Triangles/Rectangles)

16. Define y-coordinate of a points.

Or

Write a formula for finding the area of a ΔABC with coordinates of the vertices as $A(x_1, y_1), B(x_2, y_2), C(x_3, y_3)$.

Turn (

17. What is the angle of elevation ?
18. State SSS similarity criterion for two triangles.
19. If $P(E) = 0.05$, what is the probability of 'not E' ?
20. If $r = 2$ cm, then find curved surface area of hemisphere in terms of π .

Section-B**2 each**

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

21. Express 156 as a product of its prime factors.
22. A solid 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 .

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

$$x + y = 14$$

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

Or

Find the value of :

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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 $g(x)$.

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Find the height of the tower.

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Turn Over

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 $AB \parallel DC$ intersect each other at the point O. Using a similarity criterion for two triangles, show that :

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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

XAPBIKD22—6803-C(New)

Turn Over

H-3-C

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 $\frac{2 \tan 30^\circ}{1 - \tan^2 30^\circ}$ is :
 (A) $\cos 60^\circ$ (B) $\sin 60^\circ$
 (C) $\tan 60^\circ$ (D) $\sin 30^\circ$
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. $-3, -\frac{1}{2}, 2, \dots$ 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.

XAPBIKD22—6803-C(New)

Turn Over

H-3-C

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 $\sec 4A = \operatorname{cosec} (A - 20^\circ)$ where $4A$ is an acute angle, find the value of A .

Or

Evaluate :

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

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

XAPBIKD22—6803—C(New)

H-3-C

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.

REPRODUCED FROM CBSE (New)

H-3-C

Turn Over

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 :

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

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.

XAPBIKD22—6803—C(New)

H-3-C

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.

XAPBIKD22—6803—C(New)

H-3-C

Turn Over

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

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XAPBIKD22—6803—C(New)

H-3-C

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B-3-B

Roll No.

Total No. of Questions : 40+20+20]

[Total No. of Printed Pages : 24

XthBAJKLK22

8003-B

MATHEMATICS

(New/Old/Old II Course)

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.

XthBAJKLK22—8003-B (New)

Turn Over

B

(New Course)**Section-A**

Note :— Q. Nos. 1 to 10 are MCQs of 1 mark each.

- H.C.F. of 135 and 225 is :
 (A) 15 (B) 9
 (C) 45 (D) None of these
- Every constant is a polynomial of degree :
 (A) 1 (B) 2
 (C) 0 (D) None of these
- If in a quadratic equation $ax^2 + bx + c = 0$ ($a \neq 0$), $c = 0$, then roots of quadratic equation are :
 (A) One root is 0 (B) Both roots are 0
 (C) None root is 0 (D) None of these
- If a, b, c are in A.P., then b is equal to :
 (A) $\frac{a-c}{2}$ (B) $\frac{c-a}{2}$
 (C) $\frac{a+c}{2}$ (D) None of these

XthBAJKLK22—8003-B (New)

B-3-B

5. Any point which lies on x -axis has y -coordinate equal to :
- (A) 1 (B) 0
(C) -1 (D) None of these
6. A tangent can meet the circle at :
- (A) 2 points (B) 1 point
(C) Centre of circle (D) None of these
7. The area of a circle whose circumference is 44 cm (using $\pi = \frac{22}{7}$) is :
- (A) $\pi \text{ cm}^2$ (B) $\frac{\pi}{2} \text{ cm}^2$
(C) $2\pi \text{ cm}^2$ (D) None of these
8. Sum of the probability of an event and its complement is always equal to : <https://www.jkboseonline.com>
- (A) 0 (B) 1
(C) Not defined (D) None of these
9. The value of $\frac{\sec 22^\circ}{\operatorname{cosec} 68^\circ}$ is :
- (A) -1 (B) 0
(C) 1 (D) None of these

10. The slant height of a Right circular cone of radius r cm and height h cm is equal to :

(A) $h^2 + r^2$

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

(C) $h^2 - r^2$

(D) $\sqrt{h^2 - r^2}$

Note :— Q. Nos. 11 to 15 are fill in the blank with 1 mark each.

11. The common point a tangent to a circle and the circle is called

.....

12. Consistent equations with unique solution meet at

(one point/no point)

13. In an A.P. series $S_n - S_{n-1} = \dots\dots\dots$ (a_{n-1}/a_n)

Or

Find the 10th term of the series 4, 8, 12,

14. $\operatorname{cosec}^2 \theta - \cot^2 \theta = \dots\dots\dots$ (0/1)

15. All circles are (congruent/similar)

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

16. Define Line of Sight.

17. Give two different examples of pair of similar figures.

XthBAJKLK22—8003-B (New)

B-3-B

18. State the converse of Basic Proportionality Theorem.

Or

State Pythagoras Theorem.

19. Define y-coordinate or ordinate.

20. If diameter of sphere = 2 unit, find the volume of sphere.

Section-B

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

21. A cubical block of side 7 cm is surmounted by a hemisphere. Find the surface area of the solid.

22. Find the H.C.F. of 96 and 404 by the prime factorisation method. Hence find their L.C.M.

23. Check wheather the pair of linear equations are consistent or inconsistent $\frac{3}{2}x + \frac{5}{3}y = 7$, $9x - 10y = 14$.

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

Or

Find the trigonometric ratios of 45° .

25. One card is drawn from a well-shuffled deck of 52 cards. Calculate the probability that the card will :
- be an ace
 - not be an ace
26. The wickets taken by a bowler in 10 cricket matches are as follows :

2 6 4 5 0 2 1 3 2 3

From the frequency distribution table of the given data, find mode of the data.

Section-C

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

27. Find the zeros of the quadratic polynomial and verify the relationship between the zeros and the coefficients

$$3x^2 - x - 4$$

Or

Divide $3x^3 + x^2 + 2x + 5$ by $1 + 2x + x^2$ and verify the division algorithm.

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

$$x + y = 14$$

$$x - y = 4$$

29. Find the roots of the quadratic equation, if they exist, using quadratic formulae

$$2x^2 - 2\sqrt{2}x + 1 = 0$$

30. Check whether 301 is a term of the list of numbers 5, 11, 17, 23, 29,

Or

Find the 11th term from the last term (towards the first term) of the A.P. series :

$$10, 7, 4, 1, \dots, -62$$

31. Prove that :

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

32. 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.

Or

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

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

34. 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 cylinder.

Section-D

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

35. Find the roots of the equation $\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}$, $x \neq -4$, $x \neq 7$.

Or

Sum of the areas of two squares is 468 m^2 . If the difference of their perimeters is 24 m, find the sides of two squares.

The angles of elevation of the top of a tower from two points of 4 m and 9 m from the base of the tower and in the same straight line with it are complementary. Find the height of the tower.

JKLK22—8003-B (New)

B

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

Or

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

38. In an equilateral triangle, D is a point on the side BC , such that $BD = \frac{1}{3}BC$. Prove that :

$$9(AD)^2 = 7(AB)^2.$$

Or

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

9. Construct a triangle similar to a given triangle ABC with its sides equal to $\frac{5}{3}$ of the corresponding sides of the triangle ABC (i.e. of scale factor $\frac{5}{3}$).

The table below gives the percentage distribution of female teachers in the primary school of rural areas of various States and U.T. of India. Find mean percentage of female teachers using step deviation method :

Percentage of Female Teachers	No. of States/U.T.
15—25	6
25—35	11
35—45	7
45—55	4
55—65	4
65—75	2
75—85	1

XthBAJKLK22**8003-B****MATHEMATICS****(New/Old/Old II Course)****Time : 3 Hours]****[Maximum Marks : 100**

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.

XthBAJKLK22—8003-B (Old)**Turn Over****B-3-B**

(Old Course)

1. Choose the correct answer :

(i) L.C.M. of 21 and 91 is :

(A) 162

(B) 182

(C) 192

(D) None of these

(ii) Zeros of the quadratic polynomial $x^2 + 7x + 10$ are :

(A) -2, 5

(B) -2, -5

(C) 2, 5

(D) None of these

(iii) If $\tan A = \frac{4}{3}$, then $\cos A$ is equal to :

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

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

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

(D) None of these

(iv) The linear equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ have infinitely solution, if :

(A) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$

(B) $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

(C) $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

(D) None of these

(v) ABC and BDE are two equilateral triangles such that D is the midpoint of BC. Ratio of the areas of the triangles ABC and BDE is :

(A) 2 : 1

(B) 1 : 2

(C) 4 : 1

(D) 1 : 4

1

(vi) Write the first three terms of A.P. when the first term a and common difference d are as :

$$a = -2 \text{ and } d = 0$$

1

2. Find a relation between x and y such that the point (x, y) is equidistant from the points $(7, 1)$ and $(3, 5)$. 2
3. If tangents PA and PB from a point P to a circle with centre O are inclined to each other at an angle of 80° , then find $\angle POA$. 2
4. A ladder 15 m long reaches a window 10 m above the ground. Find the distance of the foot of the ladder from the base of the wall. 2
5. Use Euclid's division algorithm to find H.C.F. of 196 and 38,220. 4
6. Check whether the polynomial $x^2 + 3x + 1$ is a factor of the polynomial $3x^4 + 5x^3 - 7x^2 + 2x + 2$. 4
7. Prove that the perpendicular at the point of contact to the tangent to a circle passes through the centre. 4

8. Find the roots of the quadratic equation $2x^2 - x + \frac{1}{8} = 0$ by factorization.
9. Find the area of a quadrant of a circle whose circumference is 22 cm.
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 ?
11. Solve the pair of linear equations $3x + 4y = 10$ and $2x - 2y = 2$ by substitution method.

Or

The coach of a cricket team buys 7 bats and 6 balls for ₹ 3,800. Later, she buys 3 bats and 5 balls for ₹ 1,750. Find the cost of each bat and each ball.

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

Or

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

XthBAJKLK22—8003-B (Old)

B-3-B

13. Find the sum of the first 40 positive integers divisible by 6.

Or

Two A.P.'s have the same common difference. The difference between their 100th terms is 100. What is the difference between their 1,000th terms ?

6

14. If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio. Prove it.

Or

In a triangle, if the 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. Prove it.

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 values of y for which the distance between the points $P(2, -3)$ and $Q(10, y)$ is 10 units.

6

16. If $\tan(A + B) = \sqrt{3}$ and $\tan(A - B) = \frac{1}{\sqrt{3}}$; $0^\circ < A + B \leq 90^\circ$; $A > B$, find A and B .

Or

Prove that :

$$\frac{\tan \theta}{1 - \cot \theta} + \frac{\cot \theta}{1 - \tan \theta} = 1 + \sec \theta \operatorname{cosec} \theta$$

6

17. A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground making an angle 30° with it. The distance between the foot of the tree to the point where the top touches the ground is 8 m. Find the height of the tree.

Or

The angles of depression of the top and the bottom of an 8 m tall building from the top of a multistoreyed building are 30° and 45° , respectively. Find the height of the multistoreyed building and the distance between the two buildings. <https://www.jkboseonline.com> 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.

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 and measure their lengths. 7

19. 2 cubes each of volume 64 cm^3 are joined end-to-end. Find the surface area of the resulting cuboid. ✓

Or

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. 7

XthBAJKLK22—8003-B (Old)

B-3-B

20. Consider the following distribution of daily wages of 50 workers of a factory :

Daily Wages (in ₹)	Number of Workers
500—520	12
520—540	14
540—560	8
560—580	6
580—600	10

Find the mean daily wages of the workers of the factory by using an appropriate method.

Or

If the Median of the distribution given below is 28.5, find the values of x and y :

Class Interval	Frequency
0—10	5
10—20	x
20—30	20
30—40	15
40—50	y
50—60	5
Total	60

7

XthBAJKLK22**8003-B****MATHEMATICS***(New/Old/Old II Course)***Time : 3 Hours]****[Maximum Marks : 100**

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.

XthBAJKLK22—8003-B (Old II)**B-3-B**

(Old II Course)

1. Choose the correct answer :

(i) Probability of an event that is certain to happen is :

(A) 0

(B) 1

(C) 2

(D) None of these

1

(ii) Roots of the equation $x^2 - 7x = 0$ will be :

(A) 7

(B) 0, -7

(C) 0, 7

(D) None of these

1

(iii) In $\triangle ABC$, $AB = 6\sqrt{3}$ cm, $AC = 12$ cm and $BC = 6$ cm. Then angle B is :

(A) 120°

(B) 60°

(C) 90°

(D) 45°

1

(iv) Volume of hemisphere is :

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

(B) $\frac{1}{3}\pi r^3$

(C) $\frac{4}{3}\pi r^3$

(D) None of these

1

(v) The common point of a tangent to a circle and the circle is called :

- | | | |
|----------------------|-------------------|---|
| (A) Secant | (B) Chord | |
| (C) Point of contact | (D) None of these | 1 |

(vi) Draw an angle of 60° with the help of a compass and ruler. 1

2. If $\sin \theta = \frac{4}{3}$, find $\cos \theta$ and $\tan \theta$. 2

3. Draw the Graph of the linear equation :

$$4x + 6y = 18 \quad 2$$

4. Give *two* different examples of pair of non-similar figures. 2

5. Prove that the perpendicular at the point of contact to the tangent to a circle passes through the circle. 4

6. Find the quadratic polynomial, the sum and product of whose zeros are 1 and 1 respectively. 4

7. Check whether -150 is a term of the A.P. 11, 8, 5, 2, 4

8. Show that $3\sqrt{2}$ is irrational. 4

9. Solve the following equations by substitution method :

$$x + y = 14$$

$$x - y = 4 \quad 4$$

XthBAIKLK22—8003—B (Old II)

B-3-B

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

Or

The sum of the reciprocals of Rehman's ages (in years) 3 years ago and 5 years from now is $1/3$. Find his present age.

6

12. 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

Is it possible to design a rectangular mango grove whose length is twice its breadth and the area is 800 m^2 ? If so, find its length and breadth.

6

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

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

Xth BAJKLK22—8003-B (Old II)

B-3-B

Turn Over

Or

If a line intersects sides AB and AC of a $\triangle ABC$ at D and E respectively and is parallel to BC, prove that :

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

14. 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

In an equilateral triangle ABC, D is the point on side BC such that $BD = \frac{1}{3}BC$. Prove that :

$$9AD^2 = 7AB^2$$

15. If the points A(6, 1), B(8, 2), C(9, 4) and D(P, 3) are the vertices of a parallelogram, taken in order, find the value of P.

Or

Find the area of the quadrilateral whose vertices, taken in order, are (-4, -2), (-3, -5), (3, -2) and (2, 3).

16. Prove that :

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

Or

Prove that :

$$\frac{\cot A - \cos A}{\cot A + \cos A} = \frac{\operatorname{cosec} A - 1}{\operatorname{cosec} A + 1} \quad 6$$

17. 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.

Or

If A, B and C are interior angles of a triangle ABC, then show that :

$$\sin\left(\frac{B+C}{2}\right) = \cos\frac{A}{2} \quad 7$$

18. 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. <https://www.jkboseonline.com>

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 and measure their lengths. 7

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

Or

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

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

7

20. 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.

Or

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.

7

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XthBAJKLK22—8003-B (Old II)

B-3-B

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B-3-B

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[Total No. of Printed Pages : 24

XthBAJKLK22

8003-B

MATHEMATICS

(New/Old/Old II Course)

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.

XthBAJKLK22—8003-B (New)

B-3-B

Turn Over

(New Course)**Section-A**

Note :— Q. Nos. 1 to 10 are MCQs of 1 mark each.

1. H.C.F. of 135 and 225 is :
- (A) 15 (B) 9
(C) 45 (D) None of these
2. Every constant is a polynomial of degree :
- (A) 1 (B) 2
(C) 0 (D) None of these
3. If in a quadratic equation $ax^2 + bx + c = 0$ ($a \neq 0$), $c = 0$, then roots of quadratic equation are :
- (A) One root is 0 (B) Both roots are 0
(C) None root is 0 (D) None of these
4. If a, b, c are in A.P., then b is equal to :
- (A) $\frac{a-c}{2}$ (B) $\frac{c-a}{2}$
(C) $\frac{a+c}{2}$ (D) None of these

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5. Any point which lies on x -axis has y -coordinate equal to :
- (A) 1 (B) 0
(C) -1 (D) None of these
6. A tangent can meet the circle at :
- (A) 2 points (B) 1 point
(C) Centre of circle (D) None of these
7. The area of a circle whose circumference is 44 cm (using $\pi = \frac{22}{7}$) is :
- (A) $\pi \text{ cm}^2$ (B) $\frac{\pi}{2} \text{ cm}^2$
(C) $2\pi \text{ cm}^2$ (D) None of these
8. Sum of the probability of an event and its complement is always equal to :
- (A) 0 (B) 1
(C) Not defined (D) None of these
9. The value of $\frac{\sec 22^\circ}{\operatorname{cosec} 68^\circ}$ is :
- (A) -1 (B) 0
(C) 1 (D) None of these

10. The slant height of a Right circular cone of radius r cm and height h cm is equal to :

(A) $h^2 + r^2$

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

(C) $h^2 - r^2$

(D) $\sqrt{h^2 - r^2}$

Note :— Q. Nos. 11 to 15 are fill in the blank with 1 mark each.

11. The common point a tangent to a circle and the circle is called

12. Consistent equations with unique solution meet at

(one point/no point)

13. In an A.P. series $S_n - S_{n-1} = \dots\dots\dots$ (a_{n-1}/a_n)

Or

Find the 10th term of the series 4, 8, 12,

14. $\operatorname{cosec}^2 \theta - \cot^2 \theta = \dots\dots\dots$ (0/1)

15. All circles are (congruent/similar)

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

16. Define Line of Sight.

17. Give two different examples of pair of similar figures.

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18. State the converse of Basic Proportionality Theorem.

Or

State Pythagoras Theorem.

19. Define y-coordinate or ordinate.

20. If diameter of sphere = 2 unit, find the volume of sphere.

Section-B

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

21. A cubical block of side 7 cm is surmounted by a hemisphere. Find the surface area of the solid.

22. Find the H.C.F. of 96 and 404 by the prime factorisation method. Hence find their L.C.M.

23. Check wheather the pair of linear equations are consistent or inconsistent $\frac{3}{2}x + \frac{5}{3}y = 7$, $9x - 10y = 14$.

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

Or

Find the trigonometric ratios of 45° .

25. One card is drawn from a well-shuffled deck of 52 cards. Calculate the probability that the card will :
- be an ace
 - not be an ace
26. The wickets taken by a bowler in 10 cricket matches are as follows :

2 6 4 5 0 2 1 3 2 3

From the frequency distribution table of the given data, find mode of the data.

Section-C

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

27. Find the zeros of the quadratic polynomial and verify the relationship between the zeros and the coefficients

$$3x^2 - x - 4$$

Or

Divide $3x^3 + x^2 + 2x + 5$ by $1 + 2x + x^2$ and verify the division algorithm.

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

$$x + y = 14$$

$$x - y = 4$$

29. Find the roots of the quadratic equation, if they exist, using quadratic formulae

$$2x^2 - 2\sqrt{2}x + 1 = 0$$

30. Check whether 301 is a term of the list of numbers 5, 11, 17, 23, 29,

Or

Find the 11th term from the last term (towards the first term) of the A.P. series :

$$10, 7, 4, 1, \dots, -62$$

31. Prove that :

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

32. 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.

Or

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

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

34. 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 cylinder.

Section-D

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

35. Find the roots of the equation $\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}$, $x \neq -4$, $x \neq 7$.

Or

Sum of the areas of two squares is 468 m^2 . If the difference of their perimeters is 24 m, find the sides of two squares.

The angles of elevation of the top of a tower from two points of 4 m and 9 m from the base of the tower and in the same straight line with it are complementary. Find the height of the tower.

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

Or

Find the value of K , if the points $A(2, 3)$, $B(4, K)$ and $C(6, -3)$ are collinear. <https://www.jkboseonline.com>

38. In an equilateral triangle, D is a point on the side BC , such that

$$BD = \frac{1}{3}BC. \text{ Prove that :}$$

$$9(AD)^2 = 7(AB)^2.$$

Or

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

9. Construct a triangle similar to a given triangle ABC with its sides equal to $\frac{5}{3}$ of the corresponding sides of the triangle ABC (i.e. of scale factor $\frac{5}{3}$).

The table below gives the percentage distribution of female teachers in the primary school of rural areas of various States and U.T. of India. Find mean percentage of female teachers using step deviation method :

Percentage of Female Teachers	No. of States/U.T.
15—25	6
25—35	11
35—45	7
45—55	4
55—65	4
65—75	2
75—85	1

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