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 $\dfrac{2\tan 30°}{1 - \tan^2 30°}$ 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

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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, $-\dfrac{1}{2}$, 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 $\triangle ABC$ 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.

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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.

Turn Over

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

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

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 :

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

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.

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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