Roll No.

Candidates must write the Code on the title page of the answer book.

- Please check that this question paper contains 10 printed pages.

- Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.

- Please check that this question paper contains 38 questions.

- Please write down the Serial Number of the question before attempting it.

- 15 minute time has been allotted to read this question paper. The students will read the question paper only and will not write any answer on the answer-book during this period.

I-PRE BOARD EXAMINATION

MATHEMATICS

Time Allowed : 3 hours   **Maximum Marks : 80**

General Instructions :

i)   This question paper has 5 Section A-E.

ii)   Section – A has 20 MCQs carrying 1 mark each.

iii)   Section – B has 5 questions carryding 02 marks each.

iv)   Section – C has 6 questions carrying 03 marks each.

v)   Section–D has 4 questions carrying 05 marks each.

vi)   Section – E has 3 case based integrated units of assessment (04 marks each) with subpart of the values of 1, 1 and 2 marks each respectively.

This paper consists of 10 printed pages.

vii)   All qestions are compulsory. However, an internal choice in 2 questions of 5 marks, 2 questions of 3 marks and 2 questions of 2 marks has been provided . An internal choice has been provided in the 2 marks questions of section-E.

viii)   Draw neat figures wherever rquired. Take $\pi=22/7$ wherever required if not stated.

SECTION – A

Section A consists of 20 questions of 1 mark each.

1.   HCF of two consecutive even numbers is :   1

   (a) 0   (b) 1

   (c) 2   (d) 4

2.   A quadratic polynomial, whose zeroes are 4 and –3 is :   1

   (a) x^2+x+5 (b) x^2-x+6

   (c) x^2-x-12 (d) x^2+2x-6

3.   The 30 th term of the A.P. 10, 7, 4 . . . . is :   1

   (a) 87   (b) 77

   (c) –77   (d) –87

4.   The nature of the roots of quadratic equation $2x^2 + x + 4 = 0$ is   1

   (a) no real roots   (b) real roots

   (c) equal roots   (d) none of these

5.   The sum of first 16 terms of the A.P. 10, 6, 2 ...... is   1

   (a) – 320   (b) 320

   (c) – 352   (d) – 440

6.   The zeroes of the $x^2-3x+10$ are :   1

   (a) 2, –5   (b) –2, 5

   (c) 2, 5   (d) – 2, –5

7. The value of 'c' for which the pair of equations $cx - y = 2$ and $6x - 2y = 4$ will have infinitely many solutions is : 1

(a) 3   (b) −3

(c) − 12   (d) none of these

8. The line segment joining the point P(−3, 2) and Q(5, 7) is divided by the y-axis in the ratio : 1

(a) 3 : 1   (b) 3 : 4

(c) 3 : 2   (d) 3 : 5

9. If angle between two radii of a circle is 130°. The angle between the tangents at the ends of the radii is : 1

(a) 90⁰   (b) 50⁰

(c) 70⁰   (d) 40⁰

10. The distance between the points (0, 6) and (0, -2) is : 1

(a) 5 units   (b) 6 units

(c) 8 units   (d) 3 units

11. In the given figure, value of x (in cm) is: 1

(a) 4

(b) 5

(c) 6

(d) 8
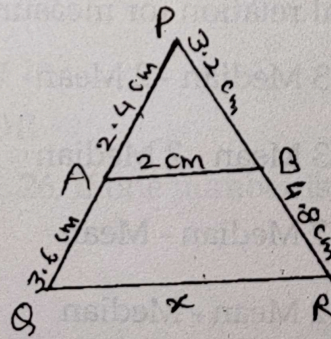
12. The value of $(1+\cos A)(1-\cos A)\operatorname{cosec}^2 A$ is : 1

(a) 0   (b) ½

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

13. The probability that the drawn card from a pack of 52 cards is neither an ace nor a spade is :　　1

    (a) $\dfrac{9}{13}$ (b) $\dfrac{35}{52}$

    (c) $\dfrac{10}{13}$ (d) $\dfrac{19}{26}$

14. Formula for calculating the median of a grouped frequency distribution is :　　1

    (a) $\ell + \dfrac{\frac{N}{2} - cf}{f} \times h$ (b) $\dfrac{N}{2}$

    (c) $\dfrac{N}{2}(\ell + cf)$ (d) $\dfrac{\ell + cf}{f}$

15. Value of $\sec 45° - \csc 45°$ is :　　1

    (a) 0

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

    (c) $\sqrt{3}/2$

    (d) 1

16. If α and β are roots of the equation $2x^2 + 3x + 5 = 0$, the value of $(\alpha + \beta)$ will be :　　1

    (a) $3/2$ (b) $-3/2$

    (c) $5/2$ (d) $-5/2$

17. The empirical relation for measuring the mode is :　　1

    (a) Mode = 3 Median - 2 Mean

    (b) Mode = 3 Mean - 2 Median

    (c) Mode = 2 Median - Mean

    (d) Mode = 2 Mean - Median

18. If $4\tan\theta = 3$, then the value of $\left(\dfrac{4\sin\theta - \cos\theta}{4\sin\theta - \cos\theta}\right)$ is :　　1

    (a) 0   (b) $\frac{1}{4}$

    (c) $\frac{1}{2}$ (d) $\frac{3}{4}$

Direction :   In the questions number 19 and 20 , a statement of assertion (A) is followed by a statement of reason (R). Choose the correct option :

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)

(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A)

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

19. Statement A (Assertion) : The point $(0, 6)$ lies on y-axis   1

Statement R (Reason) : The x-co-ordinate of the point on y-axis is zero.

20. Statement A(Assertion) : Height AB in the figure is 20 metres if BC is 20 metres.

Statement R(Reason) $\tan \theta = \dfrac{AB}{BC} = \dfrac{Perpendicular}{Base}$
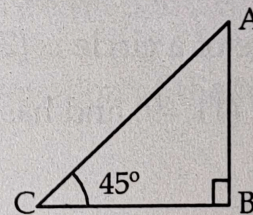
where θ is $\angle ACB$ 1

SECTION–B

Section B consists of 5 questions of 2 marks each.

21. Assuming that $\sqrt{2}$ is irrational, show that $5\sqrt{2}$ is an irrational number.   2

22. Solve for x and y $21x + 47y = 110$ 2
$$47x + 21y = 162$$

OR

The difference between two numbers is 26. If one number is thrice the other, find the numbers.
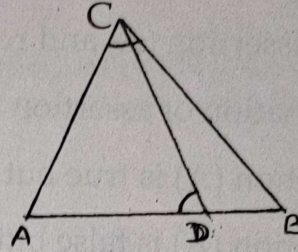
23. If $\tan(A+B) = \sqrt{3}$ and $\tan(A-B) = \dfrac{1}{\sqrt{3}}$, $0° < A+B \le 90°$ and A>B, then find the measures of angles A and B.   2

OR

Find the value of $\dfrac{\sin 60°}{\cos^2 45°} - 3\tan30° + 5\cos90°$

24. Find the number of revolutions made by a circular wheel of area 1.54 m² in rolling

   a distance of 176 m.   2

25. In the adjoining figure, $\angle ACB = \angle CDA$ if AC=8 cm and AD=3 cm find BD.   2


SECTION–C

Section C consists of 6 questions of 3 marks each.

26. Determine the zeroes of the polynomial $p(x) = 2x^2-11x+15$. Aslo verify the relationship

   between the zeroes and the coefficeint.   3

27. The centre of a circle is (2a, a-7). Find the values of 'a' if the circle passess through

   the point (11, -9) and has diameter $10\sqrt{2}$ units.   3

OR

   Show that the points (1, 7), (4, 2), (-1, -1) and (-4, 4) are the vertices of a square.

28. In the figure , PQ and RS are the common tangents of two circles intersecting at O,

   prove that PQ = RS   3
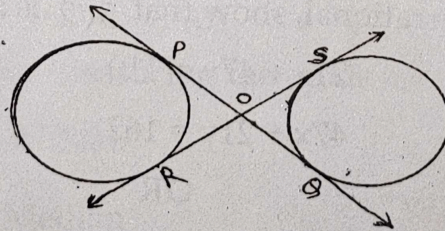
OR

   Prove that a rectangle circumscribing a circle is a square.

29. Prove that $\sqrt{\dfrac{1-\cos A}{1+\cos A}} = \operatorname{cosec} A - \cot A$ 3

30. In a single throw of a die, find the probability of getting :   3

   (a) a prime number

   (b) a number lying between 2 and 6

   (c) an odd number

31. Find the median marks for the following frequency distribution : 3

Marks	0-20	20-40	40-60	60-80	80-100
No. of students	7	12	23	18	10

SECTION -D

Section D consists of 4 questions of 5 marks each.

32. Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points then other two sides are divided in the same ratio. Using above theorem prove that a line drawn through the mid point of one side of a triangle parallel to the another side bisects the third side. 5

33. The angle of elevation of the top of a tower from a certain point is 30°. If the observer moves 20 metres towards the tower, the angle of elevation of the top increases by 15°. Find the height of the tower. 5

OR

The shadow of a tower standing on a level plane is found to be 50 m longer when sun's angle of elevation is 30° than when it was 60°. Find the height of the tower.
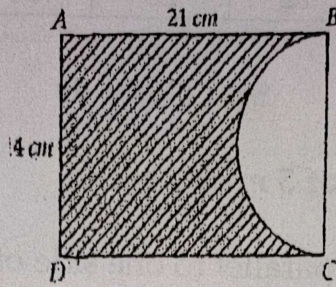
34. Find the area of the shaded design in given figure, where ABCD is a square of side 10 cm and semicircles are drawn with each side of the square as diameter. (use $\pi = 3.14$) 5
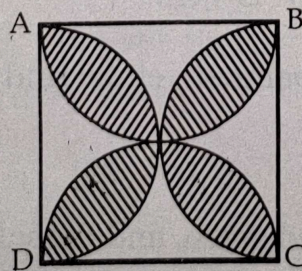
OR

In the figure, ABCD is a rectangle of dimensions 21 cm ×14 cm. A semicircle is drawn with BC as diameter. Find the area and the perimeter of the shaded region in the figure.

35. A train travelling at a uniform speed for 360 km, would have taken 48 minutes less to travel the same distance if its speed were 5 km/hr more. Find the original speed of the train. 5

SECTION-E

Case Study Based Questions are compulsory.

36. Read the text carefully and answer the questions :

In a toy manufacturing company wooden parts are assembled and painted. One shape of cone mounted on a cylinder as show in figure. The total height of the toy is 26 cm and the height of its conical part is 6 cm. The diameters of the base of conical part is 5 cm and that of the cylindrical part is 4 cm :
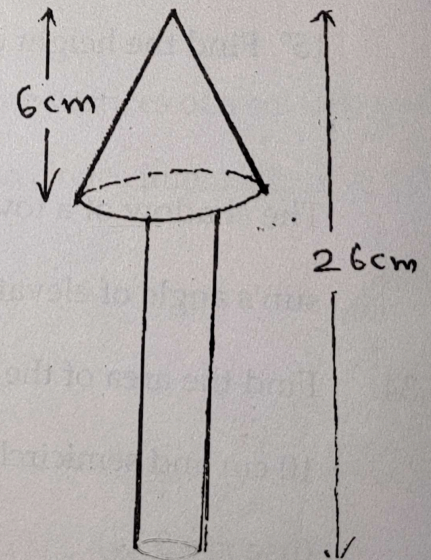
(a) If its cylindrical part is to be painted yellow find the surface area need to be painted. 1

(b) If its conical part is to be painted green, find the suface area need to be painted. 2

OR

Find the volume of the wood used in making this toy.

(c) If the cost of painting the toy is 3 paise per sq. cm. then find the cast of painting the toy (use π = 3.14) 1

37. Read the text carefully and answer the questions

Saving money is a good habit and it should be inculcated in children from the beginning. Mrs. Pushpa brought a piggy bank for her child Akshar. He puts one five rupee coin of his savings in the piggy bank on the first day. He increases his savings by one five-rupee coin daily.
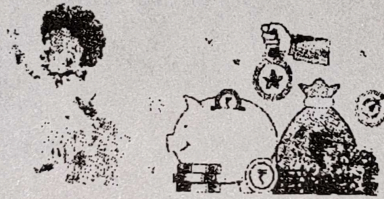
(i) If the piggy bank can hold 190 coins of five rupees in all, find the number of days he can contribute to put the five-rupee coins into it. 1

(ii) Find the total money he saved. 1

(iii) How much money Akshar saves in 10 days ? 2

OR

How many coins are there in piggy bank on 15th day?

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38. Read the text carefully and answer the questions.

Akshat studies in a Public school, in a city. During summer vacation he went to his native place in a village. His grandfather took him to the bank of a nearby river. Akshat was very happy to see the pollution free environment near the river. He was standing on the bank of the river .He though to measure the width of the river. He found that the angle of elevation of the top of a tree standing on the opposite bank was $60°$. When he moved 30 m away from the river the angle of elevation reduced to $30°$.
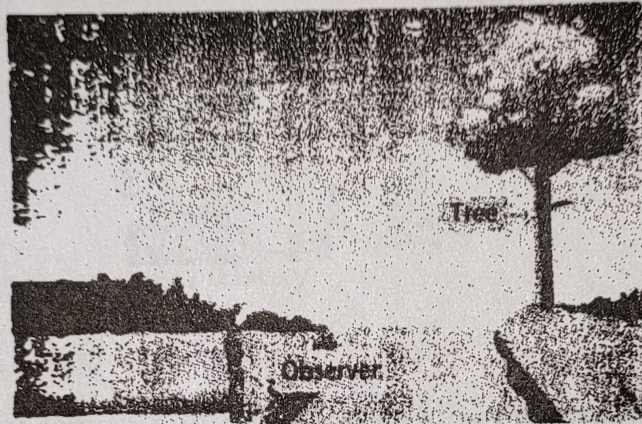
(i) What is the height of the tree ?   1

(ii) What is the width of the river ?   1

(iii) After movig how much distance away from the river the angle of elevation becomes $45°$.   2

OR

If the width of the river were 40 m then what would be the height of the tree selected ?

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