DAV PUBLIC SCHOOLS, ODISHA

PERIODIC ASSESSMENT -I , 2023-24

- Please check that this question paper contains 4 printed pages.
- Check that this question paper contains 19 questions.
- Write down the Serial Number of the question in the left side of the margin before attempting it.

MATHEMATICS (STANDARD)

STD : X

TIME – 1hr 30 min **Maximum Marks. – 40**

General Instructions:

1. This Question Paper has 5 Sections A-E.
2. Section A has 10 MCQs carrying 01 mark each
3. Section B has 2 questions carrying 02 marks each.
4. Section C has 4 questions carrying 03 marks each.
5. Section D has 2 questions carrying 05 marks each.
6. Section E has 1 case based integrated unit of assessment of 04 marks with subparts of the values of 1,1 and 2 marks respectively.
7. All Questions are compulsory. However, an internal choice in 1 Question of 5 marks, 1 Question of 3 marks and 1 Question of 2 marks has been provided. An internal choice has been provided in the 2marks questions of Section E
8. Draw neat figures wherever required. Take π = 22/7 wherever required if not stated.

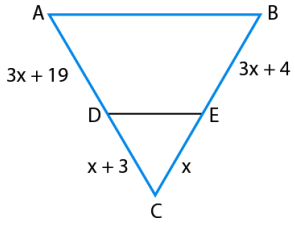
SECTION – A (1×10 = 10)

1. If $a = x^3y^2$ and $b = xy^3$; x , y are prime numbers, then product of HCF(a, b) and LCM(a, b) is:
   (a) xy b) xy^2 c) x^3y^3 (d) x^4y^5
2. If 5 is the least prime factor of number x and 7 is the least prime factor of number y , then the least prime factor of $(x + y)$ is:
   (a) 12 (b) 7 (c) 5 (d) 2
3. A quadratic polynomial will intersect x-axis at
   (a) one point only (b) two points only
   (c) at most two points (d) at least two points
4. If $x = 2\sin^2\theta$ and $y = 2\cos^2\theta + 1$, then $(x + y - 3)$ is equal to
   (a) 3 (b) 2 (c) 1 (d) 0

5. If one zero of the polynomial f(x) = $(k^2+4)x^2 + 13x + 4k$ is reciprocal of other , then the value of k is equal to

(a) 2 (b) -2 (c) 1 (d) – 1

6. The value of x for which DE ∥ AB in the given figure is:



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

7. If two zeroes of a quadratic polynomial are 2 and – 3 and the graph of the polynomial is a downward opening parabola, then the polynomial is:

(a) $x^2 + x - 6$ (b) $x^2 - x - 6$ (c) $-x^2 - x + 6$ (d) option a and c both

8. The value of $'k'$ for which the pair of given linear equations $x - 3y = k,\ \ 2x + 3y = 3$ have unique solution is :

(a) any real value except 6 (b) any real value except -1

(c) any real value except 3 (d) any non-zero real value of k

9. The value of $9\cos^2 A + \frac{9}{\text{cosec}^2 A}$ is

(a) 9 (b) 1 (c) $\frac{1}{9}$ (d) 81

10. **Assertion(A)** : 6^n will never end with digit '0' for any natural value of n.

Reason (R) : Prime factorization of 6 contains 2 and 3 as prime factors.

(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.

SECTION – B (2×2= 4)

11. If α & β are zeroes of a quadratic polynomial $p(x) = x^2 - (k-6)x + (2k+1)$; find the value of k, if $\alpha + \beta = \alpha\beta$

12. (a) For which value(s) of k, do the pair of equations kx + 3y = k – 3 and 12x + ky = k has no solutions?

or

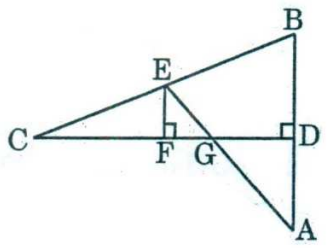
(b) Mohit and Sahil are driving on two roads represented by the equations 2x = 7 – 3y and 4x + 6y = 12. They drive within the speed limit. Will they meet at some point? Justify your answer.

SECTION – C (3×4 = 12)

13. Prove that $\sqrt{5}$ is an irrational number.

14. Find the zeroes of the polynomial $\frac{x^2}{4} - 2x + 3$ & verify the relationship between the zeroes and its coefficients.

15. (a) In the given figure , CD is the perpendicular bisector of AB. EF is perpendicular to CD. AE intersects CD at G. Prove that $\frac{CF}{CD} = \frac{FG}{DG}$.



or

(b) The diagonals of a quadrilateral ABCD intersect each other at the point O such that $\frac{AO}{BO} = \frac{CO}{DO}$. Show that ABCD is a trapezium.

16. If a sinA + b cosA = c, then prove that a cosA – b sinA = $\sqrt{(a^2 + b^2 - c^2)}$

SECTION – D (2× 5= 10)

17. (a) (i) If secθ = $x + \frac{1}{4x}$, Prove that secθ + tanθ = 2x or $\frac{1}{2x}$.

(ii) In a right triangle ABC, ∠B = 90°, AB = 3cm and AC = 6cm. Find ∠C and ∠A.

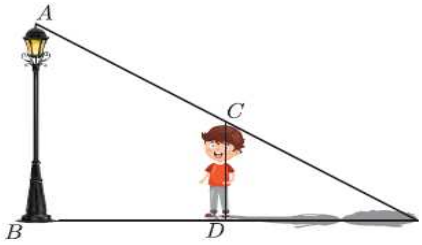
or

(b) Prove that: $\frac{tanA}{1 - cotA} + \frac{cotA}{1 - tanA}$ = 1+ secA .cosecA

18. A shopkeeper gives books on rent for reading. She takes a fixed charge for the first two days and an additional charge for each day thereafter. Latika paid Rs 22 for a book kept for 6 days, while Anand paid Rs 16 for the book kept for 4 days. Find the fixed charge and the charge for each extra day. If Rahul had kept the book for 10 days , then how much money he has to pay ?

SECTION – E (1×4=4)

19. Rohan is very intelligent in maths. He always tries to relate the concept of maths in daily life. One day he was walking away from the base of a lamp post at a speed of 1.2 m/s. Lamp is 6 m above the ground.



i) If the length of shadow after 2 seconds is 0.6 meter, what is the height of Rohan?

ii) Find the minimum time after which his shadow will become larger than his original height?

iii) (a) If the shadow of Rohan would be double of his height (found in first question), then at what distance he may be standing from the light post?

or

(b) Find the length of his shadow after he moves 5 seconds from the light post with a speed of 1.8m/sec in the same straight line (consider the height of Rohan remain same in the first case) ?

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