

**SUMMATIVE ASSESSMENT – 1, JANUARY - 2022**

**MATHEMATICS PAPER – 1**

**(Modal Paper – 2)**

**Class: 10<sup>th</sup>**

**Max. Marks: 100**

**Time: 3hr 15 min**

**Instructions:**

1. In the duration of 3hrs, 15 min. 15 min of time is allotted to read the question paper.
2. All answers shall be written in the answer booklet only.
3. Question paper consists of 4 sections and 33 questions.
4. Internal choice is available in section IV only.
5. Answers shall be written neatly and legibly.

**SECTION – I**

**Note:1. Answer all the questions in one word or phrase**

**2. Each question carries 1 mark.**

**12 × 1 = 12 M**

1. The decimal representation of  $\frac{14587}{2 \times 5^4}$  will terminate after \_\_\_\_\_ decimal places.  
A) 4                      B) 5                      C) 6                      D) 10
2. If  $A = \{1, 3, 5, 7\}$  and  $B = \{2, 3, 5, 7\}$  then which of the following are disjoint sets?  
A)  $A \cup B$ ,  $A - B$     B)  $A \cap B$ ,  $A - B$     C)  $A \cup B$ ,  $A \cap B$     D) None of these
3. Product of zeroes of the polynomial  $3x^3 - 5x^2 + 6x + 2$  is \_\_\_\_\_.  
A)  $\frac{5}{3}$                       B)  $\frac{-2}{3}$                       C) 2                      D)  $\frac{-5}{3}$
4. Statement P: The graph of  $y = x^2$  is a parabola.  
Statement Q: The graph of  $y = mx + c$  is a parabola.  
A) Both P and Q are true.                      C) P is true and Q is false  
B) Both P and Q are false                      D) P is false and Q is true.
5. If  $\sin A = \frac{\sqrt{3}}{2}$ , then the value of  $2\cot^2 A - 1 =$  \_\_\_\_\_
6. The value of  $\frac{1}{\cos^2 36^\circ + \cos^2 54^\circ} =$  \_\_\_\_\_
7. The mean of  $\sin 0^\circ$ ,  $\sin 30^\circ$ ,  $\sin 90^\circ$  is \_\_\_\_\_.  
A) 0                      B)  $\frac{1}{2}$                       C) 1                      D)  $\frac{3}{2}$
8. A and B are two sets and  $A \subset B$ , then match the following.  
a)  $A \cup B$                       (    )    i)  $\emptyset$   
b)  $A \cap B$                       (    )    ii) A  
c)  $A - B$                       (    )    iii) B  
A) a – i, b – ii, c – iii    B) a – iii, b – ii, c – i    C) a – iii, b – i, c – ii    D) a – iii, b – ii, c – i

9. Probability of a certain event is \_\_\_\_\_

- A) 0                      B) 1                      C)  $\frac{1}{2}$                       D) not define

10. Assertion :  $\sin A - \cos A$  is negative if  $0^\circ < A < 45^\circ$ .

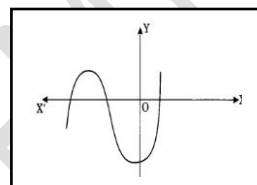
Reason :  $\sin A = \frac{\text{opposite side of } A}{\text{Hypotenuse}}$ .

- A) Both Assertion and Reason are true. Reason is supporting the Assertion.  
B) Both Assertion and Reason are true. Reason does not supporting the Assertion.  
C) Assertion is true. Reason is false  
D) Assertion is false. Reason is true.

11. If  $n(A) = 4$  and  $n(B) = 7$ , then maximum number of elements in  $A \cap B$  is \_\_\_\_\_

12. No. of zeroes of the polynomial in the adjacent graph

- A) 3                      B) 2                      C) 1                      D) -2, 1



### Section – II

**Note: 1. Answer all the questions.**

**2. Each question carries 2 marks.**

**8 × 2 = 16 M**

13. Express  $\log 4 + \log 3 - \log 2$  in a single logarithm.  
14. A and B are two non-empty sets, then draw the venn-diagram of  $A - B$ ?  
15. If one zero of the quadratic polynomial  $4x^2 - 8kx - 9$  negative of the other, find value of 'k'?  
16. What can you say about the graph of  $ax^2 + bx + c$  when  $a < 0$ ?  
17. From a well shuffled pack of cards, a card is drawn at random. Find the probability of getting a black queen?  
18. Simplify  $\sec^2 \theta (1 + \sin \theta)(1 - \sin \theta)$ ?  
19. Find the value of  $\tan 2A$ , if  $\cos 3A = \sin 45^\circ$ ?  
20. Find median and mode of the following data?  
12, 5, 9, 6, 14, 9 and 8.

### Section – III

**Note: 1. Answer all the following questions.**

**2. Each question carries 4 marks.**

**8 × 4 = 32 M**

21. If  $\alpha$  and  $\beta$  are zeroes of the polynomial  $x^2 - px + q$ , then find the value of  $\alpha^2 - \beta^2$ .  
22. Show that  $\sec^2 \theta + \operatorname{cosec}^2 \theta = \sec^2 \theta \cdot \operatorname{cosec}^2 \theta$ .  
23. Solve  $\log_5(x + 1) - 1 = 1 + \log_5(x - 1)$ ?  
24. If  $x^2 + y^2 = 27xy$ , show that  $\log \left( \frac{x-y}{5} \right) = \frac{1}{2} [\log x + \log y]$   
25. Write the formula to find mean to a grouped frequency distribution table in step deviation method and explain the terms involved in it?

26. Rahim takes out all the hearts from the cards. What is the probability of

- A) Picking out an ace from the remaining pack
- B) Picking out a diamonds
- C) Picking out a card that is not a heart
- D) Picking out the ace of hearts.

27. Find the cubic polynomial whose zeroes are 3, -1 and  $-\frac{1}{3}$ ?

28.  $A = \{x / x \text{ is a factor of } 24\}$  and  $B = \{x / x \text{ is multiple of } 4 \text{ less than } 19\}$ . Then find  $A \cup B$  and  $A \cap B$

#### Section – IV

**Note: 1. Answer all questions**

**2. Each question carries 8 marks.**

**3. Each question has internal choice**

**5 × 8 = 40 M**

29. Express all trigonometric ratios in terms of 'Sec  $\theta$ '.

OR

If  $\frac{\sin \theta}{1 - \cos \theta} + \frac{\sin \theta}{1 + \cos \theta} = 4$  ( $0^\circ < \theta < 90^\circ$ ), then find the value of  $\theta$ ?

30. A box contains 90 discs which are numbered from 1 to 90. If one disc is drawn at random from the box, find the probability that it bears (i) a two-digit number (ii) a perfect square number (iii) a number divisible by 5?

OR

Prove that  $\sqrt{2} + \sqrt{3}$  is irrational number.

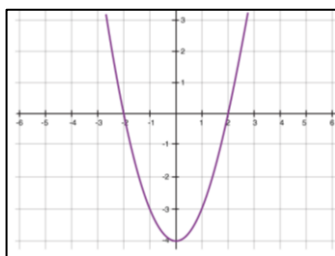
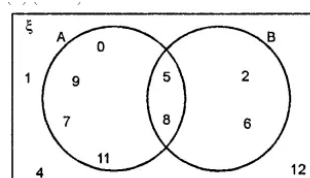
31. From the adjacent diagram check whether

$n(A) + n(B) - n(A \cap B) = n(A \cup B)$  or not?

OR

Due to heavy storm, an electric wire got bent as shown in

the figure. It follows a mathematical shape. Answer the following questions below?



- A) Name the shape in which the wire bent?
- B) What are the zeroes of the polynomial?
- C) What will be the expression of the polynomial?
- D) What is the value of the polynomial when  $x = -1$ ?

32. Find the mode of the following data?

C. I	30 – 39	40 – 49	50 – 59	60 – 69	70 – 79	80 – 89	90 – 99
frequency	2	3	20	31	17	10	4

OR

Verify that  $-2$ ,  $1$  and  $3$  are the zeroes of the cubic polynomial  $x^3 - 2x^2 - 5x + 6$  and check the relationship between zeroes and the co-efficient.

33. Find the zeroes of the polynomial  $x^2 - 2x - 15$ ?

OR

Draw the "less than ogive" to the following data?

Classes	1 – 4	4 – 7	7 – 10	10 – 13	13 – 16	16 – 19
Frequency	6	30	42	14	4	4