

Instructions to Students: Read all the questions thoroughly and write down the answers.

This question paper contains a total of 4 parts. They are

- I. There will be 4 questions. Each question carries 4 marks. Answer all the questions.
- II. There will be 6 questions. Each question carries 2 marks. Answer all the questions.
- III. There will be 7 questions. Each question carries 1 mark. Answer all the questions.
- IV. There will be 10 multiple choice questions each question carries $\frac{1}{2}$ mark. Answer all the questions.

I. Answer all the questions. Each question carries 4 marks

4 x 4 =16

1. If $x^2 + y^2 = 25xy$, then prove that $2 \log(x + y) = 3 \log 3 + \log x + \log y$?
2. Verify whether $3, -1, -\frac{1}{3}$ are the zeroes of the cubic polynomial $p(x) = 3x^3 - 5x^2 - 11x - 3$, and then verify the relationship between the zeroes and the coefficients.
3. A chemist has two solutions of hydrochloric acid in stock. One is 50% solution and the other is 80% solution. How much of each should be used to obtain 100ml of a 68% solution?
4. For what value of n , are the n^{th} terms of two APs: 63, 65, 67, ... and 3, 10, 17, ... equal?

II. Answer all the questions. Each question carries 2 marks

6 x 2 =12

5. Find the ratio in which the y-axis divides the line segment joining the points (5, -6) and (-1, -4). Also find the point of intersection.
6. Find x so that $x, x + 2, x + 6$ are consecutive terms of a geometric progression.
7. Find the values of 'k' if the quadratic equation $2x^2 + kx + 3 = 0$ has two equal roots
8. Two angles are complementary. The larger angle is 3° less than twice the measure of the smaller angle. Find the measure of each angle.
9. If $A = \{x: x \text{ is a natural number}\}$, $B = \{x: x \text{ is an even natural number}\}$

 $C = \{x: x \text{ is an odd natural number}\}$ and $D = \{x: x \text{ is a prime number}\}$

find $A \cap B, A \cap C, A \cap D, B \cap C$.
10. Show that $3\sqrt{2}$ is irrational.

III. Answer all the questions. Each question carries 1 mark

7 x 1 = 7

11. Find the LCM and HCF of 17, 23, and 29 by the prime factorization method.
12. If $A = \{1, 2, 3\}$ and $B = \{3, 4, 5\}$, then illustrate $A \cap B$ in Venn-diagrams
13. If $p(t) = t^3 - 1$, find the values of $p(1)$, $p(-1)$, $p(0)$, $p(2)$, $p(-2)$.
14. 5 pencils and 7 pens together cost Rs 50 whereas 7 pencils and 5 pens together cost Rs 46. write suitable equations for the given data.
15. Check whether $x(2x+3) = x^2+1$ is a quadratic equation or not?
16. Find the sum of the first n natural numbers
17. Write Heron's formula and explain each term?

IV. Answer all the questions. Each question carries 1/2 mark

10 x 1/2 = 5

18. The slope of the line passing through $(a,0)$ and $(0,b)$
a. a/b b. b/a c. $-a/b$ d. $-b/a$
19. The zero of the polynomial $2x-3$
a. $2/3$ b. $3/2$ c. $-2/3$ d. $-3/2$
20. One of the following is an irrational number
a. $2/3$ b. $\sqrt{\frac{16}{25}}$ c. $\sqrt{8}$ d. $\sqrt{0.04}$
21. The n term of G.P. is $a_n = ar^{n-1}$ where 'r' represents
a. First term b. Common difference c. Common ratio d. Radius
22. The equation of the line which intersects x-axis at $(3, 0)$ is
a. $x + 3 = 0$ b. $y + 3 = 0$ c. $x - 3 = 0$ d. $y - 3 = 0$
23. Which of the following vertices form a triangle?
a. $(1, 2), (1, 3), (1, 4)$ b. $(5, 1), (6, 1), (7, 1)$ c. $(0, 0), (-1, 0), (2, 0)$ d. $(1, 2), (2, 3), (3, 4)$
24. . If $n(A)=12$ and $n(A \cap B) = 5$, then $n(A - B) =$
a. 7 b. 4 c. 17 d. 1
25. . One root of the equation $4x^2 + 4x-3=0$ is
a. $-3/2$ b. $3/2$ c. -4 d. -2
26. $A = \{X: x \neq x\}$, then it is an example for _____ set
a. singleton b. empty c. finite d. infinite
27. The graph of a cubic polynomial is a
a. straight line b. parabola c. circle d. free hand smooth curve