

BRINDHAVAN HR.SEC.SCHOOL, SUKKIRANPATTI
PUBLIC MODEL FULL TEST

SUBJECT: MATHS
Std: 10

Mark: 100
Time: 3 hrs

Part – A

Choose the correct Answer:-

14x1=14

1. $A = \{a, b, p\}, B = \{2, 3\}, C = \{p, q, r, s\}$ then $n[(A \cup C) \times B]$ is
(A) 8 (B) 20 (C) 12 (D) 16
2. The range of the relation $R = \{(x, x^2) | x \text{ is a prime number less than } 13\}$ is
(A) $\{2, 3, 5, 7\}$ (B) $\{2, 3, 5, 7, 11\}$ (C) $\{4, 9, 25, 49, 121\}$ (D) $\{1, 4, 9, 25, 49, 121\}$
3. The sum of the exponents of the prime factors in the prime factorization of 1729 is
(A) 1 (B) 2 (C) 3 (D) 4
4. The first term of an A.P. whose 8th and 12th terms are 39 and 59 respectively is
(A) 5 (B) 6 (C) 4 (D) 3
5. If $(x - 6)$ is the HCF of $x^2 - 2x - 24$ and $x^2 - kx - 6$ then the value of k is
(A) 3 (B) 5 (C) 6 (D) 8
6. If $ax^2 + bx + c = 0$ has equal roots, then c is equal (A) $\frac{b^2}{2a}$ (B) $\frac{b^2}{4a}$ (C) $-\frac{b^2}{2a}$ (D) $-\frac{b^2}{4a}$
7. If in ΔABC , $DE \parallel BC$. $AB = 3.6$ cm, $AC = 2.4$ cm and $AD = 2.1$ cm then the length of AE is
(A) 1.4 cm (B) 1.8 cm (C) 1.2 cm (D) 1.05 cm
8. Two poles of heights 6 m and 11 m stand vertically on a plane ground. If the distance between their feet is 12 m, what is the distance between their tops? (A) 13 m (B) 14 m (C) 15 m (D) 12.8 m
9. The angle of inclination of a straight line parallel to x-axis is equal to (A) 0° (B) 60° (C) 45° (D) 90°
10. The slope of the line which is perpendicular to a line joining the points (0,0) and (-8,8) is
(A) -1 (B) 1 (C) $\frac{1}{3}$ (D) -8
11. If the ratio of the height of a tower and the length of its shadow is $\sqrt{3} : 1$, then the angle of elevation of the sun has measure (A) 45° (B) 30° (C) 90° (D) 60°
12. If the radius of the base of a cone is tripled and the height is doubled then the volume is
(A) made 6 times (B) made 18 times (C) made 12 times (D) unchanged
13. Radius and height of a right circular cone and that of a right circular cylinder are respectively, equal. If the volume of the cylinder is 120 cm^3 , then the volume of the cone is equal to
(A) 1200 cm^3 (B) 360 cm^3 (C) 40 cm^3 (D) 90 cm^3
14. Which of the following is incorrect?
(A) $P(A) > 1$ (B) $0 \leq P(A) \leq 1$ (C) $P(\emptyset) = 0$ (D) $P(A) + P(\overline{A}) = 1$

Part – B

10x2=20

i) Answer any 10 Questions.

ii) Question No 28 is Compulsory.

15. If $B \times A = \{(-2, 3), (-2, 4), (0, 3), (0, 4), (3, 3), (3, 4)\}$ then find A and B .
16. A Relation R is given by the set $\{(x, y) / y = x + 3, x \in \{0, 1, 2, 3, 4, 5\}\}$. Determine its domain and range.
17. If the Highest Common Factor of 210 and 55 is expressible in the form $55x - 325$, find x
18. The general term of a sequence is defined as
$$a_n = \begin{cases} n(n+3); n \in \mathbb{N} \text{ is odd} \\ n^2 + 1; n \in \mathbb{N} \text{ is even} \end{cases}$$
 Find the eleventh and eighteenth terms.
19. Which rational expression should be subtracted from $\frac{x^2+6x+8}{x^3+8}$ to get $\frac{3}{x^2-2x+4}$
20. If the difference between the roots of the equation $x^2 - 13x + k$ is 17 find k .
21. If $\Delta ABC \sim \Delta DEF$ such that area of ΔABC is 9 cm^2 and the area of ΔDEF is 16 cm^2 and $BC = 2.1$ cm. Find the length of EF
22. Find the value of ' a ' for which the given points are collinear. $(2, 3), (4, a)$ and $(6, -3)$
23. Find the slope of a line joining the given points $(-6, 1)$ and $(-3, 2)$

24. A kite is flying at a height of 75 m above the ground. The string attached to the kite is temporarily tied to a point on the ground. The inclination of the string with the ground is 60° . Find the length of the string, assuming that there is no slack in the string
25. If the base area of a hemispherical solid is 1386 sq. metres, then find its total surface area?
26. The volume of a solid right circular cone is 11088 cm^3 . If its height is 24 cm then find the radius of the cone
27. What is the probability that a leap year selected at random will contain 53 Saturdays
28. Find the equation of straight line whose angle of inclination is 45° and y-intercept is $\frac{2}{5}$.

Part – C

Answer any 10 Questions. Question no 42 is compulsory.

10x5=50

29. If $A = \{1,3,5\}$ and $B = \{2,3\}$ then (i) find $A \times B$ and $B \times A$ (ii) Is $A \times B = B \times A$? If not why? (iii) Show that $n(A \times B) = n(B \times A) = n(A) \times n(B)$
30. Represent each of the given relations by (a) an arrow diagram, (b) a graph and (c) a set in roster form, wherever possible. $\{(x, y) | x = 2y, x \in \{2,3,4,5\}, y \in \{1,2,3,4\}\}$
31. The sum of three consecutive terms that are in A.P. is 6 and their product is -120 . Find the three terms
32. Find the greatest number consisting of 6 digits which is exactly divisible by 24, 15, 36?
33. If $9x^4 + 12x^3 + 28x^2 + ax + b$ is a perfect square, find the values of a and b .
34. A bus covers a distance of 90 km at a uniform speed. Had the speed been 15 km/hour more it would have taken 30 minutes less for the journey. Find the original speed of the bus.
35. State and prove basic proportionality theorem
36. Find the area of the quadrilateral formed by the $(-4, -2)$, $(-3, -5)$, $(3, -2)$ and $(2, 3)$
37. Let $A(3, -4)$, $B(9, -4)$, $C(5, -7)$ and $D(7, -7)$. Show that ABCD is a trapezium.
38. Two ships are sailing in the sea on either sides of a lighthouse. The angle of elevation of the top of the lighthouse as observed from the ships are 30° and 45° respectively. If the lighthouse is 200 m high, find the distance between the two ships. ($\sqrt{3} = 1.732$)
39. The radius and height of a cylinder are in the ratio 5:7 and its curved surface area is 5500 sq.cm. Find its radius and height.
40. A funnel consists of a frustum of a cone attached to a cylindrical portion 12 cm long attached at the bottom. If the total height be 20 cm, diameter of the cylindrical portion be 12 cm and the diameter of the top of the funnel be 24 cm. Find the outer surface area of the funnel
41. Two unbiased dice are rolled once. Find the probability of getting (i) a doublet (equal numbers on both dice) (ii) the product as a prime number (iii) the sum as a prime number (iv) the sum as 1
42. If α, β are the roots of the equation $3x^2 - 4x + 1 = 0$, form a quadratic equation whose roots are $\frac{\alpha^2}{\beta}$ and $\frac{\beta^2}{\alpha}$

Part – D

Answer the two Questions.

2x8=16

43. a) Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{3}{5}$ of the corresponding sides of the triangle PQR (scale factor $\frac{3}{5} < 1$) (OR)
- b) Construct a triangle ΔPQR such that $QR = 5$ cm, $\angle P = 30^\circ$ and the altitude from P to QR is of length 4.2 cm.
44. a) Discuss the nature of solutions of the following quadratic equation $x^2 + x - 12 = 0$ (OR)
- b) Draw the graph of $y = x^2 + 3x - 4$ and hence use it to solve $x^2 + 3x - 4 = 0$

ALL THE BEST

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