FULL PORTION TEST – 2022 -2023

CLASS : X **SUBJECT : MATHEMATICS** **MARKS : 100** **TIME : 3 HRS**

Q. NO : 5

PART – A

CHOOSE THE CORRECT ANSWER **14 X 1 = 14**

1. If $g = \{(1, 1), (2, 3), (3, 5), (4, 7)\}$ is a function given by $g(x) = \alpha x + \beta$ then the values of α and β are (A) (1, 2) (B) (–1, 2) (C) (2, –1) (D) (–1, –2)

2. An A.P. consists of 31 terms. If its 16^{th} term is m, then the sum of all the terms of this A.P. is (A) 16 m (B) 62 m (C) 31 / 2 m (D) 31 m

3. The radioactive sample decays and the remaining sample at infinite time is given by b = 1 – $[\frac{1}{2} + \frac{1}{4} + \cdots \infty]$ *then b is* …… (A) 0 (B) 1 (c) $\frac{1}{\sqrt{2}}$ (d) $\frac{1}{2}$

4. The solution of $(2x - 1)^2 = 9$ is equal to

(A) $-1, 2$ (B) -1 (C) 2 (D) None of these

5. Which of the following should be added to make $x^4 + 64$ is a perfect square

(A) $4x^2$ (B) $8x^2$ (C) $-8x^2$ (D) $16x^2$

6. For a matrix A, B is called the additive inverse of A if

(A) A + B ≠B + A (B) B + A = A +B = 0 (C) $B + A = A + B \neq 0$ (D) A + B = 0 ≠ B + A

7. If ΔABC is an isosceles triangle with ∠C = 90° and AC = 5 cm, then AB is

(A) 5√2 cm (B) 10 cm (C) 2.5 cm (D) 5 cm

8. When proving that a quadrilateral is a trapezium, it is necessary to show

(A) Two parallel and two non-parallel sides. (B) Two sides are parallel.

(C) Opposite sides are parallel. (D) All sides are of equal length.

9. If the points (0,0), (a,0) and (0,b) are collinear, then

(A)a=b (B) a+b (C) ab=0 (D) a≠b

10. (1 + $\tan\theta + \sec\theta$)(1 + $\cot\theta - \operatorname{cosec}\theta$) is equal to

(A) –1 (B) 0 (C) 1 (D) 2

11. If the radius of the base of a right circular cylinder is halved keeping the same height, then the ratioof the volume of the cylinder thus obtained to the volume of original cylinder is (A) 1 : 6 (B) 1 : 8 (C) 1 : 2 (D) 1 : 4

12. A solid frustum is of height 8 cm. If the radii of its lower and upper ends are 3 cm and 9 cm respectively, then its slant height is:

(a) 15 cm (b) 12 cm (c) 10 cm (d) 17 cm

13. If the standard deviation of x, y, z is p then the standard deviation of $3x + 5$, $3y + 5$, $3z + 5$ is (A) $3p$ (B) $3p + 5$ (C) $9p + 15$ (D) $p + 5$

14. Which of the following is incorrect?

(A) $P(A) + P(\bar{A}) = 1$ (B) $P(\emptyset) = 0$ (C) $0 \leq P(A) \leq 1$ (D) $P(A > 1$

PART - B

ANSWER ANY 10 QUESTIONS (QUESTION NUMBER 28 IS COMPULSORY) 10 X 2 = 20

15. Let A={1,2,3,4,5},B=N and f:A->B be defined by f(x)=x^2.Find the range of f. Identify the type of function.

16. 'a' and 'b' are two positive integers such that $a^b \times b^a$ = 800. Find 'a' and 'b'.

17. Which term of an A.P. 16, 11, 6, 1,... is -54 ?

18. Find the quotient and remainder whenx^3+x^2-7x - 3 is divided by x - 3.

19. A has 'a' rows and 'a+3' columns. B has 'b' rows and '17-b' columns, and if bothproducts AB and BA exist, find a, b?

20. Find the area of the triangle whose vertices are (-3,5), (5,6) and (5,-2).

21. Find the equation of a straight line passing through (5,-3) and (7,- 4).

22. Prove that $\sec\theta - cos\theta = tan\theta sin\theta$

23. A tower stands vertically on the ground. From a point on the ground, which is 48 m awayfrom the foot of the tower, the angle of elevation of the top of the tower is30°. Find the height of thetower.

24. If the radii of the circular ends of a frustum which is 45 cm high are 28 cm and 7 cm, find thevolume of the frustum.

25. If the ratio of radii of two spheres is 4:7, find the ratio of their volumes.

26. If the standard deviation of a data is 3.6 and each value of the data is divided by 3, then find thenew variance and new standard deviation.

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28. In ΔPQR, given that S is a point on PQ such that ST||QR and $\frac{PS}{SQ} = \frac{3}{5}$. If PR =5.6cm. then find PT.

PART - C

ANSWER ANY 10 QUESTIONS (QUESTION NUMBER 42 IS COMPULSORY) 10 X 5 = 50

29. Let A = The set of all natural numbers less than 8, B = The set of all prime numbers less than 8, C = The set of even prime number. Verify that A×(B −C) = (A×B)−(A×C).

30. If d is the Highest Common Factor of 32 and 60, find x and y satisfying d = 32x+ 60 y.

31. In a G.P. the 9th term is 32805 and 6th term is 1215. Find the 12th term.

32. Simplify $\frac{2a^2+5a+3}{2a^2+7a+6} \div \frac{a^2+6a+5}{-5a^2-35a-50}$.

33. Find the value of a and b if the following polynomial is a perfect square

$4x^4 - 12x^3 + 37x^2 + bx + a.$

34. Solve $\begin{pmatrix} 1 & 2 \\ 3 & 3 \end{pmatrix}\begin{pmatrix} x & 0 \\ 0 & y \end{pmatrix} = \begin{pmatrix} x & 0 \\ 9 & 0 \end{pmatrix}$.

35. The perpendicular PS on the base QR of a ΔPQR intersects QR at S, such that QS=3 SR.Prove that $2PQ^2 = 2PR^2 + QR^2$.

36. Find the area of the quadrilateral formed by the points (8,6), (5,11), (-5,12) and (-4,3).

37. Find the equation of the median of ΔABC through A where the vertices are A (6,2), B(-5, -1) and C(1,9).

38. Prove the identity $(\sin\theta + cosec\theta)^2 + (\cos\theta + sec\theta)^2 = 7 + tan^2\theta + cot^2\theta$

39. A vessel is in the form of a frustum of a cone. Its radius at one end and the height are 8 cm and 14 cm respectively. If its volume is $\frac{5676}{3} cm^3$, then find the radius at the other end.

40. Water is flowing at the rate of 15 km per hour through a pipe of diameter 14 cm into a rectangular tank which is 50 m long and 44 m wide. Find the time in which the level of water in the tanks will rise by 21 cm.

41. Two dice are rolled together. Find the probability of getting a doublet or sum of faces as 4.

42. Given $\sum x = 99$, n = 9 ,$\sum(x-10)^2 = 79$,then find $\sum x^2$ and $\sum(x-\overline{x})^2$.

PART - C

ANSWER THE FOLLOWING QUESTIONS **2 X 2 = 16**

43. (a) Construct a ΔPQR in which QR = 5 cm, ∠P = 40° and the median PG from P to QR is 4.4 cm.Find the length of the altitude from P to QR. **(OR)**

(b) Draw the two tangents from a point which is 10 cm away from the centre of a circle of radius 5 cm.Also, measure the lengths of the tangents.

44. (a) Draw the graph of y=$x^2 - 4x + 3$ and use it to solve $x^2 - 6x + 9 = 0$. **(OR)**

(b) A school announces that for a certain competition, the cash price will be distributed for all the participants equally as show below

No. of participants(x)	2	4	6	8	10
Amount for each participants in Rs (y)	180	90	60	45	36

(i) Find the constant of variation

(ii) Graph the above and hence, find how much will each participant get if the number of participants are 12

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