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STANDARD -X **MATHEMATICS**

TIME : 2.00 Hrs MARKS:100

PART I

CHOOSE THE CORRECT ANSWER: 19X1=19

1. Let A={1,2,3,4} and B={4,8,9,10}. A function f: A→ B given by f = {(1,4), (2,8), (3,9), (4,10)} is a
(a) Many- one function (b) Identity function(c) One-to-one function (d) Into function

2. Let f and g be two functions given by f= {(0,1),(2,0),(3, -4), (4,2) , (5,7)}
g= {(0,2), (1,0), (2,4), (-4,2), (7,0)} then the range of f o g is
(a) {0,2,3,4,5} (b) {-4,1,0,2,7} (c) {1,2,3,4,5} (d){0,1,2}

3. Euclid's division lemma states that for positive integers a and b, there exist unique integers q and r such that a = bq+r, where r must satisfy
(a) 1< r<b (b) 0< r<b (c) $0 \leq r < b$ (d) $0 < r \leq b$

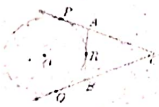
4. If $A = 2^{65}$ and $B = 2^{64} + 2^{63} + 2^{62} + \ldots + 2^0$ which of the following is true?
(a) B is 2^{64} more than A (b) A and B are equal (c) B is larger than A by 1 (d) A is larger than B by 1

5. $\frac{x}{x^2-25} - \frac{8}{x^2+6x+5}$ gives (a)$\frac{x^2-7x+40}{(x-5)(x+5)}$ (b) $\frac{x^2+7x+40}{(x-5)(x+5)(x+1)}$ (c) $\frac{x^2-7x+40}{(x+1)(x^2-25)}$ (d) $\frac{x^2+10}{(x+1)(x^2-25)}$

6. If the roots of the equation $q^2x^2 + p^2x + r^2 = 0$ are the squares of the roots of the equation $qx^2 + px + r = 0$, then q, p,r are in
(a) A.P (b) G.P (c)Both A.P and G.P (d) none of these

7. If number of columns and rows are not equal in a matrix then it is said to be a
(a) diagonal matrix (b) rectangular matrix (c)square matrix (d) identity matrix

8. If inΔ ABC , DE ∥ BC. AB =3.6 cm, AC= 2.4 cm and AD = 2.1 cm then the length of AE is
(a) 1.4cm (b) 1.8 cm (c) 1.2 cm (d)1.05cm



9. In figure CP and CQ are tangents to a circle with centre at O. ARB is another tangent touching the circle at R. If CP =11cm and BC = 7 cm, then the length of BR is
(a) 6cm (b) 5cm (c) 8cm (d) 4cm

10. If (5,7), (3,p) and (6,6) are collinear, then the value of p is
(a)3 (b)6 (c)9 (d)12

11. When proving that a quadrilateral is a parallelogram by using slopes you must find
(a) The slopes of two sides (b) The slopes of two pair of opposite sides (c)The lengths of all sides(d) Both the lengths and slopes of two sides

12. $\tan\theta \ \text{cosec}^2\theta - \tan\theta$ is equal to (a) $\sec\theta$ (b) $\cot^2\theta$ (c)$\sin\theta$ (d)$\cot\theta$

13. $a\cot\theta + b\,\text{cosec}\,\theta = p$ and $b\cot\theta + a\,\text{cosec}\,\theta = q$ then $p^2 - q^2$ is equal to
(a) a^2-b^2 (b) b^2-a^2 (c)a^2+b^2 (d) b - a

14. The height of a right circular cone whose radius is 5 cm and slant height is 13cm will be
(a) 12cm (b) 10cm (c)13cm (d)5cm

15. A shuttle cock used for playing badminton has the shape of the combination of
(a) a cylinder and a sphere (b) a hemisphere and a cone (c)a sphere and a cone (d) frustum of a cone and a hemisphere

16. The ratio of the volumes of a cylinder, a cone and a sphere, if each has the same diameter and same height is
(a) 1:2:3 (b) 2:1:3 (c) 1:3:2 (d) 3:1:2

17. The standard deviation of a data is 3. If each value is multiplied by 5 then the new variance is
(a) 3 (b) 15 (c) 5 (d)225

18. If the mean and coefficient of variation of a data are 4 and 87.5% then the standard deviation is (a) 3.5 (b) 3 (c)4.5 (d) 2.5

19. The probability a red marble selected a random from a jar containing p red, q blue and r green marbles is (a) $\frac{q}{p+q+r}$ (b) $\frac{p}{p+q+r}$ (c) $\frac{p+q}{p+q+r}$ (d)$\frac{p+r}{p+q+r}$

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PART II

ANSWER ANY 7 QUESTIONS. 7X2=14

20. If A X B = {(3,2),(3,4), (5,2), (5,4)} then find A and B.
21. Let A = {1,2,3,4,...45} and R be the relation defined as "square is of a number " on A. Write R as a subset of A X A . Also find the domain the range of R.
22. 'a ' and 'b' are two positive integers such that $a^b \times b^a = 800$. Find 'a ' and 'b'
23. Find the number of terms in the A.P 3,6,9,12,...111.
24. $A=\begin{bmatrix} 5 & 2 & 2 \\ -\sqrt{17} & 0.7 & \frac{5}{2} \\ 8 & 3 & 1 \end{bmatrix}$ then verify $(A^T)^T = A$
25. Verify that $A^2 = I$ when $A = \begin{pmatrix} 5 & -4 \\ 6 & -5 \end{pmatrix}$
26. If ΔABC is similar to Δ DEF such that BC =3 cm, EF = 4 cm and area of ΔABC = 54 cm^2. Find the area of ΔDEF.
27. Find the area of the triangle whose vertices are (1,-1), (-4,6) and (-3,-5).
28. Find the range and co-efficient of range of the following data 25,67,48,53,18,39,44.
29. what is the probability that a leap year selected at random will contain 53 saturdays.

PART III

ANSWER ANY 7 QUESTIONS. 7X5=35

30. Let A = {x∈ W| x<2}, B = {x ∈N| 1< x ≤4} and C = {3,5}. Verify that (AUB) XC = (AXC) U (BXC)
31. Let f: A →B be a function defined by $f(x) = \frac{x}{2} - 1$, where A ={2,4,6,10,12} B= {0,1,2,4,5,9}. Represent f by (i) set of ordered pairs (ii) a table (ii) an arrow diagram (iv) a graph
32. Find the sum to n terms of the series 3+33++333+...to n terms
33. Rekha has 15 square colour papers of sizes 10cm, 11cm, 12cm,...24cm. How much area can be decorated with these colour papers?
34. Find the square root of $64x^4 - 16x^3 + 17x^2 - 2x + 1$
35. If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ show that $A^2 - 5A + 7I_2 = 0$
36. State and prove Thales theorem.
37. Find the area of the quadrilateral whose vertices are at (-9,-2),(-8,-4),(2,2) and (1,-3).
38. A teacher asked the students to complete 60 pages of a record note book. Eight students have completed only 32, 35, 37, 30,33,36,35 and 37 pages. Find the standard deviation of the pages completed by them.
39. Two dice are rolled together. Find the probability of getting a doublet or sum of faces as 4.

PART IV

ANSWER ALL QUESTIONS: 4X8=32

(QUESTION NO. GIVEN AS PER PUBLIC EXAMINATION)

43.(a) Construct a triangle similar to a given triangle ABC with its sides equal to $\frac{6}{5}$ of the corresponding sides of the triangle ABC (scale factor to $\frac{6}{5}$ >1)

(b) Draw a circle of radius 4.5 cm . Take a point on the circle . Draw the tangent at that point using the alternate segment theorem.

44.(a) A two wheeler parking zone near bus stand charges as below.

Time (in hours)	4	8	12	24
Amount (₹)	60	120	180	360

Check if the amount charged are in direct variation or in inverse variation to the parking time. Graph the data. Also (i) find the amount to be paid when parking time is 6 hr; (ii) find the parking duration when the amount paid is ₹ 150

(b)Draw the graph of xy = 24 , x, y > 0. Using the graph find , (i) y when x = 3 and (ii) x when y = 6

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