10TH - MATHEMATICS - FULL TEST-1.

MARKS: 100 TIME: 3 Hrs.

PART-I

(i) Answer all the questions. 14×1=14

(ii) Choose the most appropriate answer from the given four alternatives and write the option code and the corresponding answer.

1. If the ordered pairs $(a+2, 4)$ and $(5, 2a+b)$ are equal then (a, b) is

A) $(2, -2)$ B) $(5, 1)$ C) $(2, 3)$ D) $(3, -2)$.

2. If $f(x) = 2x^2$ and $g(x) = \frac{1}{3x}$, then fog is

A) $\frac{3}{2x^2}$ B) $\frac{2}{3x^2}$ C) $\frac{2}{9x^2}$ D) $\frac{1}{6x^2}$.

3. Given $F_1 = 1$, $F_2 = 3$ and $F_n = F_{n-1} + F_{n-2}$ then F_5 is

A) 3 B) 5 C) 8 D) 11

4. A system with ___ will reduce to identity.

A) Unique solution B) No solution.

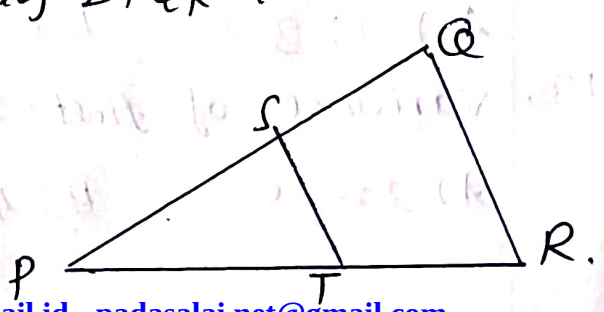
C) Three solution D) Infinite number of solution.

5. A square matrix in which all the entries above the leading diagonal are zero is called a ___

A) lower triangular matrix B) Triangular matrix

C) uper triangular matrix D) Diagonal matrix.

6. In a given figure $ST \parallel QR$. $PS = 2$ cm and $SQ = 3$ cm Then the ratio of the area of ΔPQR to the area of ΔPST is



A) 25 : 4 B) 25 : 7

C) 25 : 11 D) 4 : 25

7. A chord is a subsection of ____

A) Tangent B) Secant C) Straight ling D) None.

8. A staight line has equation $8y = 4x + 21$. which of the following is true.

A) The slope is 0.5 and the y intercept is 1.6

B) The slope is 5 and the y intercept is 2.6

C) The slope is 0.5 and the y-intercept is 2.6

D) The slope is 5 and the y-intercept is 1.6.

9. $(1+\tan\theta+\sec\theta)(1+\cot\theta-\operatorname{cosec}\theta)$ is equal to

A) 0 B) 1 C) 2 D) -1

10. If the ratio of the height of a tower and length of its shadow $1:\sqrt{3}$, then the angle of elevation of the sun has measure.

A) 45° B) 30° C) 90° D) 60°

11. A spherical ball of radius r_1 units is melted to make 8 new identical balls each of radius r_2 units. Then $r_1 : r_2$ is.

A) 2:1 B) 1:2 C) 4:1 D) 1:4

12. The height and radius of the cone of which the frustum is a part are h_1 units and r_1 units respectively. Height of the frustum is h_2 units and radius of the smaller base is r_2 units. If $h_2 : h_1 = 1:2$ then $r_2 : r_1$ is

A) 1:3 B) 1:2 C) 2:1 D) 3:1

13. Variance of first 20 natural numbers is

A) 32.25 B) 44.25 C) 33.25 D) 30

14. If $P(E) = 0.05$, then $P(\text{not } E) =$ _____

A) 0.05 B) 0.5 C) 0.9 D) 0.95

PART – II

Answer any 10 questions. $10 \times 2 = 20$

Question No. 28 is compulsory.

15. let $A = \{1, 2, 3\}$ and $B = \{x / x$ is a prime number less than $7\}$. Find $A \times B$ and $B \times A$.

16. Define constant function.

17. If $13824 = 2^a \times 3^b$ then find a and b.

18. Find the general term of the sequence $5, -25, 125, \ldots$

19. Find the excluded value of $\dfrac{x^2+6x+8}{x^2+x-2}$

20. If one root of the equation $2y^2 - ay + 64 = 0$ is twice the other then find the values of a.

21. If $A = \begin{bmatrix} 1 & 3 & -2 \\ 5 & -4 & 6 \\ -3 & 2 & 9 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 8 \\ 3 & 4 \\ 9 & 6 \end{bmatrix}$, find $A+B$.

22. PQ is a tangent drawn from a point P to a circle with centre O and QOR is a diameter of the circle such that $\angle POR = 120^\circ$. Find $\angle OPQ$.

23. Find the equation of a straight line passing through $(5, 7)$ and is (i) parallel to x-axis, (ii) parallel to y-axis.

24. prove that $\dfrac{\cos\theta}{1+\sin\theta} = \sec\theta - \tan\theta$.

25. The radius of a spherical balloon increases from 12 cm to 16cm as air is being pumped into it. Find the ratio of the surface area of the balloons in the two cases.

26. Find the standard deviation of first 21 natural numbers.

27. A coin is tossed thrice. What is the probability of getting two consecutive Heads?

28. Find the equation of a straight line parallel to the line $y = \frac{4}{3}x - 7$ and passing through the point $(-7, -1)$.

PART - III

Answer any 10 questions. $10 \times 5 = 50$

Question No. 42 is compulsory.

29. A function f is defined by $f(x) = 2x - 3$ find.

(i) $\frac{f(0) + f(1)}{2}$

(ii) find x such that $f(x) = 0$

iii) find x such that $f(x) = x$

iv) find x such that $f(x) = f(1-x)$.

30. If $f(x) = 2x+3$, $g(x) = 1-2x$ and $h(x) = 3x$ prove that $fo(goh) = (fog)oh$.

31. Find the greatest number consisting of 6 digits which is exactly divisible by 24, 15, 36?

32. Find x, y and z, given that the numbers $x, 10, y, 24, z$ are in A.P?

33. Solve: $\frac{1}{2x} + \frac{1}{4y} - \frac{1}{3z} = \frac{1}{4}$; $\frac{1}{x} = \frac{1}{3y}$;
$\frac{1}{x} - \frac{1}{5y} + \frac{4}{z} = 2\frac{2}{15}$.

34. Find the value of m and n if $x^4 - 8x^3 + mx^2 + nx + 16$. is a perfect square.

35. Given that $A = \begin{bmatrix} 1 & 3 \\ 5 & -1 \end{bmatrix}$, $B = \begin{bmatrix} 1 & -1 & 2 \\ 3 & 5 & 2 \end{bmatrix}$
$C = \begin{bmatrix} 1 & 3 & 2 \\ -4 & 1 & 3 \end{bmatrix}$ verify that $A(B+C) = AB + AC$.

36. State and prove Pythagoras Theorem.

37. A line makes positive intercepts on coordinate axes whose sum is 7 and it passes through $(-3, 8)$. Find its equation.

38. From the top of a tree of height 13 m the angle of elevation and depression of the top and bottom of another tree are 45° and 30° respectively. Find the height of the second tree ($\sqrt{3} = 1.732$).

39. A vessel is in the form of a hemispherical bowl mounted by a hollow cylinder. The diameter is 14 cm and the height of the vessel is 13 cm. Find the capacity of the vessel.

40. Find the mean and variance of the first 'n' natural numbers.

41. Two dice are rolled once. Find the probability of getting even number on the first die or sum of the face values is 7.

42. Find the area of the quadrilateral whose vertices are at $(-4,-2)$, $(-3,-5)$, $(3,-2)$ and $(2,3)$.

PART-IV

Answer all the questions: $2 \times 8 = 16$.

43. a) Take a point which is 11cm away from the centre of a circle of radius 4 cm and draw two tangents to the circle from that point.

(or)

b). Draw a triangle ABC of base BC = 8cm, $\angle A = 60^\circ$ and the bisector of $\angle A$ meets BC at D such that BD = 6cm.

44. a) Draw the graph of $y = x^2 - 5x - 6$ and hence solve $x^2 - 5x - 14 = 0$

(or)

b) A bus is travelling a uniform speed of 50km/hr. Draw the distance - time graph and hence find.

i) the constant of variation.

ii) how far will it travel in $1\frac{1}{2}$ hr

iii) the time required to cover a distance of 300km from the graph.

ALL THE BEST.