$\overline{X}^{th}$ - STANDARD.

Chapter - 1, 2. (2M TEST).

I. ANSWER THE FOLLOWING:-

1. Define a function
2. Compute x such that $10^4 \equiv x \pmod{19}$
3. If $f(x) = 3+x$, $g(x) = x-4$, then check whether $f\circ g = g\circ f$.
4. An organization plans to plant saplings in 25 streets in a town in such a way that one sapling for the first street, three for the second, nine for the third and so on. How many saplings are needed to complete the work?
5. Find the 19th term of an A.P is $-11, -15, -19, \ldots$
6. A relation 'f' is defined by $f(x) = x^2 - 2$ where $x \in \{-2, -1, 0, 3\}$ (i) List the elements of f (ii) Is 'f' a function.
7. Find $A\times B$ and $B\times A$ if $A = \{m, n\}$; $B = \phi$.
8. Find the middle terms of an A.P. $9, 15, 21, 27, \ldots, 183$.
9. A relation R is given by the set $\{(x,y) \mid y = x+3, x \in \{0,1,2,3,4,5\}\}$. Determine its domain and range
10. If $f(x) = x^2 - 1$, $g(x) = x-2$, find a if $g\circ f(a) = 1$
11. If $1+2+3+\ldots+n = 666$ then find n.
12. Let f be a function and $f: N \to N$ be defined by $f(x) = 3x+2$, $x \in N$. Find the pre-image of 29, 53.
13. Is $7\times 5\times 3\times 2+3$, a composite number? Justify your answer?
14. Find the largest number which divides 1230 and 1926 leaving remainder 12 in each case.
15. If nine times nineth term is equal to fifteen times fifteenth term show that six times twenty fourth term is zero.

16. Find the Least number that is divisible by the first ten natural numbers.

17. Find the value of x, in $x^2-4x-12$.

18. If $13824 = 2^a \times 3^b$, then find 'a' and 'b'.

19. If $P = \frac{x}{x+y}$, $Q = \frac{y}{x+y}$, then find $\frac{1}{P^2-Q^2}$.

20. Let $A = \{1,2,3,4 \ldots 45\}$ and R be the relation defined as "is square of a number" on
(a) Write R as a subset of $A \times A$. Also find the domain and Range of R.

21. Show that the function $f: N \to N$ defined by $f(m) = m^2+m+3$ is one - one function.

22. If m, n are natural numbers, for what values of m, does $2^n \times 5^m$ ends in 5?

23. Find the 3^{rd} and 4^{th} terms of the sequences of $a_n = \begin{cases} n^2 & \text{if } n \text{ is odd} \\ n^2/2 & \text{if } n \text{ is even.} \end{cases}$

24. Find the value of $1^2+2^2+3^2+\cdots+10^2$ and hence deduce $2^2+4^2+6^2+\cdots+20^2$.

25. A man has 532 flowers pots. He wants to arrange them in rows such that each row contains 21 flower pots. Find the number of completed rows and how many flower pots are left over.

26. Find x so that $x+6$, $x+12$ and $x+15$ are three Consecutive terms of a G.P.

27. If $3+k$, $18-k$, $5k+1$ are in A.P, then find k.

28. If $1^3+2^3+3^3+\cdots+k^3 = 16900$, then find $1+2+3+\cdots+k$.

29. Find k if $f \circ f(k) = 5$ where $f(k) = 2k-1$

30. Let $A = \{1,2,3 \ldots 100\}$ and R be the ~~function~~ Relation defined as "a cube of an A". Find the domain and range.

31. In an G.P $\frac{1}{4}, \frac{1}{2}, 1, 2, \ldots$ find t_{10}.

32. In a theatre, there are 20 seats in the front row and 30 rows are allotted. Each successive row contains two additional seats than its front row. How many seats are there in the last row?

33. Find the G.P whose first term $a = 7$ and common ratio $r = 6$.

34. Let f be a function from R to R defined by $f(x) = 3x - 5$ Find the values of a and b given that $(a, 4)$ and $(1, b)$ belong to f.

35. If $R = \{(x-2), (-5, y)\}$ represents the Identity function, find the values of x and y.

36. Find the common difference of an A.P in which $t_{18} - t_{14} = 32$.

37. Find the number of Integer Solutions of $3x \equiv 1 \pmod{15}$.

38. Find the Sum of $1 + 3 + 5 + \ldots + 55$.

39. If a, b, c are in A.P then show that $3^a, 3^b, 3^c$ are in G.P

40. Find the next three terms of the sequence $\frac{1}{2}, \frac{1}{6}, \frac{1}{10}, \frac{1}{14}, \ldots$

41. Find the greatest number that will divide 445 and 572 leaving remainders 4 and 5 respectively.

42. A function f is define by $f(x) = 3 - 2x$. Find x such that $f(x^2) = [f(x)]^2$.

43. Solve : $5x \equiv 4 \pmod{6}$

44. Find k if $f \circ f(k) = 5$ where $f(k) = 2k - 1$.

45. If the first term of an Infinite G.P is 8 and its sum to infinity is $\frac{32}{3}$ then find the common ratio.

46. Define : Relation.

47. show that the square of an odd Integer is of the form $4q+1$, for some Integer q.

48. Find the indicated term of the sequence whose n^{th} term is given by $a_n = -(n^2-4)$; a_4 and a_{11}.

49. Find the sum of 8 terms of the G.P $1, -3, 9, -27, \ldots$

50. Let $f(x) = 2x+5$. If $x \neq 0$ then find $\frac{f(x+2)-f(2)}{x}$.

51. Represent the function $f(x) = \sqrt{2x^2-5x+3}$ as a Composition of two functions.

52. Find the least positive value of x such that $67+x \equiv 1 \pmod{4}$.

53. Find the LCM and HCF of 408 and 170 by applying the fundamental theorem of arithmetic.

54. Find the 10^{th} term of a G.P whose 8^{th} terms is 768 and the common ratio is 2.

55. Prove that $2^n + 6 \times 9^n$ is always divisible by 7. for any positive integer n.

56. In an A.P the sum of first n terms is $\frac{5n^2}{n} + \frac{3n}{2}$. Find the 17^{th} term.

57. Use EDL to find the HCF of 867 and 255

58. Find the sum of first 15 terms of the A.P $8, 7\frac{1}{4}, 6\frac{1}{2}, 5\frac{3}{4}, \ldots$

59. If t_n is the n^{th} terms of an A.P then $t_{8n} - t_n$?

60. Let $F_1 = 1$, $F_2 = 3$ and $F_n = F_{n-1} + F_{n-2}$ then first 5 terms are?

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வினா எண் Qn. No.

X - Standard. - Part-II

Compulsory questions :-

1) A solid sphere and a solid hemisphere have equal total surface Area. Prove that the ratio of their volume is $3\sqrt{3}:4$

Sol:

r_1 and r_2 be the radius of sphere and hemisphere

T.S.A of sphere = T.S.A of solid hemi sphere

$4\cancel{\pi} r_1^2 = 3\cancel{\pi} r_2^2$

$\frac{r_1^2}{r_2^2} = \frac{3}{4}$

$\frac{r_1}{r_2} = \frac{\sqrt{3}}{\sqrt{4}}$

$\frac{r_1}{r_2} = \frac{\sqrt{3}}{2}$

Ratio of volumes $= \frac{\text{volume of sphere}}{\text{volume of hemisphere}}$

$= \frac{\frac{4}{\cancel{3}}\cancel{\pi} \times r_1^3}{\frac{2}{\cancel{3}}\cancel{\pi} \times r_2^3}$

$= \frac{4r_1^3}{2r_2^3} = 2\left[\frac{r_1}{r_2}\right]^3$

$= 2\left[\frac{\sqrt{3}}{2}\right]^3$

$= \frac{\cancel{2} \times \sqrt{3} \times \sqrt{3} \times \sqrt{3}}{\cancel{2} \times 2 \times 2}$

$= \frac{3\sqrt{3}}{4} = 3\sqrt{3} : 4$

Ratio of volumes $= 3\sqrt{3}:4$

② If $1^3+2^3+3^3+\dots+k^3 = 44100$, then find $1+2+3+\dots+k$.

$1^3+2^3+3^3+\dots+k^3 = 44100$

$\left[\frac{k(k+1)}{2}\right]^2 = 44100$

$\frac{k(k+1)}{2} = \sqrt{44100}$

$\frac{k(k+1)}{2} = 210.$

$\therefore 1+2+3+\dots+k = 210$

③ What is the Probability that a leap year selected at random will contain 53 saturdays?

A leap has 366 days, it has 52 full weeks and 2 days.

sample space for two days.

S = {Sun-mon, mon-Tue, Tue-wed, wed-Thu, Thu-Fri, Fri-Sat, Sat-Sun}

மதிப் பெண்கள் Marks

பக்க வாரியான மொத்தம் Pagewise Total Marks

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$n(S) = 7$.

Let A be the Event of 53rd saturday.

$A = \{Fri\text{-}Sat, Sat\text{-}Sun\}$;

$n(A) = 2$.

53 saturdays in a leap year is $P(A) = \frac{n(A)}{n(S)}$

$P(A) = \frac{2}{7}$

(4) Find the Equation of a straight line Passing through (5,7) and is

i) Parallel to x axis

Sol:

x axis is $y = b$

$(5,7)$, $b = 7$.

The required Equation of the line is $y = 7$.

(ii) Parallel to Y axis

$x = c$.

$(5,7)$, $c = 5$.

The required Equation of the line is $x = 5$.

(5) The hill in the form of a right triangle has its foot at (19,3). The inclination of the hill to the Ground is 45°. Find the Equation of the hill joining the foot and top.

Sol:

$\tan\theta = m$

$\tan 45° = m$.

one point slope form Equation is

$y - y_1 = m(x - x_1)$

$y - 3 = 1(x - 19)$

$y - 3 = x - 19$

$x - 19 - y + 3 = 0$

$x - 16 - y = 0$

$x - y - 16 = 0$

(6) The Radius of a spherical balloon increases from 12 cm to 16 cm as air being pumped into it. Find the ratio of the surface area of the balloons in two cases.

r_1 and r_2 is the Radius of the two balloons.

Given,

$\frac{r_1}{r_2} = \frac{12}{16} = \frac{3}{4}$

C.S.A of balloons $= \frac{4\pi r_1^2}{4\pi r_2^2}$

$= \frac{r_1^2}{r_2^2} = \left[\frac{r_1}{r_2}\right]^2$

$= \left[\frac{3}{4}\right]^2 = \left[\frac{9}{16}\right]$

The ratio ... 9 : 16

மதிப் பெண்கள் Marks

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Sol:

$x^2-(\alpha+\beta)x+(\alpha\beta).$

$x^2-(1+\sqrt{3})x+(1-\sqrt{3})$

$x^2-\cancel{1}-\sqrt{3}x+\cancel{1}-\sqrt{3}$

$x^2-\sqrt{3}x-\sqrt{3}=0.$

Whose roots are.

$7+\sqrt{3},\ 7-\sqrt{3}.$

$\alpha+\beta=7+\cancel{\sqrt{3}}+7-\cancel{\sqrt{3}}$

$\alpha+\beta=14$

$\alpha\beta=(7+\sqrt{3})(7-\sqrt{3})$

$=7^2-(\sqrt{3})^2=49-3$

$\alpha\beta=46.$

$\therefore$ The Q.F of equation are $x^2-(\alpha+\beta)x+\alpha\beta=0$

$\therefore x^2-14x+46=0.$

பக்க வாரியான மொத்தம் Pagewise Total Marks