Assignment

Class 11

Subject Mathematics

Semester 1

Syllabus included

1-Sets

2-Functions and Relations

3-Trigonometric Functions

4-Mathematical Induction

5-Complex Numbers

6-Linear Inequalities

7-Permutation and Combination

Chapter 1:- Set

1) Which symbol is used to represent Null or Void set ?

2) Is the given statement correct?

If A = $\{1, 2, 3, 4, 5\}$

Statement $\{3, 4\}$ c A.

3) Find the union of the given pair:

x = $\{1, 3, 5\}$, y = $\{1, 2, 3\}$

4) Which of the following are sets ? Justify your answer.

(i) The collection of all the months of a year beginning with the letter J.

(ii) The collection of ten most talented writers of India.

(iii) A team of eleven best-cricket batsmen of the world.

(iv) The collection of all boys in your class.

(v) The collection of all natural numbers less than 100.

(vi) A collection of novels written by the writer Munshi Prem Chand.

(vii) The collection of all even integers.

(viii) The collection of questions in this Chapter.

(ix) A collection of most dangerous animals of the world

5) Write all subsets of A = $\{1, 2, 3\}$.

6) Write the following sets in roster form:

(i) A = {x: x is an integer and − 3 < x < 7}

(ii) B = {x: x is a natural number less than 6}

(iii) C = {x: x is a two-digit natural number such that the sum of its digits is 8}

(iv) D = {x: x is a prime number which is divisor of 60}

(v) E = The set of all letters in the word TRIGONOMETRY (vi) F = The set of all letters in the word BETTER

7) Write power set of the set A = {a, b, c}.

8) Write the following as intervals:

i) $\{x: x \in R, -4 < x \leq 6\}$ ii) $\{x: x \in R, -12 < x \leq -10\}$

iii) $\{x: x \in R, 0 \leq x < 7\}$ iv) $\{x: x \in R, 3 \leq x < 4\}$

9) Some students have to study following subjects in the roaster form. The sets are given below:-

(i) The set of all letters in the word 'MATHEMATICS'.

(ii) The set of all letters in the word 'ALGEBRA

(iii) The set of all vowels is the word 'EQUATION

(iv) The set of all natural numbers less than 7.

(v) The set of squares of integers

Describe all the above sets in roaster form, and what value in this question.

11) Show that the following four conditions are equivalent :-

i) A ⊂ B (ii) A-B= φ iii) A u B =B iv) A ∩ B = A

12) Let μ = {1, 2, 3, 4, 5, 6, 7, 8, 9}, A = {1, 2, 3, 4}, B= {2, 4, 6, 8} and C= {3, 4, 5, 6}. Find

(i). A', (ii) B', (iii) (A u C)', (iv) (A u B)', (v) (A.')', (vi) (B-C)'.

13) For any sets A and B, show that:

P(A n B) = P(A) n P(B)

14) In a group of 400 people , 250 can speak Hindi and 200 can speak English. How many people can speak both Hindi and English?

15) Find sets A, B and C such that A ∩ B, B ∩ C, A ∩ C are non- empty sets

A ∩ B ∩ C = φ

16) In a committee, 50 people speak French, 20 speak Spanish and 10 speak both Spanish and French. How many speak at least one of these two languages?

17. In a group of 65 people, 40 like cricket, 10 like both cricket and tennis. How many like tennis only and not cricket? How many like tennis?

18. Let A and B be sets. If A ∩ X = B ∩ X = φ and A ∪ X = B ∪ X for some set X, show that A = B

19. In a survey of 60 people, it was found that 25 people read newspaper H, 26 read newspaper T, 26 read newspaper I, 9 read both H and I, 11 read both H and T,8 read both T and I, 3 read all three newspapers. Find: (i) the number of people who read at least one of the newspapers. ii)the number of people who read exactly one newspaper.

Chapter 2:-Functions and Relations

Question 1:

If $\left(\frac{x}{3}+1,\ y-\frac{2}{3}\right)=\left(\frac{5}{3},\ \frac{1}{3}\right)$, find the values of x and y.

Question 2: If the set A has 3 elements and the set B = {3, 4, 5}, then find the number of elements in (A × B)?

Question 3: If G = {7, 8} and H = {5, 4, 2}, find G × H and H × G.

Question 4: State whether each of the following statement are true or false. If the statement is false, rewrite the given statement correctly.

(i) If P = {*m*, *n*} and Q = {*n*, *m*}, then P × Q = {(*m*, *n*), (*n*, *m*)}.

(ii) If A and B are non-empty sets, then A × B is a non-empty set of ordered pairs (*x*, *y*) such that *x* ∈ A and *y* ∈ B.

(iii) If A = {1, 2}, B = {3, 4}, then A × (B ∩ Φ) = Φ.

Question 5: If A = {–1, 1}, find A × A × A.

Question 6: If A × B = {(*a*, *x*), (*a*, *y*), (*b*, *x*), (*b*, *y*)}. Find A and B.

Question 7: Let A = {1, 2}, B = {1, 2, 3, 4}, C = {5, 6} and D = {5, 6, 7, 8}. Verify that

(i) A × (B ∩ C) = (A × B) ∩ (A × C)

(ii) A × C is a subset of B × D

Question 8: Let A = {1, 2} and B = {3, 4}. Write A × B. How many subsets will A × B have? List them.

Question 9: Let A and B be two sets such that *n*(A) = 3 and *n* (B) = 2. If (*x*, 1), (*y*, 2), (*z*, 1) are in A × B, find A and B, where *x*, *y* and *z* are distinct elements.

Question 10: The Cartesian product A × A has 9 elements among which are found (–1, 0) and (0, 1). Find the set A and the remaining elements of A × A.

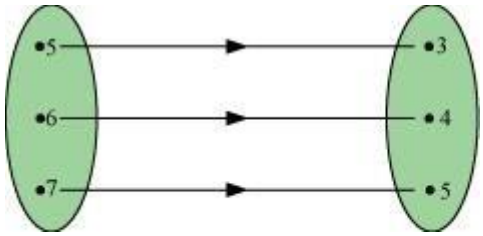
Question 11: Let A = {1, 2, 3, … , 14}. Define a relation R from A to A by R = {(*x*, *y*): 3*x* – *y* = 0, where *x*, *y* ∈ A}. Write down its domain, codomain and range.

Question 12: Define a relation R on the set **N** of natural numbers by R = {(*x*, *y*): *y* = *x* + 5, *x* is a natural number less than 4; *x*, *y* ∈ **N**}. Depict this relationship using roster form. Write down the domain and the range.

Question 13: A = {1, 2, 3, 5} and B = {4, 6, 9}. Define a relation R from A to B by R = {(*x*, *y*): the difference between *x* and *y* is odd; *x* ∈ A, *y* ∈ B}. Write R in roster form.

Question 14: The given figure shows a relationship between the sets P and Q. write this relation (i) in set-builder form (ii) in roster form.

What is its domain and range?



Question 15: Let A = {1, 2, 3, 4, 6}. Let R be the relation on A defined by

{(a, b): a, $b \in$ A, b is exactly divisible by a}.

(i) Write R in roster form

(ii) Find the domain of R

(iii) Find the range of R.

Question 16: Determine the domain and range of the relation R defined by R = {(x, x + 5): $x \in$ {0, 1, 2, 3, 4, 5}}.

Question 17: Write the relation R = {(x, x^3): x is a prime number less than 10} in roster form.

Question 18: Let A = {x, y, z} and B = {1, 2}. Find the number of relations from A to B.

Question 19: Let R be the relation on **Z** defined by R = {(a, b): a, $b \in$ **Z**, $a - b$ is an integer}. Find the domain and range of R.

Question 20: Which of the following relations are functions? Give reasons. If it is a function, determine its domain and range.

(i) {(2, 1), (5, 1), (8, 1), (11, 1), (14, 1), (17, 1)}

(ii) {(2, 1), (4, 2), (6, 3), (8, 4), (10, 5), (12, 6), (14, 7)}

(iii) {(1, 3), (1, 5), (2, 5)}

Question 21: Find the domain and range of the following real function:

(i) $f(x) = -|x|$ (ii) $f(x) = \sqrt{9 - x^2}$

Question 22: A function f is defined by $f(x) = 2x - 5$. Write down the values of

(i) $f(0)$, (ii) $f(7)$, (iii) $f(-3)$

Question 23: The function 't' which maps temperature in degree Celsius into temperature in degree Fahrenheit is defined by $t(C) = \frac{9C}{5} + 32$.

Find (i) $t(0)$ (ii) $t(28)$ (iii) $t(-10)$ (iv) The value of C, when $t(C) = 212$

Question 24: The relation f is defined by $f(x)=\begin{cases} x^2, & 0 \le x \le 3 \\ 3x, & 3 \le x \le 10 \end{cases}$

The relation g is defined by $g(x)=\begin{cases} x^2, & 0 \le x \le 2 \\ 3x, & 2 \le x \le 10 \end{cases}$

Show that f is a function and g is not a function.

Question 25: If $f(x) = x^2$, find $\dfrac{f(1.1)-f(1)}{(1.1-1)}$.

Question 26: Find the domain of the function $f(x)=\dfrac{x^2+2x+1}{x^2-8x+12}$

Question 27: Find the domain and the range of the real function f defined by $f(x)=\sqrt{(x-1)}$.

Question 28: Find the domain and the range of the real function f defined by $f(x) = |x - 1|$.

Question 29: Let $f=\left\{\left(x, \dfrac{x^2}{1+x^2}\right): x \in \mathbf{R}\right\}$ be a function from **R** into **R**. Determine the range of f.

Question 30: Let $f, g: \mathbf{R} \to \mathbf{R}$ be defined, respectively by $f(x) = x + 1$, $g(x) = 2x - 3$.

Find $f + g$, $f - g$ and $\dfrac{f}{g}$.

Question 31: Let $f = \{(1, 1), (2, 3), (0, -1), (-1, -3)\}$ be a function from **Z** to **Z** defined by $f(x) = ax + b$, for some integers a, b. Determine a, b.

Question 32: Let R be a relation from **N** to **N** defined by $R = \{(a, b): a, b \in \mathbf{N} \text{ and } a = b^2\}$. Are the following true?

(i) $(a, a) \in R$, for all $a \in \mathbf{N}$

(ii) $(a, b) \in R$, implies $(b, a) \in R$

(iii) $(a, b) \in R$, $(b, c) \in R$ implies $(a, c) \in R$.

Justify your answer in each case.

Question 33: Let A = {1, 2, 3, 4}, B = {1, 5, 9, 11, 15, 16} and $f = \{(1, 5), (2, 9), (3, 1), (4, 5), (2, 11)\}$. Are the following true? (i) f is a relation from A to B (ii) f is a function from A to B.

Justify your answer in each case.

Question 34: Let f be the subset of $\mathbf{Z} \times \mathbf{Z}$ defined by $f = \{(ab, a + b): a, b \in \mathbf{Z}\}$. Is f a function from $\mathbf{Z}$ to $\mathbf{Z}$: justify your answer.

Question 35: Let $A = \{9, 10, 11, 12, 13\}$ and let $f: A \rightarrow \mathbf{N}$ be defined by $f(n)$ = the highest prime factor of n. Find the range of f.

Chapter 3:-Trigonometric Functions

1. Find the radian measures corresponding to the following degree measures:
(i) 25^0
(ii) $47^0 30'$
(iii) 240^0
(iv) 540^0

2. A wheel makes 360 revolutions in one minute. Through how many radians does it turn in one second?

3. Find the degree measure of the angle subtended at the centre of a circle of radius 100 cm by an arc of length 22 cm. Use π =22/7
4. In a circle of diameter 40 cm, the length of a chord is 20 cm. Find the length of minor arc of the chord.
5. If in two circles, arcs of the same length subtend angles 60 degree and 75 degree at the centre, find the ratio of their radii.
6. Find the angle in radian though which a pendulum swings if its length is 75 cm and the tip describes an arc of length
   (i) 10 cm
   (ii) 15 cm
   (iii) 21 cm
7. Find the value of other five trigonometric ratios: cot x=3/4, x lies in third quadrant
8. Find the value of sin765 degrees
9. Find the value of csc(-1410^0)
10. Prove that: $sin^2\frac{\pi}{6} + cos^2\frac{\pi}{3} - tan^2\frac{\pi}{4} = -1/2$
11. sin 3x + sin 2x − sin x = 4 sin x cos x/2 cos 3x/2
12. sin x + sin 3x + sin 5x + sin 7x = 4 cos x cos 2x sin 4x
13. cot x cot 2x − cot 2x cot 3x − cot 3x cot x = 1
14. Prove that: $\cos\left(\frac{\pi}{4}-x\right)\cos\left(\frac{\pi}{4}-y\right)-\sin\left(\frac{\pi}{4}-x\right)\sin\left(\frac{\pi}{4}-y\right)=\sin(x+y)$

15) Prove that: $\dfrac{\tan\left(\frac{\pi}{4}+x\right)}{\tan\left(\frac{\pi}{4}-x\right)}=\left(\dfrac{1+\tan x}{1-\tan x}\right)^2$

16) Prove that $\sin(n+1)x \sin(n+2)x + \cos(n+1)x \cos(n+2)x = \cos x$

17) Prove that $\cos\left(\frac{3\pi}{4}+x\right)-\cos\left(\frac{3\pi}{4}-x\right)=-\sqrt{2}\sin x$

18) Prove that $\sin^2 6x - \sin^2 4x = \sin 2x \sin 10x$

19) Prove that $\cos^2 2x - \cos^2 6x = \sin 4x \sin 8x$

20) Prove that $\sin 2x + 2\sin 4x + \sin 6x = 4\cos^2 x \sin 4x$

21) Prove that $\cot 4x (\sin 5x + \sin 3x) = \cot x (\sin 5x - \sin 3x)$

Question 22: Prove that $\frac{\cos 9x - \cos 5x}{\sin 17x - \sin 3x} = -\frac{\sin 2x}{\cos 10x}$

Question 23: Prove that $\frac{\sin 5x + \sin 3x}{\cos 5x + \cos 3x} = \tan 4x$

Question 24: Prove that $\frac{\sin x - \sin y}{\cos x + \cos y} = \tan\frac{x-y}{2}$

Question 25: Prove that $\frac{\sin x + \sin 3x}{\cos x + \cos 3x} = \tan 2x$

Question 26: Prove that $\frac{\sin x - \sin 3x}{\sin^2 x - \cos^2 x} = 2\sin x$

Question 27: Prove that $\frac{\cos 4x + \cos 3x + \cos 2x}{\sin 4x + \sin 3x + \sin 2x} = \cot 3x$

Question 28: Prove that $\cot x \cot 2x - \cot 2x \cot 3x - \cot 3x \cot x = 1$

Question 29: Prove that $\tan 4x = \frac{4\tan x\left(1-\tan^2 x\right)}{1-6\tan^2 x+\tan^4 x}$

Question 30: Prove that $\cos 4x = 1 - 8\sin^2 x \cos^2 x$

Question 31 Prove that: $\cos 6x = 32\cos^6 x - 48\cos^4 x + 18\cos^2 x - 1$

Question 32: Find the principal and general solutions of the equation $\tan x = \sqrt{3}$

Question 33: Find the principal and general solutions of the equation $\sec x = 2$

Question 34: Find the principal and general solutions of the equation $\cot x = -\sqrt{3}$

Question 35: Find the general solution of cosec x = –2

Question 36: Find the general solution of the equation $\cos 4x = \cos 2x$

Question 37: Find the general solution of the equation $\cos 3x + \cos x - \cos 2x = 0$

Question 38: Find the general solution of the equation $\sin 2x + \cos x = 0$

Question 39: Find the general solution of the equation $\sec^2 2x = 1 - \tan 2x$

Question 40: Find the general solution of the equation $\sin x + \sin 3x + \sin 5x = 0$

Question 41: Prove that: $2\cos\frac{\pi}{13}\cos\frac{9\pi}{13} + \cos\frac{3\pi}{13} + \cos\frac{5\pi}{13} = 0$

Question 42: Prove that: (sin 3x + sin x) sin x + (cos 3x – cos x) cos x = 0

Question 4 3: Prove that: $(\cos x + \cos y)^2 + (\sin x - \sin y)^2 = 4\cos^2\frac{x+y}{2}$

Question 44: Prove that: $(\cos x - \cos y)^2 + (\sin x - \sin y)^2 = 4\sin^2\frac{x-y}{2}$

Question 45: Prove that: $\sin x + \sin 3x + \sin 5x + \sin 7x = 4\cos x \cos 2x \sin 4x$

Question 46: Prove that: $\frac{(\sin 7x + \sin 5x) + (\sin 9x + \sin 3x)}{(\cos 7x + \cos 5x) + (\cos 9x + \cos 3x)} = \tan 6x$

.**Question 47:** Prove that: $\sin 3x + \sin 2x - \sin x = 4\sin x \cos\frac{x}{2}\cos\frac{3x}{2}$

Question 48: $\tan x = -\frac{4}{3}$, x in quadrant II

Question 49: Find $\sin\frac{x}{2},\ \cos\frac{x}{2}$ and $\tan\frac{x}{2}$ for $\cos x = -\frac{1}{3}$, x in quadrant III

Question 50: Find $\sin\frac{x}{2},\ \cos\frac{x}{2}$ and $\tan\frac{x}{2}$ for $\sin x = \frac{1}{4}$, x in quadrant II

Chapter 4:- Principal of Mathematical induction

1). For every integer n, prove that $7^n - 3^n$ is divisible by 4.

2) Prove the following by using the principle of mathematical induction for all $n \in N$:

$$1+3+3^2+\ldots+3^{n-1}=\frac{(3^n-1)}{2}$$

3. Prove the following by using the principle of mathematical induction for $n \in N$

$$1^3+2^3+3^3+\ldots+n^3=\left(\frac{n(n+1)}{2}\right)^2$$

4) Prove the following by using the principle of mathematical induction for all $n \in N$:

$$1+\frac{1}{(1+2)}+\frac{1}{(1+2+3)}+\ldots+\frac{1}{(1+2+3+\ldots n)}=\frac{2n}{(n+1)}$$

5) Prove the following by using the principle of mathematical induction for all $n \in N$: 1.2.3 + 2.3.4 + … + $n(n + 1)(n + 2)$ =

$$\frac{n(n+1)(n+2)(n+3)}{4}$$

6) Prove the following by using the principle of mathematical induction for all $n \in N$:

$$1.3+2.3^2+3.3^3+\ldots+n.3^n=\frac{(2n-1)3^{n+1}+3}{4}$$

7) Prove the following by using the principle of mathematical induction for all $n \in N$:

$$1.3+3.5+5.7+\ldots+(2n-1)(2n+1)=\frac{n(4n^2+6n-1)}{3}$$

8) Prove the following by using the principle of mathematical induction for all $n \in N$

$1.2 + 2.2^2 + 3.2^2 + \ldots + n.2^n = (n - 1)\, 2^{n+1} + 2$

9) Prove the following by using the principle of mathematical induction for all $n \in N$:

$$\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+\ldots+\frac{1}{2^n}=1-\frac{1}{2^n}$$

10. Prove the following by using the principle of mathematical induction for all $n \in N$:

$$\frac{1}{2.5}+\frac{1}{5.8}+\frac{1}{8.11}+\ldots+\frac{1}{(3n-1)(3n+2)}=\frac{n}{(6n+4)}$$

11) Prove the following by using the principle of mathematical induction for all $n \in N$:

$$\frac{1}{1.2.3}+\frac{1}{2.3.4}+\frac{1}{3.4.5}+\ldots+\frac{1}{n(n+1)(n+2)}=\frac{n(n+3)}{4(n+1)(n+2)}$$

12) Prove the following by using the principle of mathematical induction for all $n \in N$:

$$a + ar + ar^2 + \dots + ar^{n-1} = \frac{a\left(r^n - 1\right)}{r - 1}$$

13) Prove the following by using the principle of mathematical induction for all $n \in N$:

$$\left(1+\frac{3}{1}\right)\left(1+\frac{5}{4}\right)\left(1+\frac{7}{9}\right)\dots\left(1+\frac{(2n+1)}{n^2}\right) = (n+1)^2$$

Chapter 5:-Complex Numbers

1) Express the given complex number in the form *a* + *ib*:

$$(5i)\left(-\frac{3}{5}i\right)$$

2) Express the given complex number in the form *a* + *ib*: $i^9 + i^{19}$

3) Express the given complex number in the form *a* + *ib*: i^{-3}

4) Express the given complex number in the form *a* + *ib*: $3(7 + i7) + i(7 + i7)$

5) Express the given complex number in the form *a* + *ib*: $(1 - i) - (-1 + i6)$

6) Express the given complex number in the form ai+b:

$$\left(\frac{1}{5}+i\frac{2}{5}\right)-\left(4+i\frac{5}{2}\right)$$

7) Express the given complex number in the form ai+b:

$$\left[\left(\frac{1}{3}+i\frac{7}{3}\right)+\left(4+i\frac{1}{3}\right)\right]-\left(-\frac{4}{3}+i\right)$$

8) Find the multiplicative inverse of the complex number $4 - 3i$

9) Find the multiplicative inverse of the complex number $\sqrt{5}+3i$

10) Express the following expression in the form of *a* + *ib*.

$$\frac{\left(3+i\sqrt{5}\right)\left(3-i\sqrt{5}\right)}{\left(\sqrt{3}+\sqrt{2}i\right)-\left(\sqrt{3}-i\sqrt{2}\right)}$$

11) Find the modulus and argument of complex number $z=-1-i\sqrt{3}$

12) Find modulus and argument of complex number $z=-\sqrt{3}+i$

13) Convert the given complex number in polar form: $1 - i$

14. Solve the equation $x^2 + 3 = 0$

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15. Solve the equation $2x^2 + x + 1 = 0$

16 Evaluate $\left[i^{18} + \left(\frac{1}{i}\right)^{25}\right]^3$

17) For any two complex numbers z_1 and z_2, prove that

$\operatorname{Re}(z_1 z_2) = \operatorname{Re} z_1 \operatorname{Re} z_2 - \operatorname{Im} z_1 \operatorname{Im} z_2$

18) Reduce $\left(\frac{1}{1-4i} - \frac{2}{1+i}\right)\left(\frac{3-4i}{5+i}\right)$ to the standard form

19) If $x - iy = \sqrt{\frac{a-ib}{c-id}}$ prove that $\left(x^2+y^2\right)^2 = \frac{a^2+b^2}{c^2+d^2}$

20) Convert the following in the polar form:

(i) $\frac{1+7i}{(2-i)^2}$, (ii) $\frac{1+3i}{1-2i}$

21) Solve the equation $3x^2 - 4x + \frac{20}{3} = 0$

22) If $z_1 = 2-i,\ z_2 = 1+i,$ find $\left|\frac{z_1+z_2+1}{z_1-z_2+1}\right|$.

Chapter 6:-Linear Inequalities

Question 1: Solve $24x < 100$, when (i) x is a natural number (ii) x is an integer

Question 2: Solve $-12x > 30$, when

Question 3: Solve $5x - 3 < 7$, when Solve $3x + 8 > 2$, when

Question 5: Solve the given inequality for real x: $4x + 3 < 5x + 7$
Question 6: Solve the given inequality for real x: $3x - 7 > 5x - 1$

Question 7: Solve the given inequality for real x: $3(x - 1) \leq 2(x - 3)$

Question 8: Solve the given inequality for real x: $3(2 - x) \geq 2(1 - x)$

Question 9: Solve the given inequality for real $x + \frac{x}{2} + \frac{x}{3} < 11$ **x:**

Question 10: Solve the given inequality for real x: $\frac{x}{3} > \frac{x}{2} + 1$

Question 11: Solve the given inequality for real x: $\frac{3(x-2)}{5} \leq \frac{5(2-x)}{3}$

Question 12: Solve the given inequality for real x: $\frac{1}{2}\left(\frac{3x}{5} + 4\right) \geq \frac{1}{3}(x-6)$

13.Solve the given inequality for real x: $37 - (3x + 5) \geq 9x - 8(x - 3)$

Question 14: Solve the given inequality for real x: $\frac{x}{4} < \frac{(5x-2)}{3} - \frac{(7x-3)}{5}$

Question 15: Solve the given inequality for real x: $\frac{(2x-1)}{3} \geq \frac{(3x-2)}{4} - \frac{(2-x)}{5}$

Question 16: Solve the given inequality and show the graph of the solution on number line: $3x - 2 < 2x + 1$

Question 17: Solve the given inequality and show the graph of the solution on number line: $5x - 3 \geq 3x - 5$

Question 18: Solve the given inequality and show the graph of the solution on number line: $3(1 - x) < 2(x + 4)$

Question 19: Solve the given inequality and show the graph of the solution on number line: $\frac{x}{2} \geq \frac{(5x-2)}{3} - \frac{(7x-3)}{5}$

Question 20: Ravi obtained 70 and 75 marks in first two unit test. Find the minimum marks he should get in the third test to have an average of at least 60 marks.

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Question 21: To receive Grade 'A' in a course, one must obtain an average of 90 marks or more in five examinations (each of 100 marks). If Sunita's marks in first four examinations are 87, 92, 94 and 95, find minimum marks that Sunita must obtain in fifth examination to get grade 'A' in the course.

Question 22: Find all pairs of consecutive odd positive integers both of which are smaller than 10 such that their sum is more than 11.

Question 23: Find all pairs of consecutive even positive integers, both of which are larger than 5 such that their sum is less than 23.

Question 24: The longest side of a triangle is 3 times the shortest side and the third side is 2 cm shorter than the longest side. If the perimeter of the triangle is at least 61 cm, find the minimum length of the shortest side.

26) A solution of 8% boric acid is to be diluted by adding a 2% boric acid solution to it. The resulting mixture is to be more than 4% but less than 6% boric acid. If we have 640 litres of the 8% solution, how many litres of the 2% solution will have to be added?

27) How many litres of water will have to be added to 1125 litres of the 45% solution of acid so that the resulting mixture will contain more than 25% but less than 30% acid content?

Chapter 7:-Permutation and Combination

1) How many 3-digit numbers can be formed from the digits 1, 2, 3, 4 and 5 assuming that (i) repetition of the digits is allowed?
(ii) repetition of the digits is not allowed?

Q.2: How many 3-digit even numbers can be formed from the digits 1, 2, 3, 4, 5, 6 if the digits can be repeated?

Q.3: How many 4-letter code can be formed using the first 10 letters of the English alphabet, if no letter can be repeated?

Q.4: How many 5-digit telephone numbers can be constructed using the digits 0 to 9 if each number starts with 67 and no digit appears more than once?

Q.5: A coin is tossed 3 times and the outcomes are recorded. How many possible outcomes are there?

Q.6: Given 5 flags of different colours, how many different signals can be generated if each signal requires the use of 2 flags, one below the other?

Q.7: Evaluate
(i) 8 ! (ii) 4 ! – 3 !

Q.8: Is 3 ! + 4 ! = 7 ! ?

Q.9: Compute 8!/6!×2!

Q.10: Evaluate n!(n−r)!,n!(n−r)!, when
(i) n=6,r=2 (ii) n=9,r=5n=6,r=2 (ii) n=9,r=5

11. How many 3-digit numbers can be formed by using the digits 1 to 9 if no digit is repeated?

12: How many 4-digit numbers are there with no digit repeated?

13: How many 3-digit even numbers can be made using the digits 1, 2, 3, 4, 6, 7, if no digit is repeated?

14: Find the number of 4-digit numbers that can be formed using the digits 1, 2, 3, 4, 5 if no digit is repeated. How many of these will be even?

15: From a committee of 8 persons, in how many ways can we choose a chairman and a vice chairman assuming one person can not hold more than one position?

16: Find n if n−1P3:nP4=1:9n if n−1P3:nP4=1:9

17: How many words, with or without meaning, can be formed using all the letters of the word EQUATION, using each letter exactly once?

18: How many words, with or without meaning can be made from the letters of the word MONDAY, assuming that no letter is repeated, if.
(i) 4 letters are used at a time,
(ii) all letters are used at a time,
(iii) all letters are used but first letter is a vowel?

19: In how many of the distinct permutations of the letters in MISSISSIPPI do the four I's not come together?

20: In how many ways can the letters of the word PERMUTATIONS be arranged if the
(i) words start with P and end with S,

(ii) vowels are all together,
(iii) there are always 4 letters between P and S?

21 Determine n if
(i)2nC3:nC3=12:1(i)2nC3:nC3=12:1
(ii)2nC3:nC3=11:12nC3:nC3=11:1

22) How many chords can be drawn through 21 points on a circle?

23) In how many ways can a team of 3 boys and 3 girls be selected from 5 boys and 4 girls?

24) Find the number of ways of selecting 9 balls from 6 red balls, 5 white balls and 5 blue balls if
each selection consists of 3 balls of each colour

25) Determine the number of 5 card combinations out of a deck of 52 cards if there is exactly one ace in each combination.

26) In how many ways can one select a cricket team of eleven from 17 players in which only 5 players can bowl if each cricket team of 11 must include exactly 4 bowlers?

27**)** A bag contains 5 black and 6 red balls. Determine the number of ways in which 2 black and 3 red balls can be selected.

Q28: In how many ways can a student choose a programme of 5 courses if 9 courses are available and 2 specific courses are compulsory for every student?

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