Dt: 10/05/21 DMS INTERNEL - II

Section - 1

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1) The difference between the permutation and Combination are: given:

Permutation	Combination
1) permutation means the selection of objects, where the order of selection matters.	1) The Combination means the selection of objects, in which the order of selection does not matter
2) In other words, it is the arrangement of r objects taken out of n objects	2) In other words, it is the selection of r objects taken out of n objects arrangements
3) The formula for permutation is $^nP_r = n!/(n-r)!$	3) The formula for Combination is $^nC_r = n!/[r!(n-r)!]$

4) PBS Based on sumRule and product Rule:

1) In how many ways can we draw a heart or a spade from an ordinary deck of playing cards? A header an ace? An ace or a king? A card number 2

though 10? A numbered card or a King?

Sol: (a) No. of heart = 13, No. of shade = 13

Sumrule: ways to draw heart (or) Shade = 13 + 13 = 26 ways

b) No. of heart = 13, No. of Ace = 4

Sumrule: ways to draw heart (or) Ace = 13 + 4 = 17 ways

c) No. of Ace = 4 ; No. of kind = 4

Sumrule: way to draw heart (or) King = 4 + 4 = 8 ways

d) No. of n 2 to 10 is 10

No. of way a card numbered 2 throug 10 = 9 × 4 =

36 ways

e) No. of numbered card = 36

No. of king " = 4

∴ No. of ways to draw numbered card

(or) a king = 36 + 4 ways.

= 40 ways

Section. II

6. Binomial theorem:

Statement:

A Binomial theorem describes the algebraic expansion of powers of a Binomial with two variables

Proof:

$$(x+y)^n = n_{c_0} \cdot x^n y^n + n_{c_1} \cdot x^{n-1} \cdot y^1 + n_{c_2} \cdot x^{n-2} \cdot y^2$$
$$+ \cdots + n_{c_{n-1}} \cdot x^1 \cdot y^{n-1} + n_{c_n} \cdot x^n \cdot y^n$$

It can be written as

$$\boxed{(x+y)^n = \sum_{r=0}^{x} n_{c_r} \cdot (x)^{n-r} \cdot y^r}$$

$$\rightarrow (1+x)^n = n_{c_0} \, 1^n \cdot x^0 + n_{c_1} \, 1^{n-1} \cdot x^1 + n_{c_2} \cdot 1^{n-2} \cdot x^2 +$$
$$n_{c_3} \cdot 1^{n-3} \cdot x^3 + \cdots$$

$$= n_{c_0} \cdot x^0 + n_{c_1} \cdot x^1 + n_{c_2} \cdot x^2 + n_{c_3} \, x^3 + \cdots$$

$$= 1.x^0 + \frac{n!}{(n-1)!1!} . x + \frac{n!}{(n-x)x!} . x^2 + \frac{n!}{(n-3)!3!} . x^2 + \cdots$$

$$= 1 + \frac{n(\cancel{n-1})!}{(\cancel{n-1})!} . x + n . \frac{(n-1)}{(n-2)} + x^2 + \frac{n(n-1)(n-2)(n-3)}{(\cancel{n-3})3!} . x^3$$

$$\boxed{(1+x)^n = 1 + nx + \frac{n(n-1)}{x!} . x^2 + \frac{n(n-1)(n-2)}{x!} . x^3 + \cdots}$$

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8) Among 50 patients admitted to a hospital
25 are diagnosed with penumonia.
30 with bronchitic
10 with both pnemonia and bronchuls

let $U = \{$ patients in the hospital $\} \Rightarrow |U| = 50$

$A = \{$ diagnosed with pneumonia $\} = |A| = 25$

$B = \{$ bronchitis $\} = |B| = 30$

$A \cap B = \{$ both pneumonia and branchitis $\} = |A \cap B| = 10$

To find:

No. of patients neither diggnuced with penemunio } $|\overline{A \cup B}| = |U| - |A \cup B|$ — ①

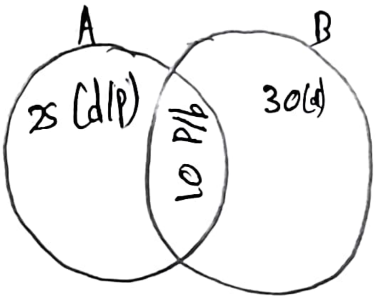
w.k.T

$|A \cup B| = |A| + |B| - |A \cap B| = 25 + 30 - 10 = 45$

∴ ① $\Rightarrow |\overline{A \cup B}| = 50 - 45$

$= 5$

∴ The 5 patints neither of hospital



(a) The number of patients diagnosed with pneumonia (or) bronchitis

diagnosed pneumonia = 25

(or)

diagnosed branchitis = 30

(b) The number of patients

not dignased pneumonia = 25

(or)

not dignosed bronchitis = 20

(c) Number of patients
diagnosed with only penumania = 20

(d) Number of patient
diagnosed with only bronchitis = 25