No.:

Assignment 2

Course & Section : Discrete Structure Section 2

Group Member :

1) Goh Jiale A22EA0043
2) Mohamad Nasrin Bin Mohd Yusoff A23CS3012
3) ~~H~~ Haritz Haykal Bin Nazrul Hisham A24CS0250

Question 1

(a) Ways from Presint 4 to 5 = 3 + 4
= 7

Ways from Presint 5 to 6 = 4 + 5
= 9

Ways from Presint 4 to 6 = 7 × 9
= 63

∴ There is 63 ways from Presint 4 to 6.

(b)(i) P(8, 8) = 40320 ways

(ii) Choose 5 letter from 8 letter.
P(8, 5) = 6720 ways

(iii) Ways to be arranged for start with S & end with E = 1 × P(6, 6) × 1
= 1 × 720 × 1
= 720 ways.

(c)(i) First, arrange 5 boy in a circle, with one empty seat ~~b~~ right of them.
(5-1)! = 4!

Next, arrange 5 girl to sit at the right of boy, which is 5!

Number of way to arrange in gender alternate = 4! × 5!
= 24 × 120
= 2880 ways

(ii) Make the couple as a block, and one person as a block, thus remain (10-1) ~~9~~ block.

Number of arrangements = (10-1-1)! × 2!
= 8! × 2!
= 80640 ways.

扫描全能王 创建

No.:

Question 1

(c)(iii) Since one group boy and one group girl, thus only 2 block. ~~where~~

Inside 5 boy, can have 5! arrangement, same for girl.

Thus, number of arrangements $= (2-1)! \times 5! \times 5!$

$= 1 \times 120 \times 120$

$= 14400$ ways.

Question 2

(a) ~~Number of ways~~ =

Number of ways for 3 women in comittee $= C(6,3) \times C(8,2)$

Number of ways for 4 women in comittee $= C(6,4) \times C(8,1)$

Number of ways for 5 women in comittee $= C(6,5) \times C(8,0)$

Number of ways for at least 3 women in comittee

$= [C(6,3) \times C(8,2)] + [C(6,4) \times C(8,1)] + [C(6,5) \times C(8,0)]$

$= 560 + 120 + 6$

$= 686$ ways.

(b) 10 boys and 10 girls.

Total number of ways $= C(20,4)$

$= 4845$ ways

~~For~~ Ways for no boy $=$ ~~C(10,5)~~ $C(10,4)$

$=$ ~~252 ways~~. 210 ways

Number of ways for at least one boy $= 4845 -$ ~~252~~ 210

$=$ ~~4593 ways~~. 4635 ways.

Question 3

(d) (i) $(5-1)! = 4!$

$= 24$ ways.

$\therefore$ Number of ways for them sit around table is 24 ways.

(ii) If captain and both vice-captain seat together, then assume as 1 block. ~~So~~

So remain 1+2 block. (2 is another 2 person, each as 1 block)

~~Number of arrangement = (3-1)!~~ Captain and vice-captain can switch, thus 3! arrangement.

Number of arrangement $= (3-1)! \times 3!$

$= 12$ ways.

No.:

Question 3

(b) Total number of way $= P(5,5)$

$= 120$ ways.

Number of ways for head next with asistant $= P(2,2) \times P(4,4)$

$= 48$ ways.

Number of ways for head not next with asistant $= 120 - 48$

$= 72$ ways.

(c)(i) Number of ways $= \dfrac{(n+r-1)!}{r!\,(n-1)!}$

$= \dfrac{(10+6-1)!}{6!\,(10-1)!}$

$= 5005$ ways.

(ii) For at least 4 hazelnut flavored, $6-4=2$ chocolate remain out of 10 types.

Number of ways $= \dfrac{(10+2-1)!}{2!\,(10-1)!}$

$= 55$ ways.

~~(d)~~ (iii) $C(10,6) = 210$ ways.

(d)(i) $C(13,11) = 78$ ways.

(ii) $P(13,11) =$ ~~3 113 510 400 ways~~ 3113510400 ways.

(iii) Number of ways for ~~at le~~ one woman player $= C(3,1) \times C(10,10)$

Number of ways for two woman player $= C(3,2) \times C(10,9)$

Number of ways for three woman player $= C(3,3) \times C(10,8)$

Number of ways for at least one woman player

$= [C(3,1) \times C(10,10)] + [C(3,2) \times C(10,9)] + [C(3,3) \times C(10,8)]$

$= 3 + 30 + 45$

$= 78$ ways.

No.:

Question 4

(a) Since there is 3 type colour of ball, we at least need to take 4 ball to get two balls in same colour.

$\therefore$ 4 balls.

(b) Number of cheesecake pieces $= 10 \times 8$

$= 80$ pieces.

Pieces per person $= \frac{80}{30+2}$

$= 2.5$ pieces.

This shows that each person can receive at least 3 pieces of cheesecake in some cases, but not all person receive 3 cheesecakes.

If 2 pieces per person, then remaining pieces $= 80 - (30+2)(2)$

$= 16$ pieces.

This show that 16 people will have at least 3 pieces cheesecake.

Thus, it shows they can have at least 3 pieces of cheesecake.

(c) For ordered pair that is sum of 10, they are (2,8), (3,7) and (4,6).

To have at least one pair of them sum of 10, the smallest number that must be choosen is the 4th integer, which is 6, that can form $4+6=10$.

(d) For five person will get same grade, number of students $= 5 \times 5$

$= 25$.

For at least one person will receive same grade, number of student $= 25+1$

$= 26$.

(e) Total is 6 computer, thus one computer can connect 0 to 5 computer.

~~If one~~ Possible number of connection $= 0, 1, 2, 3, 4, 5$.

However, if a computer connect to 5 other computer, it is impossible for a computer have 0 connection. Thus, remaining possible number of connection $= 1, 2, 3, 4, 5$.

Let number of computer $= X$, possible number of connection $= Y$

$|X| = 6$, $|Y| = 5$.

Based on pigeonhole 2nd form, if $|X| > |Y|$, there must at least two computers directly connected to the same number of other computer.

扫描全能王 创建