Shreya - 1901430120053.
Branch - CS (New).

1(i)
Ans - Posibilities - (3 men + 2 women) or (4m + 1w).
or (5m + 0w)

$= {}^7C_3 \times {}^6C_2 + {}^7C_4 \times {}^6C_1 + {}^7C_5 \times {}^6C_0.$

$= \frac{7\times6\times5}{3\times2\times1} \times \frac{6\times5}{2\times1} + \frac{7\times6\times5\times4}{4\times3\times2\times1} \times \frac{6}{1} + \frac{7\times6\times5\times4\times3}{5\times4\times3\times2\times1}$

$= 525 + 210 + 21$

$= 756$

(ii)

3	5					

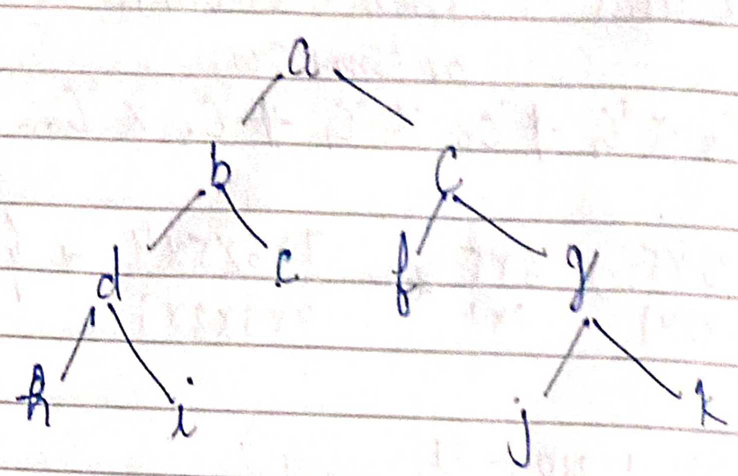
Total digits = 9
no. of ways to live first two place = 1.
further - we have to fill 4 blanks &
we have 9 digits (0, 1, 2, 3, 4, 5, 6, 7, 8, 9)

so total no. of way $= 1 \times {}^8C_4$
$= 1 \times 8 \times 7 \times 6 \times 5 \times 4$
$= 1680.$

(iii) Preorder: It's a recursive process
- visit the root of the tree.
- traverse the left sub tree.
- traverse the right sub tree.

Shreya - Cs

Postorder: It's a recursive process.
- Traverse left sub tree.
- Traverse the right sub tree.
- Visit the root of tree.



Postorder:

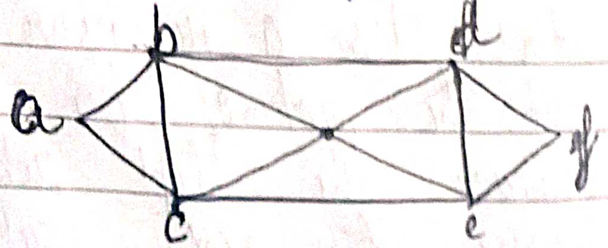
h i d e b f j k g c a.

Preorder:

a b d h i e c f g j k

(3).

Solutn. Euler circuit: It's a circuit that uses every edge in a graph with no repeats.
Being a circuit, it must start & end at the same vertex.



Shreya-53

vertex edges / (degree of the vertex

a - 2
b - 4
c - 4
d - 4
e - 4
f - 2

Since the degree of each vertex is even, so the given graph has an Eulerian circuit.

An eularian circuit on the given graph is a b e f d b e c a.

4.

Solution $a_n = 5a_{n-1} - 6a_{n-2} + 7^n$.

$a_n - 5a_{n-1} + 6a_{n-2} = 7^n$ — ①.

Characteristic equation of ①.

$\alpha^2 - 5\alpha + 6 = 0$

$\alpha = 2, 3$.

Therefore the homogeneous solution is

$a_n = A_1 2^n + A_2 3^n$ — ②.

The general form of particular solution.

$a_n = A_3 7^n$ — ③

Date
Page No.

Shreya-53

$A_3 7^n - 5A_3 7^{n-1} + 6 \cdot A_3 7^{n-2} = 7^n$.

$n = 2$.

$49A_3 - 35A_3 + 6A_3 = 49 \Rightarrow A_3 = \frac{49}{20}$.

so, $\boxed{a_n = \frac{49}{20}(7^n)}$ from 3.

general solution = homogeneous sol. + partic. sol

$= A_1 2^n + A_2 3^n + \frac{49}{20}(7^n)$

(5).

Solution: $a_n = 6a_{n-1} - 11a_{n-2} + 6a_{n-3}$.

$a_n = 6a_{n-1} + 11a_{n-2} - 6a_{n-3} = 0$. — (1)

multiplying 2 on both side of (1) & taking summation $n = 3$ to ∞.

$\sum_{n=3}^{\infty} a_n z^n - 6\sum_{n=3}^{\infty} n_{-1} z^n + 11\sum_{n=3}^{\infty} n-2 z^n - 6 \sum_{n=3}^{\infty} a_{n-3} z^n$

$A(z) = \sum_{n=0}^{\infty} a_n z^n$

$= (a_3 z^3 + a_4 z^4 + a_5 z^5 + \cdots) - 6(a_2 z^3 + a_3 z^4 + a_4 z^5 \cdots$
$+ 11 [a_1 z^3 + a_2 z^4 + a_3 z^5 + \cdots) -$
$6(a_0 z^3 + a_1 z^4 + a_2 z^5 + a_3 z^6 + a_4 z^7 + a_5 \cdots)$

Shreya B

$$[A(z) - a_0 - a_2 - a_2 z^2] - 6[zA(z) - a_0 a_1 z)] + 11[z^2 A(z) - a_0] - 6[z^3 A(z)] = 00.$$

$$= [A(z) - a_0 - a_1 z - a_2 z^2] - 6^2[A(z) - a_0 - a_1 z] + 11 z^2 (A(z) - a_0] - 6z^3[A(z)] = 00 \quad - (2).$$

Putting $a_0 = 2$ & $a_1 = 5$ & $a_2 = 1$ in (2).

$$[A(z) - 2 - 5z - z^2] - 6z[A(z) - 2 - 5z] + 11z^2[A(z) - 3] - 6z^3[A(z)] = 00$$

$$= A(z)[1 - 6z + 11z^2 - 6z^3) =$$
$$= -7z^2 - 7z + 2 .$$

$$A(z) = \frac{-7z^2 - 7z + 2}{-6z^3 + 11z^2 - 6z + 1}$$

$$A(z) = \frac{7z^2 + 7z - 2}{6z^3 - 11z^2 + 6z - 1}$$

$$= \frac{7z^2 + 7z - 2}{(z-1)(7z-1)(3z-1)}$$

$$\frac{A}{z-1} + \frac{B}{7z-1} + \frac{C}{3z-1} = \frac{7z^2 + 7z - 2}{(z-1)(7z-1)(3z-1)}.$$

Put $z = 1$

$2A = 14 - 2$

$A = 6$

Put $z = 1/2$

$B\left(\frac{-1}{2}\right)\left(\frac{1}{2}\right) = \frac{7}{4} + \frac{7}{2} - 2$

$= \frac{-1}{4} B = \frac{7 + 14 - 8}{4}$

$B = -13.$

Put $z = 1/3$

$c\left(-\frac{2}{3}\right)\left(-\frac{1}{3}\right) = \frac{7}{9} + \frac{7}{3} - 2$

$$\frac{2}{9}c = \frac{2+21-18}{9} = \frac{2c}{9} = \frac{10}{9}$$

$c = 5$.

$$A(z) = \frac{6}{z-1} - \frac{13}{2z-1} + \frac{5}{3z-1}$$

By using generating function, we get

$$\sum_{n=0}^{\infty} a_n z^n = 6\sum_{n=0}^{\infty} z^n + 13\sum_{n=1}^{\infty} (2)^n z^n$$

$$- 5\sum_{n=1}^{\infty} (3)^n (z)^n$$

comparing cofficient of z^n on both side we get

$a_n = -6 + 13 \cdot 2^n - 5 \cdot 3^n$

$$\boxed{a_n = -6 + 13 \cdot 2^n - 5 \cdot 3^n}$$