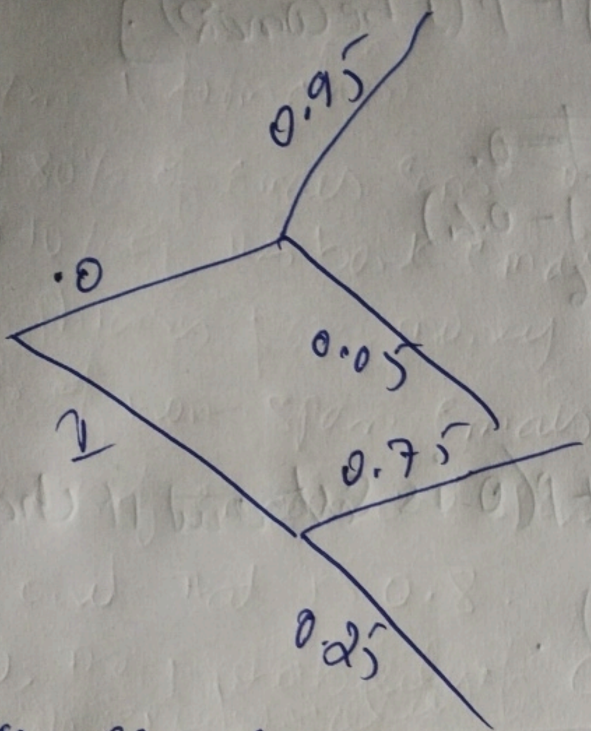
1)

Given information:



From the above Tree diagram That

0 is Sent probability : 0.7

1 is Sent with probability: 0.3

Due to noise 0 is chang to 1 with probability 0.05

Due to noise 1 is change to 0 with probability = 0.25

A: The event That 1 is Received

B: That event 1 is Sent

I must find $P(B/A)$ =

$$P(B/A) = \frac{P(A/B)\, P(B)}{P(A)}$$

$$= \frac{0.75 \times 0.3}{0.3} = 0.4$$

P(B)

(A) $P(A|B)$ = p(1 is Sent) × p(1 does not change

$P(\text{1 does not change}) = [1 - P(\text{1 become 0})] \times [1 - P(\text{1 become 2})]$

$= \cancel{(1-0.75)(1-0.}$

$= (1-0.7)(1-0.4)$

$= 0.3 \times 0.6$

$= 0.18$

$P(A) = P(\text{1 sent and it 1}) + P(\text{0 is sent and it change to 1})$

$P(A) = 0.18 + (0.7)(0.3)$.

$P(A) = 0.39$

(B)

$P(B/A) = \dfrac{P(A|B)\,P(B)}{P(A)}$

$= \dfrac{0.18 \times 0.4}{0.39}$

$= 0.18$

(2) Given information:

(1) Judges = Choose random of seven Judges.

(2) 4 Judges Favour A

(3) 3 Judges Favour B.

Find $P(A)$

A: A will win the beauty contest.

Total Judges: 7 choose 3

$= {}^{7}C_{3}$

$= \frac{7!}{3!(7-3)!}$

$= \frac{7!}{3!\,4!}$

$= \frac{7\times6\times5\times\cancel{4\times3\times2\times1}}{(3\times2\times1)\cancel{(4\times3\times2\times1)}}$

$= \frac{210}{6}$

$= 35$

$^{n}C_{r} = \frac{n!}{r!(n-r)!}$

6

4 Favours of 'A' & 3 Favours of 'B'

$P(A) = \frac{4}{35}$

$= 0.11$

$P(B) = \frac{3}{35}$

$= 0.08$

2

The Probability that 'A' will be declared as winner $= \frac{0.11}{0.11+0.08} = 0.57$