2310S7008
Nishwas. B

Problem Set-2

Page No.
Date

1.
a) Forecast Rain, i.e,
~~when she said rain and actual happed~~
~~& when she said no rain & no rain happend~~

~~i.e, P(Forecast) = P(forecast rain, and actual rain) + P(forecast no rain, and no rain)~~

P(forecast rain) = P(forecast rain, and actual rain) + P(forecast rain, and no rain)

= 0.4 + 0.2
= 0.6 or 60%

b) Mistake

P(Mistake) = P(forecast rain, and no rain) + P(forecast no rain, and actual rain)

= 0.2 + 0.15
= 0.35

c) P(actual rain / forecast rain) = $\dfrac{P(\text{forecast rain, and actual rain})}{P(\text{forecast rain})}$

Page No.
Date

$$= \frac{0.4}{0.6} = 0.667 = 66.7\%$$

d) $P\left(\text{forecast rain} \mid \text{actual rain}\right) = \dfrac{P(\text{forecast rain, and actual rain})}{P(\text{actual rain})}$

$P(\text{actual rain}) = P(\text{forecast rain, and actual rain}) + P(\text{forecast rain, and no rain})$

$= \quad = 0.4 + 0.15 = 0.55$

$P(\text{forecast rain} \mid \text{actual rain}) = \dfrac{0.4}{0.55}$

$= 0.7272$

$= 72.72\%$

2] a] $P(\text{ectopic pregnancy} \mid \text{smoker}) = 2 * P(\text{ectopic pregnancy} \mid \text{non smoker})$

b) $P(\text{smoker}) = 32\%$ or 0.32

c) $P(\text{non smoker}) = 1 - P(\text{smoker})$

$= 1 - 0.32$

$= 0.68$ or 68%

d) $P(\text{smoker} \mid \text{ectopic pregnancies})$

$= \cancel{\dfrac{P(\text{smoker And } P \text{ ectopic pregnancies})}{P(\text{ectopic pregnancies})}}$

$= \cancel{P(\text{smoker}}$

$= \dfrac{P(\text{ectopic pregnancy and Smoker})}{P(\text{ectopic pregnancy})}$

$= \dfrac{P(\text{ectopic pregnancy and smoker})}{P(\text{ectopic pregnancy} \,\&\, \text{smoker}) + P(\text{ectopic pregnancy} \,\&\, \text{non smoker})}$

$= \dfrac{P(\text{ectopic pregnancy} / \text{smoker}) \cdot P(\text{Smoker})}{P(\text{ep and smoker}) + P(\text{ep and non smoker})}$

$= \dfrac{P(ep / \text{smoker}) \cdot P(\text{smoker}) = A}{P(ep / \text{Smoker}) \cdot P(\text{smoker}) + P(ep / \text{non smoker}) \cdot P(\text{non smoker}) = B}$

$= \dfrac{\cancel{2 \cdot P(ep / \text{non smoker})}\ A}{A + B}$

$=$ as we know $A = 2 \cdot B$

$\therefore$

Page No.
Date

$= \frac{\cancel{2B \cdot \text{Smoker}}}{\cancel{2B + B}}$

$= \frac{\cancel{2B}\ 2B \cdot P(\text{Smoker})}{2B \cdot P(\text{Smoker}) + B \cdot P(\text{nonsmoker})}$

$= \frac{2B \cdot 0.32}{2B \cdot 0.32 + B \cdot 0.68}$

$= \frac{0.32 \times 2\cancel{B}}{\cancel{B}(2 \times 0.32 + 0.68)}$

$= \frac{0.64}{0.64 + 0.68} = \frac{0.64}{1.32}$

$= 0.4848$ or 48.48%

3] $P(F) = 0.52$ $\quad P(CS) = 0.05$
$P(F \cap CS) = 0.02$

a) $P(F/CS) = \frac{P(F \cap CS)}{P(CS)} = \frac{0.02}{0.05}$

b) $P(CS/F) = \frac{P(CS \cap F)}{P(F)} = \frac{0.02}{0.52}$

4] $P(str) = 0.002$ $\quad P(Eng) = 0.002$
$P(CS) = 0.01$ $\quad P(HE) = 0.003$
$P(\text{crash}/str) = 0.25$ $\quad P(\text{crash}/Eng) = 0.3$
$P(\text{crash}/CS) = 0.9$ $\quad P(\text{crash}/HE) = 0.1$

Page No.
Date

$$P(cs/crash) = \frac{P(crash/cs) \times P(cs)}{P(crash)}$$

$$P(crash) = P(crash \cap cs) + P(crash \cap str) + P(crash \cap Eng) + P(crash\ OtE)$$

$$= P(crash/cs).P(cs) + P(crash/str).P(str) + P(crash/Eng).P(Eng) + P(crash/HE).P(HE)$$

$$= 0.9 \times 0.01 + 0.25 \times 0.002 + 0.3 \times 0.002$$

$$P(cs/crash) = \frac{0.9 \times 0.001}{0.0155}$$

5] $P(L_1) = 0.8$

$P(L_2) = 0.2$

$P(WD \mid No\ window) = 0.2 \Rightarrow P(WD/L_1)$

$P(WD \mid window) = 0.9 = P(WD/L_2)$

$$P(L_1 \mid WD) = \frac{P(L_1 \cap WD)}{P(WD)}$$

$$= \frac{P(WD/L_1).P(L_1)}{P(WD)}$$

$$= \frac{P(WD/L_1).P(L_1)}{P(WD \mid No\ window) \times P(No\ window) + P(WD/window) \times P(window)}$$

$$= \frac{0.2 \times 0.8}{0.2 \times 0.8 + 0.9 \times 0.2}$$

Page No.
Date / /

$$P(L_2 / WD) = \frac{P(WD / L_2) \times P(L_2)}{P(WD)}$$

$$= \frac{0.9 \times 0.2}{0.9 \times 0.2 + 0.2 \times 0.8}$$

$$= 0.5294 = 52.94\%$$

6) a) Probability that random person will be able to donate without any knowledge about donors blood type

From above chart,

following is possible only to O^-

$\therefore$ Probability that random person can donate to another person without any information about blood types of both = Population percentage of O^-

= 6.6 % or 0.066

b] According to above information Blood Transfusion policy should be that

~~to~~ They should collect and maintain O^- blood more as it ~~is~~ can be given to any person

c] Perform blood typing on all the three soldiers,

if the wounded soldier's blood type matches with any one of other two ~~...~~ ~~...~~ according to chart then do blood tranfusion

otherwise wait till the required

blood type is arranged by keeping the wounded soldier alive by doing other activities

1.