Solution

Q.1

a) Independent trials with a constant probability of a success. Trials have only two outcomes.

b)

i) 0.2835

ii) 0.9718

c)

P(M1) =0.3

P(M2)=0.45

P(M3)=0.25

Conditional probability

P(D|M1)=0.02

P(D|m2)=0.03

P(D|M3)=0.02

Joint Probability

P(D|M1) P(M1)= 0.02(0.3)=0.006

P(D|M2) P(M2)= 0.03(0.45)=0.0135

P(D|M3) P(M3)= 0.02(0.25)=0.005

Now the total probability is:

P(D)=0.006+0.0135+0.005

Thus if a final product is randomly selected the probability is 2.45% that it is defective.

The probability of that it was made by machine M3 given that it was defective is:

P(M3|D) =0.005/0.0245 =**0.2040**

d)

(i) The probability that a person be female given that she is a smoker is:

$$f(y \mid x) = \frac{f(x,y)}{f(x)} = \frac{0.1}{0.75} = 0.1333$$

(ii) The probability that the person is non-smoker given that the person is female:

$$f(x \mid y) = \frac{f(x,y)}{f(y)} = \frac{0.15}{0.25} = 0.6$$

(e)

x	days	f(x)	x*f(x)	x-mu	sq	sqfx
0	8	0.08	0	-2.35	5.5225	0.4418
1	12	0.12	0.12	-1.35	1.8225	0.2187
2	30	0.3	0.6	-0.35	0.1225	0.03675
3	40	0.4	1.2	0.65	0.4225	0.169
4	7	0.07	0.28	1.65	2.7225	0.190575
5	3	0.03	0.15	2.65	7.0225	0.210675
			2.35			
						1.2675
i)P(X>3)=.1						
ii) EV=2.35						
iii) Var=1.26						

Q.2

b)

	A	B	C	D	E	F	G	H	I	J	K
1			Initial Distribution					Jio	Vodafone	Airtel	
2	(i)	Jio	Voda	Airtel			Jio	0.75	0.15	0.1	
3		0.3	0.4	0.3		P=	Voda	0.15	0.7	0.15	
4							Aitel	0.15	0.2	0.65	
5			Jio	Vodafone	Airtel						
6	ii)	Jio	0.75	0.15	0.1						
7		Voda	0.15	0.7	0.15						
8		Aitel	0.15	0.2	0.65						
9											
10			Jio	Vodafone	Airtel						
11		Jio	0.6	0.2375	0.1625						
12	P^2=	Voda	0.24	0.5425	0.2175						
13		Aitel	0.24	0.2925	0.4675						
14								Market shares after 3 months			
15			Jio	Vodafone	Airtel				Jio	Vodafone	Airtel
16		Jio	0.51	0.28875	0.20125				0.3588	0.3706	0.2706
17	P^2.P=	Voda	0.294	0.45925	0.24675						
18		Aitel	0.294	0.33425	0.37175						
19											