GROUP MEMBERS:

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ANSWERS:

Question 1:

I. Total number for the outcomes of flipping a coin 5 times:

$2^5 = 32$ outcomes as the coin consists of two parts which is Head and Tail.

II. The elements obtained in the sample space are as follows:
S = {HHHHH, HHHHT, HHHTH, HHTHH, THHHH, HHHTT, HHTTH, HTTHH, TTHHH, HHTTT, HTTTH, TTTHH, TTHHT, THHTT, THTHT, HTHTH, HTTTT, TTTTH, TTTTT, THHHT, TTHTT, HTTHT, THHTH, TTHTH, HHTHT, HTHTT, THTHH, THTTH, HTHHT, HTHTT, THTHH, TTTHT}

III. Probability of tails will be occurring at least 2 times on five coin flips

P(T at least 2) = $\frac{28}{32} = \frac{7}{8}$

IV. Probability of of getting all Head or all Tail on five coin flips

P(H U G) = P(H) + P(G)

$= \frac{1}{32} + \frac{1}{32}$

$= \frac{1}{16}$

Question 2:

Since two balls are drawn successively and without replacement, so the total number of balls before drawn is 15 and total number of balls after 1 ball is drawn is 14.

P(first ball is red and second is blue) = $\frac{5}{15} \times \frac{10}{14}$

$= \frac{5}{21}$

Question 3:

Let H denotes head and T denotes tail.
Sample space = {HH,HT,TH,TT}
Probability getting head = 0.8
Hence, Probability getting tail = 1 - 0.8 = 0.2

(i) P(T∩T) = 0.2 x 0.2
= 0.04

(ii) $P(H \cap T) = 0.8 \times 0.2$
$= 0.16$

Question 4:

Total applicant = 1000

Let P(A) = Applicant had CGPA above 3.70

$= \frac{150}{1000} = 0.15$

P(B) = Applicant had CGPA between 3.50 and 3.70

$= \frac{520}{1000} = 0.52$

P(C) = Applicant had CGPA between 3.00 and 3.50

$= \frac{100}{1000} = 0.1$

P(D) = Applicant had CGPA between lower than 3.00

(i) P(D) = 1 - 0.15 - 0.52 - 0.1 = 0.23

(ii) Let P(D) = 0.2

Since the number of students who get a CGPA above 3.50 is the same, hence, the probability of P(A) and P(B) is the same.

P(C) = 1 - 0.2 - 0.15 - 0.52 = 0.13

1000 x 0.13 = 130

Question 5:

(i) $P(\text{10 blue and 5 red}) = \frac{10C10 \times 10C5}{20C15}$

$= \frac{21}{1292}$

(ii) Probability randomly chosen marble is new or green

$P(N \cup G) = P(N) + (G) - P(N \cap G)$

$= \frac{80}{100} + \frac{50}{100} + \frac{50}{80}$

$= 0.675$

(iii) Probability for the marble to be red given that the marble is new

$P(R \mid N) = \frac{P(R \cap N)}{P(N)}$

$= \frac{0.24}{0.8} = \frac{3}{10}$

Question 6:

(i) P(A) = 0.10
P(B) = 0.15
P(C) = 0.35
P(D) = 0.40

(ii) P(H|A) = 0.20
P(H|B) = 0.40

P(H|C) = 0.60
P(H|D) = 0.70

(iii) $P(A|H) = \frac{P(H|A)P(A)}{P(H|A)P(A)+P(H|B)P(B)+P(H|C)P(C)+P(H|D)P(D)}$

$= \frac{(0.20)(0.10)}{(0.20)(0.10)+(0.40)(0.15)+(0.60)(0.35)+(0.70)(0.40)}$

$= \frac{2}{57}$

$P(B|H) = \frac{P(H|B)P(B)}{P(H|A)P(A)+P(H|B)P(B)+P(H|C)P(C)}$

$= \frac{(0.40)(0.15)}{(0.20)(0.10)+(0.40)(0.15)+(0.60)(0.35)+(0.70)(0.40)}$

$= \frac{2}{19}$

$P(C|H) = \frac{P(H|C)P(C)}{P(H|A)P(A)+P(H|B)P(B)+P(H|C)P(C)+P(H|D)P(D)}$

$= \frac{(0.6)(0.35)}{(0.20)(0.10)+(0.40)(0.15)+(0.60)(0.35)+(0.70)(0.40)}$

$= \frac{7}{19}$

$P(D|H) = \frac{P(H|D)P(D)}{P(H|A)P(A)+P(H|B)P(B)+P(H|C)P(C)+P(H|D)P(D)}$

$= \frac{(0.7)(0.4)}{(0.20)(0.10)+(0.40)(0.15)+(0.60)(0.35)+(0.70)(0.40)}$

$= \frac{28}{57}$

(iv) P(H) = P(H|A)P(A) + P(H|B)P(B) + P(H|C)P(C) + P(H|D)P(D)
= (0.2)(0.1) + (0.4)(0.15) + (0.6)(0.35) + (0.7)(0.4)
= 0.57