CSE230 ASSIGNMENT 2

NAME : ANIKA ISLAM
ID: 21101298
SECTION: 3

EECSE230 SPRING'22 ASSIGNMENT 02

(1) Total ways of choosing 3 cards from the entire deck = ${}^{52}C_3$

Possible ways of choosing 1 card from different suits = ${}^{4}C_3 \times {}^{13}C_1 \times {}^{13}C_1 \times {}^{13}C_1$

P(choosing each 1 card from different suits)

$$= \frac{{}^{4}C_3 \times {}^{13}C_1 \times {}^{13}C_1 \times {}^{13}C_1}{{}^{52}C_3}$$

$$= \frac{\frac{4!}{(4-3)!3!} \times \frac{13!}{(13-1)!1!} \times \frac{13!}{(13-1)!1!} \times \frac{13!}{(13-1)!1!}}{\frac{52!}{(52-3)!3!}}$$

$$= \frac{169}{425}$$

$$= 0.3976 \quad \text{(Ans)}$$

(2) P(3 balls are orange) = O O O

$= \frac{3}{9} \times \frac{2}{8} \times \frac{1}{7}$

$= \frac{1}{84}$

$= 0.0119$ (Ans)

(3) numbers used to get odd number as a product of that numbers (1 to 20)

2 | 3 5 7 9 11 13 15 17 19

P(product of two integers is odd) $= \frac{10}{20} \times \frac{10}{20}$

$= \frac{1}{4}$

$= 0.25$ (Ans)

~~(4) P(*WL) =~~

(4) P(score on 2nd and lose on ~~third~~ 3rd)

= 0.2 × ~~0.7~~ (1-0.7)

= ~~0.14~~ 0.06

P(score on 2nd and 3rd)

= 0.2 × 0.7

= 0.14

P(lose on 2nd and score on 3rd)

= (1 − 0.2) × 0.7

= ~~0.14~~ ~~0.56~~ 0.16

P(Total possibilities) = 0.06 + 0.14 + ~~0.56~~ 0.16

= ~~0.74 (Ans)~~ 0.36 (Ans)

(5)(ii) multiple of 6 as the sum

= (3+3), (4+2), (2+4), (5+1), (1+5), (6+6)

(first five: 6; (6+6): 12)

P(getting a multiple of 6 as the sum) = $\frac{6}{36}$ = $\frac{1}{6}$ (Ans)

(6) Six as a product

= (6×1), (3×2), (3×2), (1×6)

P(getting six as a product) = $\frac{4}{36}$ = $\frac{1}{9}$ (Ans)

(b) for the events to + of choosing a red ball randomly from the jar needed to be independent of that getting a white ball from the jar.—to b be binomial random variable. However, both the events of choosing a white ball or a red ball are independent of each other. Thus, x is not a binomial random variable. (Ans)

(7) $P(3) = (0.7) \times (0.5) \times (0.8) = 0.28$

$P(2) \Rightarrow 0.7 \times 0.5 \times (1-0.8) = 0.07$

$0.7 \times (1-0.5) \times 0.8 = 0.28$

$(1-0.7) \times 0.5 \times 0.8 = 0.12$

$P(2) = 0.07 + 0.28 + 0.12 = 0.47$

$P(1) \Rightarrow 0.7 \times (1-0.5) \times (1-0.8) = 0.07$

$(1-0.7) \times (1-0.5) \times 0.8 = 0.12$

$(1-0.7) \times 0.5 \times (1-0.8) = 0.03$

$P(1) = 0.07 + 0.12 + 0.03 = 0.22$

$P(0) = (1-0.7) \times (1-0.5) \times (1-0.8) = 0.03$

N	3	2	1	0
P(N)	0.28	0.47	0.22	0.03

(0.28, 0.47, 0.22, 0.03) (Ans)

(8) (a) P(at least 1 of them are 14 or older)

$= 1 - P(x \leq 3)$

$= 1 - \sum_{x=0}^{3} {}^{15}C_x \times 0.4^x \times (1-0.4)^{15-x}$

$= 1 - 0.09095$

$= 0.9095$ (Ans)

(b) P(exactly 10 of them are 14 or older)

$= {}^{15}C_{10} \times 0.4^{10} \times (1-0.4)^{15-10}$

$= 0.02449$ (Ans)

(c) P(less than 5 of them are 14 or older)

$= P(x < 5)$

$= \sum_{x=0}^{4} {}^{15}C_x \times 0.4^x \times (1-0.4)^{15-x}$

$= 0.2173$ (Ans)

(9) $H = \frac{1}{P(D)} = \frac{1}{\frac{1}{2302}} = 2302$ (Ans)

(10)

☐	☐	☐	☐	☐	☐
ND	ND	ND	ND	ND	D

$\left(1-\frac{10}{45}\right) \times \left(1-\frac{10}{45}\right) \times \left(1-\frac{10}{45}\right) \times \left(1-\frac{10}{45}\right) \times \left(1-\frac{10}{45}\right) \times \left(\frac{10}{45}\right)$

P(not defective toys upto 5th checks) $= \left(1-\frac{10}{45}\right)^5$

P(defective toys) $= \frac{10}{45}$

P(first defective toy at 6th check) $= \left(1-\frac{10}{45}\right)^5 \left(\frac{10}{45}\right)$

$= 0.06326$ (Ans)