PROBABILITY

UDAY KUMAR - FWC22086

16.4.2 [1]**Four cards are drawn from a well-shuffled deck of 52 cards. What is the probability of obtaining 3 diamonds and one spade?.**

Solution:

Let the cards drawn from the deck be $X = \{0, 1, 2, 3\}$ and $Y = \{0, 1\}$,where 0 denotes the card is from diamonds and 1 denotes the card is from spades.
Three diamonds and one spade can be selected such that XY = $\{00, 10, 20, 31\}$ where X denotes any card and Y denotes wether the card is diamond or spade.

Random variable	**values**
X	{0,1,2,3}
Y	{0,1}
XY	{00,10,20,31}

$$\Pr(00, 10, 20, 31) = \frac{{}^{13}C_3 \times {}^{13}C_1}{{}^{52}C_4} \tag{16.4.2.1}$$

$$\therefore \Pr(00, 10, 20, 31) = \frac{286}{20285} \tag{16.4.2.2}$$

[1]Read question numbers as (CHAPTER NUMBER).(EXERCISE NUMBER).(QUESTION NUMBER)