AI1103-Assignment-5

Kodavanti Rama Sravanth,CS20BTECH11027

Download all python codes from

https://github.com/Sravanth-k27/AI1103/tree/main/Assignment-5/codes

Download latex-tikz codes from

https://github.com/Sravanth-k27/AI1103/tree/main/Assignment-5/Assignment-5.tex

UGC/MATH 2018(JUNE MATH SET A)Q.18:

Two students are solving the same problem independently,if the probability of first one solves the problem is $\frac{3}{5}$ and the probability that the second one solves the problem is $\frac{4}{5}$,what is the probability that atleast one of them solves the problem?

(A) $\frac{17}{25}$ (C) $\frac{21}{25}$

(B) $\frac{19}{25}$ (D) $\frac{23}{25}$

SOLUTION UGC/MATH 2018(JUNE MATH SET A)Q.18::

Let the two students be A,B. Let the events of solving the problem by A,B be X,Y respectively.
The probability of solving the problem by A is $\Pr(X)$.
The probability of solving the problem by B is $\Pr(Y)$.
Given that

$$\Pr(X) = \frac{3}{5} \tag{0.0.1}$$

$$\Pr(Y) = \frac{4}{5} \tag{0.0.2}$$

Now we have to find probability of solving the problem by atleast one of them i.e $\Pr(X+Y)$
As,

$$\Pr(X+Y) = \Pr(X) + \Pr(Y) - \Pr(XY) \tag{0.0.3}$$

Given that students solve the problem independently.So events X and Y are independent.
for independent events

$$\Pr(XY) = \Pr(X) \times \Pr(Y) \tag{0.0.4}$$

from (0.0.1) and (0.0.2)

$$\Pr(XY) = \frac{3}{5} \times \frac{4}{5} \tag{0.0.5}$$

$$\Pr(XY) = \frac{12}{25} \tag{0.0.6}$$

now substituting (0.0.1),(0.0.2), (0.0.6) in (0.0.3) gives

$$\Pr(X+Y) = \frac{3}{5} + \frac{4}{5} - \frac{12}{25} \tag{0.0.7}$$

$$\Pr(X+Y) = \frac{23}{25} \tag{0.0.8}$$

Hence the probability that atleast one of them solves the problem is $\frac{23}{25}$

$\therefore$ **Option D is correct**