ASSIGNMENT 4

CS21BTECH11020

1 Ex 16.3 (19) (Class 11 Probability)

1.1. **Problem:** In an entrance test that is graded on the basis of two examinations,the probability of randomly chosen studnet passing the first examination is 0.8 and the probability of passing the second examination is 0.7. The probability of passing atleast one of them is 0.95. What is the probability of passing both ?

Solution: We have two exams Exam A and Exam B, Let the random variables $X, Y \in \{0, 1\}$,where we have,

Random Variable	Event
X=0	Fail in Exam A
X=1	Pass in Exam A
Y=0	Fail in Exam B
Y=1	Pass in Exam B

TABLE 1.1.1

$$P_{X+Y}(X + Y = 1) = 0.95 \quad (1.1.1)$$
$$P_X(X = 1) = 0.8 \quad (1.1.2)$$
$$P_Y(Y = 1) = 0.7 \quad (1.1.3)$$

Now, By Principle of Exclusion-Inclusion, we have

$$P_{X+Y}(U = 1) = P_X(X = 1) \quad (1.1.4)$$
$$+ P_Y(Y = 1) \quad (1.1.5)$$
$$- P_{XY}(XY = 1) \quad (1.1.6)$$

On putting Values from (1.1.1), (1.1.2) and (1.1.3) in (1.1.6) ,we have

$$0.95 = 0.8 + 0.7 - P_{XY}(XY = 1) \quad (1.1.7)$$
$$P_{XY}(XY = 1) = 1.5 - 0.95 \quad (1.1.8)$$
$$P_{XY}(XY = 1) = 0.55 \quad (1.1.9)$$

Hence probability of Passing Both exams are 0.55.