

# SNS COLLEGE OF TECHNOLOGY

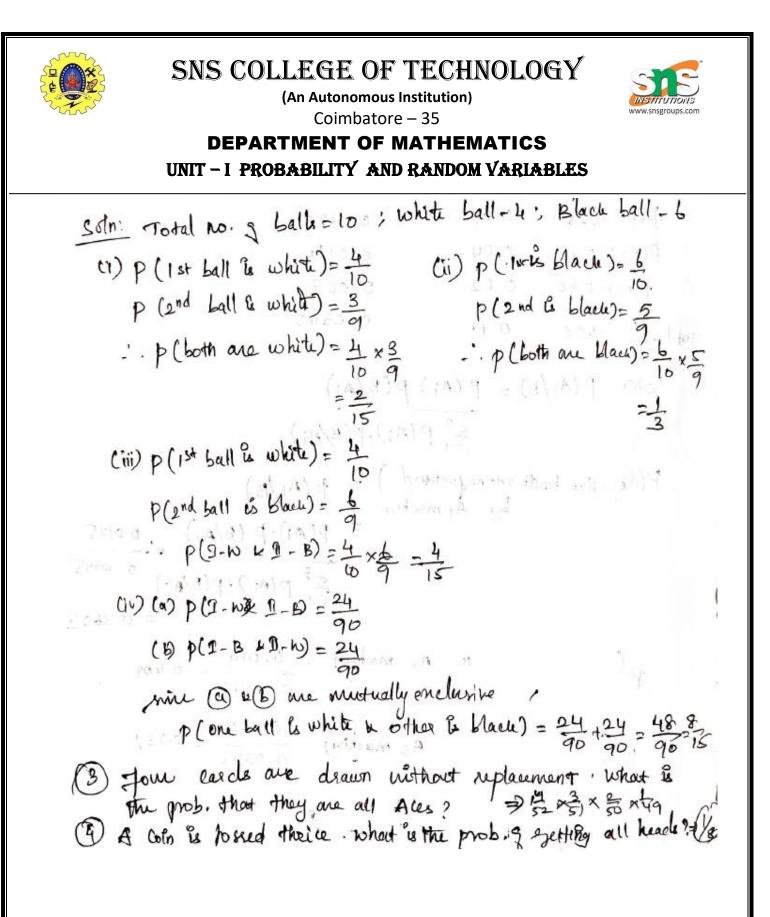


(An Autonomous Institution) Coimbatore – 35

DEPARTMENT OF MATHEMATICS UNIT - I PROBABILITY AND RANDOM VARIABLES

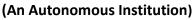
### TOTAL PROBABILITY & BAYE'S THEOREM

(1) A problem to Mathematic is given to 3 students A, B, C whose chances & solving "it are 1, 1, 1, respectively. what & the prob. that the problem will be solved? Soln: regiven p(A)=士;p(B)=士;p(c)=士 p (B will not surve) = 1-3 = = p (c will not solve) = 1- + = = = p(a|1) the three will softer) = 1 -  $\frac{1}{1} = \frac{3}{2}$ . 2) from a bag containing 4 we b B-black balls, two ball are drawn at random . If the balls are drawn one after the other without replacement, find the prob. that, (i) both are white ; (ii) both are black (iii) first & white a second & back (iv) one ball is while so the other is black.





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The set 3 ILLAND AL O

rotal probability:

 $p(A) = \leq \sum_{n=1}^{N} p(A/B_n) \cdot p(B_n)$ 

Bayes Theorem :

$$P(A_1/B) = P(A_1) \cdot P(B/A_1)$$
  
 $\sum_{i=1}^{n} P(A_i) \cdot P(B/A_1)$ 

Problem: Tri a bolt factory machines A, B, C manufacture respectively 25 1/, 351/. and 401/. g The total . og thus output 5%, 4 of and 2% are depective both. A boilt is drawn at rundom from the product and is found to be. defective. What are the probabilities that it was manufactured by machines A, B and c. Mn. Let A9 be the prob. g manufacturing the balts. Let B be the prob. 2 depective botte. PLAD PLB/AD PLAD PLB/AD

PCAD=0.25 0.05 0.0125 P(A2)=0.35 0.04 0.014 P(As)=0.40 0.02 0.008 dr£ :1.00 0.11 0.0345 DAT P(AI/B) = P(AI) P(B/AI) 5" P(A1). P(B/A1)

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 $P(defective both manufactured) = p(A_1/B)$ =  $p(A_1) \cdot p(B/A_1) = \frac{0.0125}{0.0845}$ =  $p(A_1) \cdot p(B/A_1) = \frac{0.0125}{0.0845}$ = 0.3623chin) = 0.014 = 0.405 0.008 - 0.231 Az mashin and and a set of the