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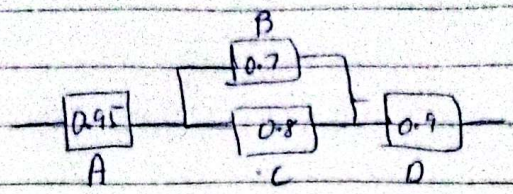
BSSE23058
Section A.

Date: Day:

Assignment # 1
Probability & Statistics

Q2.92



$P(A) = 0.95 \quad P(B) = 0.7 \quad P(C) = 0.8 \quad P(D) = 0.9$

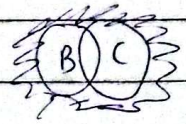
Assume the component fail independently means system will work. if ① Component A works
② Either B or C (or both works) as in parallel
③ D works.

$P(\text{system works}) = ?$

$P(\text{system works}) = P(A \cap (B \cup C) \cap D)$
$= P(A) \cdot P(B \cup C) \cdot P(D)$ as independent.
$= 0.95 \cdot P(B \cup C) \cdot 0.9$

$P(B \cup C) = ?$

$P(B \cup C) \Rightarrow$ 

$P(B \cup C) = 1 - P(B' \cup C') \Rightarrow$ 
$= 1 - P(B') \cdot P(C')$
$= 1 - (1 - P(B)) \cdot (1 - P(C))$
$= 1 - (1 - 0.7) \cdot (1 - 0.8)$
$= 1 - (0.3) \cdot (0.2)$
$= 1 - 0.06$
$= 0.94$

$P(\text{system works}) = P(A) \cdot P(B \cup C) \cdot P(D)$
$= 0.95 \cdot 0.94 \cdot 0.9$
$= 0.8037$
≈ 0.804