2(b) Suppose $s \in E \cap F$

$\Rightarrow s \in E$ & $s \in F$

$\Rightarrow [s \in R_1$ or $s \in G_2]$ & $s \in R_1^c$ & $s \in R_2$

If $s \in R_1$ then we know $s \in R_1^c$ So, we have a contradiction $(\because R_1 \cap R_1^c = \phi)$

If $s \in G_2$ then we know $s \in R_2$, So, we have a contradiction $(\because G_2 \cap R_2 = \phi)$

$\therefore E \cap F = \phi$. □

$[R_1 \cap R_2^c] \cup [G_1 \cap G_2^c] \cup [(G_1 \cup R_1)^c \cap (G_2 \cup R_2)]$

$||$

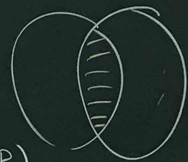
2(c) $R_1 \cap R_2^c \cup G_1 \cap G_2^c \cup W_1 \cap W_2^c$

$A = A \cap B \cup A \cap B^c$

$B = B \cap A \cup B \cap A^c$

$A \cup B = A \cap B^c \cup B \cap A^c \cup A \cap B$

3) $A \cap B = A \cup B \setminus A \cap B$



Rules Required:

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= (P(A \cap B) + P(A \cap B^c)) + (P(B \cap A) + P(B \cap A^c)) - P(A \cap B)$

FROM AXIOMS

(1) $P(\phi) = 0$

[Claim 2]

(2) $P(E_1 \cup E_2) = P(E_1) + P(E_2)$

if $E_1 \cap E_2 = \phi$

[Claim 1]

☆ [Induction will imply] $P\left(\bigcup_{i=1}^{n} E_i\right) = \sum_{i=1}^{n} P(E_i)$ whenever $E_i \cap E_j = \phi$ $i \neq j$

Proof of ☆

$n=2$ verified in (2)

Assume $n=k$

☆ for

$n=k+1$ $E_1, \ldots, E_{k+1}$ st

$E_i \cap E_j = \phi$ $i \neq j$ $\left[\bigcup_{i=1}^{k} E_i \cap E_{k+1} = \phi\right]$

$$P\left(\bigcup_{i=1}^{k+1} E_i\right) = P\left(\bigcup_{i=1}^{k} E_i \cup E_{k+1}\right)$$

$$\overset{n=2}{=} P\left(\bigcup_{i=1}^{k} E_i\right) + P(E_{k+1})$$

$$\overset{n=k}{=} \sum_{i=1}^{k} P(E_i) + P(E_{k+1}) = \sum_{i=1}^{k+1} P(E_i)$$

$P(A) = 0.7$

$P(B) = 0.6$

$P(A \cup B) = 0.9$

$P(A \cap B) = 0.7 + 0.6 - 0.9 = 0.4$

$P(A \cap B^c) = P(A) - P(A \cap B) = 0.3$

[$\because A = A \cap B \cup A \cap B^c$]

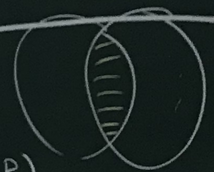
$P(B \cap A^c) = P(B) - P(A \cap B) = 0.2$

$P(A \Delta B) = P(A \cap B^c) + P(B \cap A^c)$

$= 0.5$

Rest of Table Ex.

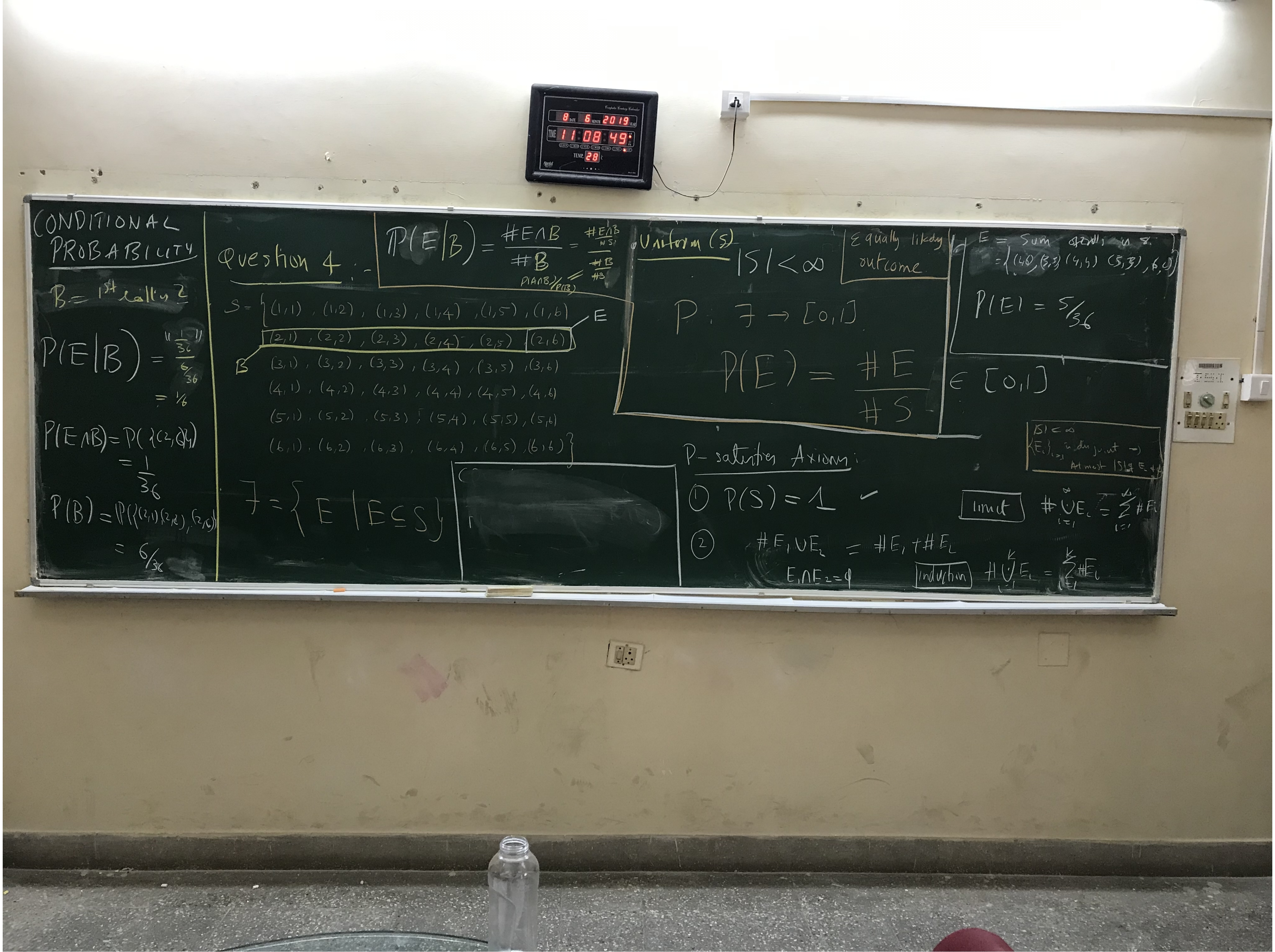
(3) $A \Delta B = A \cup B \setminus A \cap B$



Rules Required

$$P(A \cup B) = \boxed{P(A)} + P(B) - P(A \cap B)$$

$$= (P(A \cap B) + P(A \cap B^c)) + (P(B \cap A) + P(B \cap A^c)) - P(A \cap B)$$


8 DATE 6 MONTH 2019 YEAR
TIME 11:08 49
TEMP. 28
CONDITIONAL PROBABILITY
B = 1st roll is 2
P(E|B) = (1/36)/(6/36) = 1/6
P(E∩B) = P({(2,6)}) = 1/36
P(B) = P({(2,1),(2,2),...,(2,6)}) = 6/36
Question 4 :-
P(E|B) = #E∩B / #B = (#E∩B/#S) / (#B/#S) = P(E∩B)/P(B)
S = {(1,1), (1,2), (1,3), (1,4), (1,5), (1,6)
(2,1), (2,2), (2,3), (2,4), (2,5), (2,6)
(3,1), (3,2), (3,3), (3,4), (3,5), (3,6)
(4,1), (4,2), (4,3), (4,4), (4,5), (4,6)
(5,1), (5,2), (5,3), (5,4), (5,5), (5,6)
(6,1), (6,2), (6,3), (6,4), (6,5), (6,6)}
E
B
F = {E | E ⊆ S}
Uniform (S)
|S| < ∞
Equally likely outcome
P : F → [0,1]
P(E) = #E / #S
∈ [0,1]
E = Sum equals 8
= {(2,6), (3,5), (4,4), (5,3), (6,2)}
P(E) = 5/36
P - satisfies Axioms:
① P(S) = 1
② #E₁∪E₂ = #E₁ + #E₂
E₁∩E₂ = φ
induction
limit
|S| < ∞
At most |S| Eᵢ ≠ φ