

PROBLEM 1: IF  $\phi$  DENOTES THE EMPTY SET, THEN

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

(b)  $P(\phi) = \frac{1}{2}$

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

(d)  $P(\phi) = \frac{3}{4}$

See Lecture Notes

PROBLEM 2: IF A AND B ARE MUTUALLY EXCLUSIVE EVENTS, THEN  $P(A \cup B) = P(A) + P(B)$ . THIS STATEMENT IS

(a) TRUE

(b) FALSE

See Lecture Notes

PROBLEM 3: CONSIDER AN EXPERIMENT WHICH CONSISTS OF TOSSING A COIN 100 TIMES. THE TOTAL NUMBER OF POSSIBLE OUTCOMES FOR THIS EXPERIMENT IS

(a)  $2^{100}$

(b)  $100^2$

(c)  $2^2$

(d)  $100^{100}$

100 successive tasks with two outcomes each. Hence total number of outcomes is  $2 \times 2 \times \dots \times 2 = 2^{100}$

PROBLEM 4: THE TOTAL NUMBER OF WAYS OF CHOOSING  $r$  OBJECTS FROM  $n$  OBJECTS WITH REPLACEMENT WHEN ORDER IS NOT IMPORTANT IS

(a)  $\binom{n}{r}$

(b)  $n!$

See Lecture Notes

(c)  $\binom{n+r-1}{r}$

(d)  $r!$

PROBLEM 5: CONSIDER AN EXPERIMENT WHICH CONSISTS OF TOSSING  
A FAIR DIE (6 FACES) 2 TIMES. WHAT IS THE PROBABILITY  
THAT BOTH RESULTING FACES HAVE THE SAME NUMBER?

(a)  $\frac{6}{36}$

(c)  $\frac{4}{36}$

(b)  $\frac{1}{36}$

(d)  $\frac{9}{36}$

$6 \times 6 = 36$  total outcomes. Since the die is fair, all outcomes are equally likely. There are 6 outcomes for which both resulting faces have the same number. Hence, the answer is  $6/36$ .