

**MANSOURA UNIVERSITY**  
**FACULTY OF COMPUTERS AND INFORMATION**

**Probability and Statistics**  
**Second Semester – 2022/2023**  
**Date: March 3, 2023**

**Homework 2**  
**First Level**  
**Due Date: 22/3/2023**

Solve the following problems:

- 1) How many ways can 12 students in a class take 3 different tests if 4 students are to take each test?
- 2) Construct the tree diagram for the number of permutations of  $(a, b, c)$ .
- 3) Consider two items be selected randomly from a box that has containing 12 items. From these 12 items, 4 items are defective. If A is the event represents that both the tow items are defective” while B represents that “both the two items are non-defective”
  - i) Find  $P(A)$  and  $P(B)$ .
  - ii) Find  $P(\text{at least one item is defective})$ ?
- 4) A box contains three 15 items of which five are defective. If three items are chosen at random from this box, find the probability that:
  - (i) none of the three selected items is defective,
  - (ii) exactly one item of the three items is defective,
  - (iii) at least one item of the three items is defective.
- 5) A class contains 10 boys and 20 girls of which half the boys and half the girls have from Mansoura. Find the probability that a person chosen randomly is a boy or from Mansoura university.
- 6) Let A and B be events with  $P(A) = 3/8$ ,  $P(B) = 1/2$  and  $P(A \text{ intersection } B) = 1/2$ ;  
Find
  - (i)  $P(A^c)$ ,
  - (ii)  $P(B^c)$
  - (iii)  $P(A^c \text{ intersection } B^c)$ ,

- (iv)  $P(A^c \cup B^c)$ ,
- (v)  $P(A \cap B^c)$
- (vi)  $P(B \cap A^c)$

- 7) When you are rolling a pair of (fair) dice three times. What is the probability that, least one of the three tries, you roll a 7?
- 8) If  $\sum P(x) = k^2 - 8$ , find the value of  $k$ ?
- 9) If  $A$  and  $B$  are mutually exclusive events,  $P(A)=0.35$  and  $P(B)=0.45$ , find  $P(A' \cap B')$ .