Statistics for Computing

19.2/20.1 UGC / UCD

Revision

1. Permutations and Combinations

- $nPr = n!/(n-r)!$
- $nPn = n!$
- $nP_1 = n$
- $nCr = n!/(r!\ (n-r)!)$
- $nC_1 = n$
- $nC_0 = 1 = nCn$

The number of new words that can be formed by rearranging the letters of the word 'ALIVE' is: - Factorial – n! – 5! = 5*4*3*2*1 =
A. 117
B. 118
C. 119
D. 120

How many 4-letter words with or without meaning, can be formed out of the letters of the word, 'LOGARITHMS', if repetition of letters is not allowed? – nPr – 10P4 -
A. 1480
B. 2520
C. 5040
D. 7020

A delegation of 5 members has to be formed from 3 ladies and 5 gentlemen. In how many ways the delegation can be formed, if 2 particular ladies are always included in the delegation? – Combination – 6C3 -
A. 16
B. 20
C. 24
D. 28

How many 3-digit numbers can be formed from the digits 2, 3, 5, 6, 7 and 9, which are divisible by 5 and none of the digits is repeated? – Permutation – nPr – 5P2 -
A. 5
B. 10
C. 15
D. 20

2. You are given the following table of NSBM University undergraduates who has studied Commerce, Arts, Science and Mathematics for their A/Ls.

	Commerce	Arts	Science	Mathematics	Total
UGC Degree	1500	250	750	500	3000
PU Degree	1000	350	50	100	1500
VU Degree	350	25	50	75	500
Total	2850	625	850	675	**5000**

a. What is the probability of a student doing PU degree program? (02 marks)

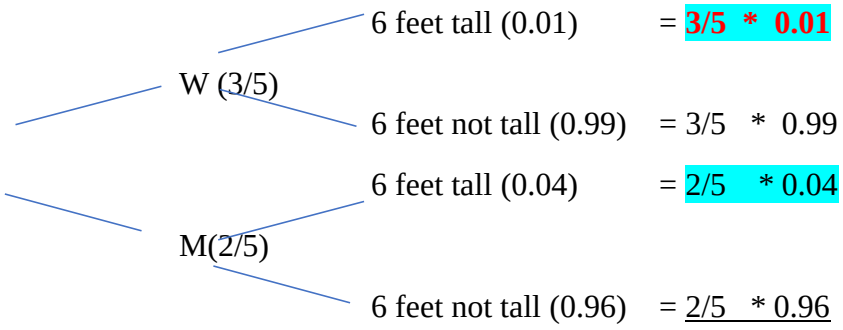
b. What is the probability of a student has done science for A/Ls? (02 marks)

c. What is the probability of a commerce student following UGC degree program? (02 marks)

d. What is the probability of a student following VU programs given that she/he has done arts for their A/Ls? (02 marks)

e. What is the probability of a student following PU programs given that she/he has done mathematics for their A/Ls? (02 marks)

3. At a certain university, 4% of men are over 6 feet tall and 1% of women are over6 feet tall. The total student population is divided in the ratio 3:2 in favor of women. If a student is selected at random from among all those over six feet tall, what is the probability that the student is a woman?



1

P(F6) = Total prob of a student being 6 feet tall = 0.006 + 0.016 = 0.022

P(W/F6) = **0.006 / 0.022 = 0.2727**

4. A factory production line is manufacturing bolts using three machines, A, B and C. Of the total output, machine A is responsible for 25%, machine B for 35% and machine C for the rest. It is known from previous experience with the machines that 5% of the output from machine A is defective, 4% from machine B and 2%from machine C. A bolt is chosen at random from the production line and found to be defective. What is the probability that it came from,

    i) Machine A?
    ii) Machine B?
    iii) Machine C?

5. An engineering company advertises a job in three newspapers, A, B and C. Itis known that these papers attract undergraduate engineering readerships in the proportions 2:3:1. The probabilities that an engineering undergraduate sees and replies to the job advertisement in these papers are 0.002, 0.001 and 0.005 respectively. Assume that the undergraduate sees only one job advertisement.

    i) If the engineering company receives only one reply to its advertisements, calculate the probability that the applicant has seen the job advertised in,
        i. Paper A? XXX
        ii. Paper B?
        iii. Paper C?

    ii) If the company receives two replies, what is the probability that both applicants saw the job advertised in paper A?
    Prob of both seen paper A = XXX * XXX

6.
    i. What are the characteristics of normal distribution
    ii. The average price of a product is 150/= with a deviation is 25/= Answer the following questions.
        a) What sort of a distribution that the price should follow?
        b) What is the probability of price between 90/= to 160/=?
        c) What is the probability of product price more than 80/=?
    iii. 35 / 47 / 87 / 50 / 25 / 67 / 50 / 80 / 90
        a) Comment whether the above data are skewed
        b) Are there any outliers

7. The average salary of 1000 employees is Rs. 2200/= and the standard deviation is Rs. 300/=. Calculate the probability of employees that obtained a salary within the range of 2000/= to 2500/=.

8. The weights of packages of a brand of cereal are Normal distributed with a mean of 32 ounce and a standard deviation of 1.3. What is the probability that a package selected at random will weight exceeding 35 ounces?

9. Find the probability for the following situations.

    a) Pr $(0.55 < Z < 1.22)$
    b) Pr $(-1.90 \leq Z \leq 0.44)$
    c) Pr $(0 \leq Z \leq 1.5)$
    d) Pr $(Z \geq -1)$
    e) Pr $(-2.5 \leq Z \leq 0.5)$
    f) Pr $(1.5 \leq Z \leq 2)$
    g) Pr $(-2 \leq Z\ -0.5)$
    h) Pr $(Z \geq 1.5)$

10. Following given the suggestion given by the production department to enhance their daily production

    - ✓ Conduct training programs
    - ✓ Reduce raw material damages

    Following results were derived after the correlation analysis

    r = 0.56 (for training) r = -0.87 (raw materials)

    a) Interpret the above results
    b) Draw a rough sketch for the above relationships
    c) What is most suitable for enhancing the production? Reason
    d) What type of decisions can be made upon this analysis?
    e) What is the underlying concept?

11.

04. The following table shows daily study time and marks obtained for "math" exam at GCE O/L by 8 students.

Daily study time (hours)	10	8	9	12	2	5	7	3
Marks obtained	85	80	80	75	55	70	75	60

1) Define the independent and the dependent variable in the scenario
2) Develop a suitable graph for above details, show the best fit line?
3) What are the characteristics of a "coefficient of correlation"?
4) According to the given details do you think study time has influence on marks obtained by students: clarify using the developed graph