**Islington College**
**Module Code: MA4001NI Logic and Problem Solving**

1. A salesman has an 80% chance of making a sale to each customer. The behavior of successive customer is assumed to be independent. If two customers A and B enter, what is the probability that the salesman will make a sale to A or B?

2. The probability that a man will be alive 25 years hence is 0.3 and the probability that his wife will be alive 25 years hence is 0.4. Find the probability that 25 years hence
   (i) Both will be alive.
   (ii) Only the man will be alive.
   (iii) Only the woman will be alive.
   (iv) None of them will be alive.
   (v) At least one of them will be alive.

3. Soni and Moni appear for an interview for two posts. The probability of Soni's selection is 1/3 and that of Moni's selection is 1/5 Find the probability that
   (i) Both of them will be selected.
   (ii) Soni can select but Moni cannot.
   (iii) Moni can select but Soni cannot.
   (iv) None of them will be selected.
   (v) At least one of them will be selected.
   (vi) Only one of them will be selected.

4. A problem in statistics is given to three students A, B and C whose chances of solving it are 1/3, 1/4 and 1/5 respectively. Find the probability that
   (i) All of them can solve.
   (ii) None of them can solve.
   (iii) Problem will be solved.

5. A can hit a target 3 times in 5 shots, B 2 times in 5 shots and C 3 times in 4 shots. They fire a volley. What is the probability that two shots hits the target?

6. In a group of equal number of men and women, 10% men and 45% women are unemployed. What is the probability that a person selected at random is employed?

7. A speaks truth 70% of cases and B in 85% of cases. In what percentage of cases are they likely to i) contradict and ii) do not contradict each other in stating the same fact.

8. In a family the husband tells a lie in 30% cases and the wife in 35% cases. Find the probability that both contradict with each other on the same fact.

9. In a certain school, 20% of the students failed in English, 15% of the students failed in mathematics, and 10% of the students failed both English and mathematics. A student is selected at random and found that he failed in English, what is the probability that he also failed in Mathematics?

10. It is known that 20% of the males and 5% of the females are employed in a certain town consisting of equal number of males and females. A person is selected at random and found to be unemployed. What is the probability that he is

    i. Male,
    ii. Female?

11. The probability that a management trainee will remain with a company is 0.6. The probability that an employee earns more than 10000 per month is 0.5. The probability that an employee is a management trainee who remained with the company or who earns more than Rs. 10000 per year is 0.70. What is the probability that an employee earns more than Rs a 10000; per year given that he is a management trainee who stayed with the company?

12. A bag contains 5 white and 3 black balls. Two balls are drawn at random one after the other without replacement. Find the probability that both balls drawn are (i) black and (ii) white.

13. A box contains 6 red, 4 white and 5 blue balls. From this box 3 balls are drawn in succession. Find the probability that they are drawn in the order red, white and blue if each ball is (i) replaced (ii) not replaced.

14. Of 250 employees of a company, a total of 130 smoke cigarettes. There are 150 males working for this company, 85 of the males smoke cigarettes. What is the probability that an employee chosen at random:
    (i) Doesn't smoke cigarettes?
    (ii) Is female and smokes cigarettes?

15. The Records of 400 examinees are below :

| Score\ Degree | B.A | B.SC | MBA | Total |
|---|---|---|---|---|
| Below 50 | 90 | 30 | 60 | 180 |
| 50 to 60 | 20 | 70 | 70 | 160 |
| Above 60 | 10 | 30 | 20 | 60 |
| Total | 120 | 130 | 150 | 400 |

    If an examinee is selected from this group of examinees , find the probability that
    i. He is a MBA degree
    ii. He is a B.SC degree, given that his score is above 60
    iii. His score is below 50 , given that he is a B.A degree
    iv. His score is above 60 ,given that he is a B.SC degree

16. A manager has two assistants and he bases his decision on information supplied independently by each of them. The probability that he makes a mistake in his thinking is 0.005. The probability that an assistant gives wrong information is 0.3. Assuming that the mistakes made by the manager are independent of the information given by the assistants, find the probability that he reaches a wrong decision.