SIBA CAMPUS

SRI LANKA INTERNATIONAL BUDDHIST ACADEMY
(Higher Educational Institute of Sri Dalada Maligawa)
Pallekele, Kundasale, Sri Lanka

IT 196 (BSC)- BASIC PROBABILITY & STATISTICS

Unit Test 02 – Theorem of Total Probability

Date: 2024.11.13   **Time: 07.00 pm – 09.00 pm**

INSTRUCTIONS:

- ✓ **Time Duration: 2 hours (120 minutes)**
- ✓ **Format: Handwritten Answers**
- ✓ **Submission Mode: Submit using the available link in BB. If you haven't access, please email me at rasadarikumarasi@gmail.com**

ANSWER ALL QUESTIONS

1) A factory has two production lines: Line A produces 60% of the items, and Line B produces 40%. Line A has a defect rate of 2%, and Line B has a defect rate of 8%. What is the probability that a randomly selected item from the factory is defective?

2) A hospital uses two types of tests for a certain disease: Test X is used 80% of the time and has a false positive rate of 3%, while Test Y is used 20% of the time and has a false positive rate of 6%. What is the probability that a randomly selected test will yield a false positive?

3) A smartphone company uses two factories, Factory A and Factory B. Factory A produces 40% of the phones with a defect rate of 1%, while Factory B produces 60% with a defect rate of 4%. What is the probability that a randomly chosen phone will be defective?

4) An insurance company processes claims using two departments: Department X processes 70% of the claims, and Department Y processes 30%. The rejection rate is 5% for claims processed by Department X and 10% for those by Department Y. What is the probability that a randomly selected claim will be rejected?

5)   A factory has three machines. Machine A produces 50% of the items with a defect rate of 2%, Machine B produces 30% of the items with a defect rate of 3%, and Machine C produces 20% with a defect rate of 4%. What is the probability that a randomly selected item is defective?

6)   A bank has two branches that handle loan applications. Branch A handles 75% of the applications, and Branch B handles 25%. The approval rate for applications at Branch A is 90%, while at Branch B, it's 80%. What is the probability that a randomly chosen application is approved?

7)   A company buys parts from Supplier X (60% of the total parts) and Supplier Y (40%). Supplier X has a defect rate of 1.5%, and Supplier Y has a defect rate of 3%. What is the probability that a randomly selected part is defective?

8)   A store offers two types of loyalty cards: Card A, which 65% of customers use, and Card B, which 35% use. With Card A, customers make an additional purchase 25% of the time, while with Card B, they do so 15% of the time. What is the probability that a randomly selected customer makes an additional purchase?

9)   A quality control department checks items from two machines. Machine M produces 55% of items with a defect rate of 3%, while Machine N produces 45% with a defect rate of 2%. What is the probability that a randomly selected item from the production line is defective?

10) A company uses two types of ads: Ad X, which reaches 70% of the audience, and Ad Y, which reaches 30%. The success rate for Ad X is 5%, while for Ad Y, it's 10%. What is the probability that a randomly chosen ad will lead to a successful response?

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