

APPLIED PROBABILITY AND STATISTICS (STA 416)
TEST

QUESTION 1 (5 marks)

Banner Health is a several state nonprofit chain of hospitals. Management wants to assess the incident of complications after surgery. They wish to use a sample of surgery patients. Categorize each technique as simple random sample, stratified sample, systematic sample, cluster sample, or convenience sampling.

- a) Obtain a list of patients who had surgery at all Banner Health facilities. Divide the patients according to type of surgery. Draw simple random samples from each group.
- b) Obtain a list of patients who had surgery at all Banner Health facilities. Number these patients, and then use a random number table to obtain the sample.
- c) Randomly select some Banner Health facilities from each of the seven states, and then include all the patients on the surgery lists of the states.
- d) At the beginning of the year, instruct each Banner Health facility to record any complications from every 100th surgery.
- e) Instruct each Banner Health facilities to record any complications from 20 surgeries this week and send in the results.

QUESTION 2 (8 marks)

The waiting time experienced (minutes) by 10 passengers awaiting the arrival of a bus at TT bus stop are given below.

11 10 5 8 8 13 7 9 8 7

- a) Calculate the mean and variance for the above data. (5 marks)
- b) Describe the shape of distribution by using an appropriate measurement. (3 marks)

QUESTION 3 (9 marks)

Nowadays, Malaysians are making a shift to cashless payment. It is found that 80% of the customers have been making cashless payment. 75% of the grocery shopping are with cashless transactions. However, 40% of the customers paid cash to buy non-grocery goods.

- a) Construct a tree diagram for the above information. (3 marks)
- b) A customer is selected at random. Find the probability that the customer is making grocery purchases. (3 marks)
- c) Given that the shopping is for grocery items, what is the probability that the customer has making a cashless payment. (3 marks)

QUESTION 4 (13 marks)

A researcher intends to measure the efficiency in medical health system. The following table represents the waiting time of 100 patients in the emergency department at Hospital W.

Waiting time (minutes)	Number of patients
0-10	13
10-20	16
20-30	30
30-40	18
40-50	15
50-60	8

- Calculate the mean and standard deviation for the patient waiting time. (7 marks)
- Construct a histogram to represent the above data. (3 marks)
- The mean and standard deviation of patient waiting time at Hospital S are 25 and 10.5 minutes respectively. Which data distribution is more consistent? (3 marks)

QUESTION 5 (15 marks)

Social media has become a popular means of communication. Thus, a data analyst intends to investigate the relationship between age and daily time spent on social media. The information gathered is shown in the table below.

Age (years)	10	12	20	35	41	18	56	33
Time (hours)	5	6	4	4	2	6	1	5

- State the independent and dependent variables. (1 marks)
- Calculate the Pearson's Product Moment Correlation Coefficient and interpret the value obtained. (5 marks)
- Calculate the coefficient of determination of the above data and interpret its meaning. (2 marks)
- Find the linear regression equation using the least-squares method. (5 marks)
- Predict the daily time spent on social media for a 48 years old person. (2 marks)

END OF QUESTIONS