



**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**FINAL EXAMINATION  
(ONLINE)  
SEMESTER I  
SESSION 2020/2021**

COURSE NAME : STATISTICS AND PROBABILITY  
COURSE CODE : BWA 10703  
PROGRAMME CODE : BWA  
EXAMINATION DATE : JANUARY / FEBRUARY 2021  
DURATION : 3 HOURS  
INSTRUCTION : ANSWERS ALL QUESTIONS  
OPEN BOOK EXAMINATION

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THIS QUESTION PAPER CONSISTS OF SEVEN (7) PAGES

## PART A

Q1 Are the following statements **TRUE** or **FALSE**?

- I If mean > median > mode, then the skew is positive  
II If mean = median = mode, then the skew is zero

- A Both true  
B Both false  
C I – true ; II – false  
D I – false ; II – true

(2 marks)

Q2 Is the following statement always true, sometimes true, or always false?

“Discrete data can take only exact values while continuous data cannot take exact values but can be given only within a specified range or measured to a specified degree of accuracy.”

- A Always true  
B Sometimes true  
C Always false  
D Not sure

(2 marks)

Q3 Which of the following is **NOT** a continuous data?

- A The mass of a cooking apple  
B The speed of cars as they were passing a checkpoint  
C The time taken by a volunteer to perform a task  
D The shoe sizes of children in a class

(2 marks)

Q4 Which of the following must be **FALSE**?

- A Descriptive statistics is an organization, summarization, analysis, and description of data sets in the effective presentation through tables and charts  
B Inferential statistics is a process of making estimation, prediction, decision, or scientific judgement  
C A population where all the elements are easily countable may be considered as finite  
D Simple random sampling defined as selecting  $n$  sampling units in such a way that each possible sample of size  $n$  has the same chance of being selected

(2 marks)

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**Q5** Determine the **TRUE** statement.

- A Frequency distribution table is not appropriate for summarizing a huge data set
- B Cumulative distribution “less-than or equal” uses upper boundaries as the partition
- C Histograms are used to represent a frequency distribution associated with two quantitative variables
- D The bars on a bar chart can only be vertical, called a column bar chart

(2 marks)

**Q6** Determine the **TRUE** statement about the box and whisker diagram.

- A It can be drawn vertically only
- B It illustrates the dispersion or spread of distribution
- C It cannot be used to identify outliers that are unusually small or large data values that lie mostly by themselves
- D It uses the highest and lowest of the data, the quartile, mean and median

(2 marks)

**Q7** Classify the following data as times series or cross sectional

- I** Obesity levels in a population
- II** Person's heart rate
- III** Customer satisfaction with the service provided

- A All are times series
- B All are cross-sectional
- C **I** and **III** are cross-sectional
- D Only **III** is times series

(2 marks)

**Q8** Which of the following must be the **FALSE** statement about the shape of distribution?

- A In a positively skewed distribution, there is a long tail at the positive end of the distribution
- B The symmetrical, bell-shaped distribution is known as a normal distribution
- C When distributions are skew, the mean generally lies between the median and the mode
- D The distribution is called right skewed if it has a long tail to the right

(2 marks)

**Q9** Recognize the type of data for the following category

Strongly disagree – Disagree – Does not matter – Agree – Strongly agree

Not tasty at all · Not tasty · Less tasty · Tasty · Very tasty

- A Ordinal and level
- B Ordinal and rank
- C Nominal and degree
- D Nominal and order

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(2 marks)

**Q10** Rolling a die or tossing a coin is called a

- A Repeated experiment
- B Sample experiment
- C Probability experiment
- D Infinite experiment

(2 marks)

**Q11** Which of the following is not a type of probability?

- A Subjective
- B Classical
- C Variable
- D Empirical

(2 marks)

**Q12** The type of probability that uses sample spaces is called

- A Subjective probability
- B Empirical probability
- C Classical probability
- D Relative probability

(2 marks)

**Q13** Which of the two events are mutually exclusive?

- A Drawing a card from a deck and getting a king or a club
- B Rolling a die and getting an even number or a 6
- C Tossing two coins and getting two heads or two tails
- D Rolling two dice and getting double or getting a sum of 8

(2 marks)

**Q14** Which of the two events are not mutually exclusive?

- A Rolling a die and getting a 6 or a 3
- B Drawing a card from a deck and getting an ace or a club
- C Tossing a coin and getting a head or a tail
- D Tossing a coin and rolling a die and getting a head and odd number

(2 marks)

**Q15** Which of the following events are dependent?

- A Tossing a coin and selecting a card from a deck
- B Tossing a coin then tossing a second coin
- C Running a race and getting tired
- D Drawing a card from a deck and replacing it, then drawing a second card

(2 marks)



**Q16** Which of the following is not a requirement of a binomial experiment?

- A There are two outcomes for each trial
- B There is a fixed number of trials
- C The probability of success must be the same for all trials
- D The outcomes must be dependent

(2 marks)

**Q17** Which distribution can be used when there are three or more outcomes?

- A Poisson distribution
- B Hypergeometric distribution
- C Multinomial distribution
- D Geometric distribution

(2 marks)

**Q18** Which distribution requires sampling to be done without replacement?

- A Poisson distribution
- B Hypergeometric distribution
- C Multinomial distribution
- D Geometric distribution

(2 marks)

**Q19** Which distribution can be used when the variable occurs over time?

- A Poisson distribution
- B Hypergeometric distribution
- C Multinomial distribution
- D Geometric distribution

(2 marks)

**Q20** Which distribution can be used to determine the probability of an outcome occurring on a specific trial?

- A Poisson distribution
- B Hypergeometric distribution
- C Multinomial distribution
- D Geometric distribution

(2 marks)

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## PART B

- Q1** A tablet computer transmits a file over a Wi-Fi link to an access point. Depending on the size of the file, it is transmitted as  $W$  packets where  $W$  has a probability distribution function

$$W(x) = \begin{cases} c/x & 1 \leq x \leq 5 \\ 0 & \text{otherwise} \end{cases}$$

- (a) Estimate the value of  $c$  numerically. (4 marks)
- (b) Find the probability that  $x$  is odd. (3 marks)
- (c) Compute expected value and variance. (6 marks)
- (d) Calculate  $\Pr(1 < X < 5)$ . (3 marks)
- (e) Find  $\Pr(\mu - \sigma \leq X \leq \mu + \sigma)$ . (4 marks)
- Q2** (a) An electronic system is designed to work as long as at least five of its eight major components function. Each of these components works independently with a probability of 0.6.
- (i) Find the probability that the system will work. (4 marks)
- (ii) Estimate the expected value and variance. (4 marks)
- (b) On average, the school photocopier breaks down eight times during the school week (Sunday to Thursday). Calculate the probability that the photocopier breaks down
- (i) five times in a given week. (3 marks)
- (ii) once on Monday. (4 marks)
- (c) In a batch of 50 calculators, on average, two are defective. In a random sample of 100 calculators, find the probability that 10 are defective. (5 marks)

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- Q3** (a) A female darts player is practicing throwing a dart at the bull's eye on a dartboard. Independently for each throw, her probability of hitting the bull's eye is 0.2. Let  $X$  be the number of throws she makes, up to and including her first success.
- (i) Write down the distribution of  $X$  and give the name of the distribution. (2 marks)
- (ii) Find the probability that she will have at least three failures before her first-time success. (4 marks)
- (ii) Compute the variance of  $X$ . (2 marks)
- (b) A manager of a manufacturing company has eight female and twelve male engineers in her department. The manager randomly selected a team of six engineers to attend a business meeting. Find the probability that the team had
- (i) two female engineers (4 marks)
- (ii) at least two male engineers (5 marks)
- (c) In a particular city, too many accidents occur every year, so the motor vehicle department has been quite strict about passing the persons who take the driving test. The probabilities that a person who takes this test will pass in the first, second, or third attempt are 0.25, 0.30, and 0.45, respectively. Find the probability that among the 19 persons who take the test, four of them will pass in the first attempt, five in the second, and the rest in the third attempt. (3 marks)

- END OF QUESTIONS

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