FUKIEN SECONDARY SCHOOL

S5 First Term Uniform Test (2020-2021)

Mathematics Extended Part Module 1

(1 hour 15 minutes)

Date: 19th October 2020 Name:_____

Time: 10:30 a.m. - 11:45 a.m. Class: _____ No.: _____

Instructions to students:

1. The maximum score of this paper is 60.

2. Attempt ALL questions. Write your answers on the single-lined paper.

3. Unless otherwise specified, show your workings clearly.

4. Unless otherwise specified, numerical answers should be either exact or given to 4 decimal places.

5. The diagrams in this paper are not necessarily drawn to scale.

1. Let A and B be two events with $P(A)=\frac{9}{25}$, $P(A\cap B)=\frac{9}{125}$ and $P(A'\cap B)=\frac{41}{125}$. Find
   (a) $P(B\,|\,A)$,
   (b) $P(B\,|\,A')$,
   (c) $P(A'\,|\,B)$.

   (6 marks)

2. In a factory, printers are produced in four production lines. Production lines *A*, *B*, *C* and *D* produce 15%, 20%, 30% and 35% of the total number of printers respectively. The percentages of defective printers produced in production lines *A*, *B*, *C* and *D* are 2%, 5%, 4% and 3% respectively. A printer is selected at random from the factory. Find the probability that
   (a) the printer is defective,
   (b) the printer is produced in production line *A* given that the printer is defective,
   (c) the printer is produced in production line *D* given that the printer is not defective.

   (8 marks)

3. In a company, 60% of the employees are male. 55% of the male employees have travelled to Japan. 70% of the female employees have travelled to Japan. An employee is selected at random from the company. Find the probability that
   (a) the employee has not travelled to Japan,
   (b) the employee is a male given that the employee has not travelled to Japan.

   (5 marks)

4. In a shooting game, the probabilities that Andy, Ken and Patrick hit a target are 0.35, 0.4 and 0.6 respectively. They shoot at the same target independently. Find the probability that
   (a) only Andy hits the target,
   (b) only one of them hits the target,
   (c) at least one of them hits the target.

   (6 marks)

5. In a company, 55% of the employees are married, 40% of the employees own property, and 24% of the employees are married and own property. An employee is selected at random from the company.
   (a) Find the probability that the employee is married and does not own property.
   (b) Find the probability that the employee is not married and does not own property.
   (c) Find the probability that the employee does not own property given that the employee is married.
   (d) Find the probability that the employee is not married given that the employee does not own property.

   (8 marks)

6. 50%, y% and 64% of the books on the bookshelves of Athena, May and Gloria respectively are fictions. Athena has read 44% of the fiction books on her bookshelf, while May has read 80% and Gloria has read 20%. If a person is selected randomly and a book is selected randomly from the bookshelf of that person, the probability of selecting a fiction book is 0.56.

   (a) Find the value of y.

   (b) A person is selected randomly and a book is selected randomly from the bookshelf of that person. Given that a fiction book which has been read is selected, find the probability that the fiction book is selected from Athena's bookshelf. (Give your answer correct to 4 decimal places.)

(5 marks)

7. Ronald and Sam may drive to work on a working day. If Ronald drives to work on a working day, the probability for Sam to drive to work on that day is 0.175. If Sam drives to work on a working day, the probability for Ronald to drive to work on that day is 0.28. It is known that the probability for Ronald to drive to work on a randomly selected working day is 0.4.

   (a) Find the probability that Sam does not drive to work on that day.

   (b) Find the probability that only 1 of them drives to work on that day.

   (c) Given that only 1 of them drives to work on that day, find the probability that Ronald drives to work on that day.

   (d) Given that Ronald does not drive to work on that day, find the probability that none of them drives to work on that day.

(8 marks)

8. A and B are two events such that $P(A \cap B) = \frac{4}{15}$ and $P(B \mid A') = \frac{2}{3}$, where A' is the complementary event of A. Let $P(A) = a$, where $0 < a < 1$.

   (a) Find $P(A' \cap B)$ in terms of a.

   (b) Find $P(B)$ in terms of a.

   (c) If A and B are independent, find the value of a.

(6 marks)

9. A and B are two events. A' and B' are the complementary events of A and B respectively. Suppose that $P(A \cup B) = \frac{31}{40}$, $P(A) = a$ and $P(B) = \frac{3}{8}$, where $0 < a < 1$.

   (a) Find $P(A \cap B)$ in terms of a.

   (b) Find $P(A \mid B')$.

   (c) If A and B are mutually exclusive events,

      (i) find the value of a,

      (ii) find $P(B' \mid A')$.

(7 marks)

End of Paper