

P425/2

APPLIED MATHEMATICS

PAPER 2

BOT 2, 2024

3 hours

Uganda Advanced Certificate of Education

S.5 Applied Mathematics

Paper 2

3 hours

INSTRUCTIONS TO LEARNERS

*Answer **all** question in section **A** and section **B***

***All** working **must** be shown clearly.*

Silent non programmable scientific calculators and mathematical tables with a list of formulae may be used.

Neat work is a must

SECTION A

1. The following are the weights of cabbages in kgs.
1.769, 1.771, 1.772, 1.775, 1.788, 1.781 and 1.784. Calculate the standard deviation.
(05 marks)
2. A vehicle changes speed from 90km/hr. to 18km/hr. from points A to B such that $AB = 120m$. Calculate the speed the vehicle covered in a distance of 50m. (05 marks)
3. **ABCD** is a square with forces of magnitude 3N, 6N, 5N and 4N acting along sides AB, BC, DC and AD respectively. Find the resultant force. (05 marks)
4. Given that A and B are independent events and $P(A) = \frac{1}{4}$, $P(A \cup B) = \frac{5}{8}$. Find P (B).
(05 marks)
5. A box contains 4 red pens, 5 green pens and 6 blue pens. If 2 pens are selected at random without replacement. Find the probability of obtaining pens of the same colours. (05 marks)
6. Five students obtained the following A' level grades in beginning of term and end of term 3 examination in a Chemistry test.

Beginning of term	A	B	C	D	E
End of term	E	A	C	D	E

- (i) Determine the rank correlation coefficient between beginning of term and end of term examinations.
- (ii) Comment on your result in (i) above. (05 marks)
7. Given that $f(1) = 0.1708$, $f(2) = 0.1679$, $f(3) = 0.1650$ and $f(4) = 0.1622$. estimate
 - (a) $f(4.8)$ and $f(2.5)$
 - (b) $f^{-1}(0.1685)$ Using interpolation or extrapolation. (05 marks)
8. A box contains 20 good and 4 bad mangoes. If 5 mangoes are picked at random, determine the probability that 4 mangoes are good and the other is bad. (05 marks)

SECTION B.

9. The table shows the time taken to complete a puzzle by 100 students in a certain school.

Time (seconds)	Number of students
19-29	2
30-39	7
40-49	18
50-59	27
60-69	23
70-79	13
80-89	7
90-99	3

- (a) Calculate
- Mean
 - Semi inter quartile range
- (b) Plot an ogive for the distribution and use it to estimate the median time.(12 marks)
10. A family has three children Timothy, James and Martin. The probability that the children speak the truth is 0.6, 0.7 and 0.9 respectively. Find
- The probability that all the three children in the family do not speak the truth.
 - Only two children in the family speak the truth.
 - At least two children in the family speak the truth. (12 marks)
11. The table gives the points awarded by three judges J_1 J_2 and J_3 to eight schools during MDD competition.

J_1	87	71	62	55	54	53	35	62
J_2	63	74	83	47	65	60	56	57
J_3	64	74	78	68	45	69	52	64

Calculate the rank correlation coefficient between the judgments of

- J_1 and J_2
 - J_1 and J_2
- (d) Comment on your result in (a) and (b) above. (12 marks)

12. A train travels along a straight piece of track between two stations A and B. it starts from rest at A and accelerates at 1.25ms^{-2} for 16s. It then travels at a constant speed for a distance of 1.56 km and then decelerates at 2ms^{-2} to come to rest at B.

a) Find the ;

- i) Constant speed
- ii) Time for which it decelerates
- iii) Distance from A to B
- iv) Average velocity between A and B

(e) Sketch the velocity time graph between A and B .(12 marks)

END