

NAME:.....COMB:.....

P425/2

Paper 2

2¹/₂ hours

Uganda Advanced Certificate of Education

S5 MATHEMATICS Paper 2

2 hours :30 minutes

INSTRUCTIONS:

- ≈ Answer **all the items in both section A and B.**
- ≈ **All necessary working must be shown clearly.**
- ≈ Give meaningful conclusions at the end of each item

SECTION A:

Item one:

The probability that John listens to a certain radio station A is 0.52 and the probability that he listens to A and not another radio station B is 0.45. The probability that he listens to neither of the stations is 0.20. Hint (use a Venn diagram)

Task: find the probability that he listens to station B

(05 scores)

Item two:

In an agro-farming company testing the effect of amount of fertilizer applied to seedling growth the following results are noted. The heights of a sample of seedlings when 200grams, 300grams, 350 grams and 450grams of fertilizers are where applied are 1.6cm, 1.9cm, 2.4cm and 2.8cm respectively.

Task:

- a) Given the head of research team has been tasked to find the approximate value for a seedling when fertilizers of 272 grams are applied and also possible amount of fertilizer required if the height is to be 3.1cm.
- b) If in another case they want to test the possible height if no fertilizer is applied

Hint: use linear interpolation or extrapolation knowledge

(08 scores)

Item three:

In 2019 the price of a shirt, a dress and pair of shoes were shs. 20,000, shs. 35,000 and 45,000 respectively. If it noted that the prices of these were shs. 25,000, shs. 50,000 and shs. Y respectively in 2021.

As well the price index of clothing material in 2015 based on 2008 was 130, the price index for the material in 2021 based on 2015 was 80.

Task: help determine;

- a) Price value of Y if the simple aggregate price index was 130 while taking 2019 as the base year.
- b) Price of the material in 2008 if the price in 2021 is 900,000.

(09 scores)

Item four:

A public health department took a study where it interviewed 768 college students about their smoking habits into the categories smokers (more than 1 pack of 10 cigarette's a week), occasional 9 less than 1 pack per week) and non-smokers.

	smoker	occasional	Non-smoker	total
Male	127	b	214	414
Female	a	66	189	C
total	226	139	d	768

The data is incomplete and needs to be refilled with actual figures because it was collected by independent persons and in the final report.

Task: find the unknowns to complete the report and find the probability of;

- Female smoke
- Non-smoker college student.

(06 scores)

SECTION B:

Item five:

In a clinical trial for a new drug, the Head of R&D has tasked the team to test the effect of the drug on 12 patients, they are given a test before (initial score noted) and after taking the drug (final score) and result have been tabulated as shown below.

Patients	1	2	3	4	5	6	7	8	9	10	11	12
Initial score	61	23	8	14	42	34	32	31	41	25	20	50
Final score	49	12	3	4	28	27	20	20	34	15	16	40

Given the relation at 5% level is significant, the drug has to be sent back for further research and improvement following Spearman's rank correlation. Advise the Head of R&D on what to do.

Task:

- Use a scatter plot to show the influence of the drug on patients and hence head of science has tasked you to determine her possible final score given she had a value of 29.

(6 scores)

- Following Spearman's rank correlation advise the head.

(6 scores)

Item six:

In company, the Board has recently faced a problem of losing its employees to other competing companies with HR claiming the case of lower wages compared to average industry values. The data has been collected as shown below for the industry.

Wage (000)	Number of workers
$200 \leq x \leq 250$	10
$250 \leq x \leq 300$	16
$300 \leq x \leq 375$	40
$375 \leq x \leq 400$	26
$400 \leq x \leq 500$	8

Human resource manager has been asked to compare with industry wages. He needs to find the variance in wages and also determine if 80% value is more than 450,00 then they should increase the wages of all workers.

Task:

- a) Using a statistical graph and use it to determine its modal wage.
- b) Determine using calculation its variance in industrial wages and as well come to conclusion if 80% value whether they should increase wages. **(12 scores)**

Item seven:

A sledge of mass 5kg is being pulled across a rough surface of co-efficient of friction 0.375 which is pulled by a force 42N. at what acceleration will it move across such a floor.

A saloon car of mass 1000kg had an accident and couldn't move any move by its engine. A police officer investigating the case towed the car using a towbar to the police station on level road from the point of occurrence of the accident using a tow truck of mass 1500kg. the resistance on the saloon car and tow truck was 400N and 600N respectively. If the driving force for the truck engine is 15KN. The police officer wonders its acceleration and tension in the tow bar

Task: Determine;

- a) Acceleration of the sledge
- b) Tension in the tow bar and acceleration of vehicles

. **(10 scores)**

END