GREENHILL ACADEMY SECONDAY

HOLIDAY PACKAGE 2024

Uganda Advanced Certificate of Education

APPLIED MATHEMATICS

Paper 2

NAME: STREAM:

INSTRUCTIONS TO STUDENTS:

Answer **all** *questions*

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

Draw the left and right hand margins

Underline your answers generally

Where necessary, take acceleration due to gravity $g = 9.8ms^{-2}$

Graph paper can be used

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

SECTION A

1. The time X in seconds for phone calls made by eleven customers at school booth were recorded as follows

   101, 110, 91, 89, 122, 115, 106, 109, 112, 105, 106

   Find;

   (i) the mean value of X for the given data. **(3 marks)**

   (ii) the interquartile range of the given data **(2 marks)**

2. A particle has an initial position vector $(a\boldsymbol{i} + b\boldsymbol{j} + c\boldsymbol{k})m$. The particle moves with a constant velocity of $(3\boldsymbol{i} + \boldsymbol{j} + 4\boldsymbol{k})ms^{-1}$ and after two seconds it has a position vector of $(7\boldsymbol{i} + \boldsymbol{j} + 11\boldsymbol{k})m$. Find the values of a, b and c. How far from the origin is the particle after 3 seconds? **(5 marks)**

3. Given that $x = 0.23$, $y = 1.2$ and $z = 3.11$ Find the interval with in which the exact value of $\frac{x-y}{z}$ lies **(5 marks)**

4. Two particles P and Q of masses $5.5m$ and $4.5m$ respectively are connected by a light inextensible string passing over a smooth fixed pulley. Initially P and Q are hanging vertically with P a distance ***d*** above the ground and the system is released from rest. If a time t elapses before P hits the ground, show that $20d = t^2 g$.

5. Show that the function $20cosx - x = 0$ has a root between $\frac{\pi}{2}$ and $\frac{10\pi}{21}$ **(5 marks)**

6. A and B are independent events where $P(A) = \frac{5}{6}$ and $P(B) = \frac{3}{4}$ What is the probability that neither event A nor event B occurs? **(5 marks)**

7. A certain frequency distribution with a variance of 59.75 had the following results. $\varepsilon fx = 3060$, and $\varepsilon fx^2 = 236480$. Find the mean of the distribution. **(5 marks)**

8. The price in shillings of commodities A, B and C in 2012 are given in the table below.

Commodity	Price in 2012	Price in 2013
A	500	750
B	1500	2100
C	1000	1200

Using 2012 as the base year, find the;

(a) Price relative for each commodity **(3 marks)**

(b) Simple aggregate price index **(2 marks)**

SECTION B

9. The age of people in a certain town and their respective number are as indicated in the table below.

Age(years)	70-<75	75-<80	80-<85	85-<90	90-<95	95-<100
Number of people	8	20	26	30	9	7

Calculate the:

(a) (i) Mean Time **(6 marks)**

(ii) Standard deviation **(5 marks)**

(b) Draw a histogram and use it to estimate the modal Age **(4 marks)**

10. (a) The price relatives of 5 items bought from two markets X and Y were recorded together with the weights as shown in table below.

Market	**Items**				
	A	B	C	D	E
X	120	130	100	150	122
Y	110	120	115	140	107
Weights	4	1.5	3	0.5	1.0

(i) Determine the weighted mean price relatives for each market and use your results to identify with reasons which market is more expensive.

(ii) If the cost of a certain item in a market X was shs 46,880, find its cost in the market Y. **(8 marks)**

(b) The unit price of sugar in 2013 was shs. 3500. The price index for the second item in 2014 based on 2013 was 124 and that of 2015 based on 2014 was 130. Determine the,

(i) Price index of 2015 based on 2013

(ii) Price of sugar in 2015. **(7 marks)**

11. A car of mass $0.8tonnes$ tows a trailer of mass $0.4tonnes$ against constant resistances totaling to 600N. The separate resistances on the car and the trailer are proportional to their masses. If the car accelerates at $1.25ms^{-2}$ along a level road, find the;

(i) forward force exerted by the engine.

(ii) Tension in the tow bar. **(12 marks)**

END

HAPPY HOLIDAY