**S475/1**

**SUBSIDIARY**

**MATHEMATICS**

**Paper 1**

**2 hours 40 mins**

*ENTEBBE*



**ENTEBBE JOINT EXAMINATION BUREAU**

**Uganda Advanced Certificate of Education**

SUBSIDIARY MATHEMATICS

Paper 1

**2 hours 40 minutes**

**INSTRUCTIONS TO CANDIDATES:**

*Attempt all* **eight** *questions in* Section **A** *and any* **four** *from* Section **B.**

Section**B** *comprises* ***two***Parts*;* Part **I** *and* Part **II***. You are required to select at least* ***one*** *question from each* Part*.*

*Each question in* Section***A*** *carries five marks while each question in* Section *B carries fifteen marks.*

*Begin each answer on a fresh page.*

*Graph papers are provided.*

*Any extra question(s)* **will not** *be assessed.*

*All working must be shown clearly.*

*Silent, non-programmable Scientific Calculators and Mathematical tables with a list of formulae may be used.*

*Where necessary, take g – 9.ms-2*

**A – SM– 1 *2023 Entebbe Joint Examination Bureau: Sub Mathematics*** **Turn Over**

**SECTION A**

*Answer* **all** *questions in this* Section*.*

1. Solve the equation; *(05 marks)*
2. Express + in the form where b and c are constants. *(05 marks)*
3. The polynomial has remainder 8 when divided by and the polynomial is divided by . Find *b* and *c*. *(05 marks)*
4. The table below shows a random variable ***x*** with the following probability distribution.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ***X*** | **1** | **2** | **3** | **4** | **5** |
|  |  | 2a |  | a |  |

Find the;

1. value of *a*
2. mean of *X. (05 marks)*
3. Solve the differential equation , given that *y = -1* when *x = 3*.

*(05 marks)*

1. The price index of an item rose by 1.75% between 2000 and 2021 and by 3.35% between 2021 and 2022. What is the 2022 price index based on 2000?

*(05 marks)*

1. Events *A* and *B* are such that , and .

Find;

1. *(02 marks)*
2. *(03 marks)*
3. The table shows the expenditures in shillings of a student for the year 2016 and 2019.

|  |  |  |  |
| --- | --- | --- | --- |
| **Item** | **Expenditure (Shs)** | | **Weight** |
| **2016** | **2019** |
| Textbooks | 100,000 | 120,000 | 3 |
| Pocket money | 50,000 | 70,000 | 2 |
| Shoes | 40,000 | 50,000 | 1 |

Using the year 2016 as the base year, calculate the weighted aggregate price index. *(05 marks)*

**SECTION B**

*You are required to select at least* ***one*** *question from each* Part*.*

*Each question in this* Section *carries fifteen marks.*

**Part I**

1. (a) Solve the simultaneous equation using matrix method;

x + 2y = 4

x + y = 3 *(05 marks)*

(b) Given that matrix , find the value of the scalar for which is a singular matrix where I is a 2 x 2 identify matrix**.** *(06 marks)*

(c) If , find . *(04 marks)*

1. (a) The seventh term of arithmetic progression (A.P) is 27 and the twelfth term is 47. Find the;
2. first term and common difference. *(06 marks)*
3. sum of first ten terms of the A.P. *(04 marks)*

(b) The second term of geometric progression (G.P) is and the sixth term is . Find the first term and the common ratio. *(05 marks)*

1. (a) Given that
2. Determine the turning point and its nature. *(05 marks)*
3. Sketch the curve. *(06 marks)*
4. Find the area of the region enclosed by the curve and x-axis.

*(04 marks)*

1. (a) Solve the equation for . *(07 marks)*

(b) It is given that and . If A is an obtuse angle and B is an acute angle, without tables or calculator, find the values of;

1. *(03 marks)*
2. *(02 marks)*

(c) Show that *(03 marks)*

**Turn Over**

**Part II**

1. The table below shows a frequency distribution of marks scored by 55 students in a test.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Marks | 10- | 20- | 30- | 40- | 50- | 60- | 70- | 80- 90 |
| Number of students | 2 | 6 | 12 | 15 | 10 | 6 | 3 | 1 |

1. Draw a histogram for the data and use it to estimate the modal.
2. Calculate the;
3. mean mark using the working mean 45
4. medium

*(15 marks)*

1. The table below shows scores by 10 students (A to J) in a Physics and Mathematics test.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Students | **A** | **B** | **C** | **D** | **E** | **F** | **G** | **H** | **1** | **J** |
| Mathematics | 28 | 20 | 40 | 28 | 21 | 31 | 36 | 29 | 33 | 24 |
| Physics | 30 | 20 | 40 | 28 | 22 | 35 | 35 | 27 | 31 | 23 |

1. (i) Plot a scatter diagram for the given data.

(ii) Draw a line of best fit on the scatter diagram.

1. Estimate the score in Mathematics for a student who scored 37 in Physics.

*(08 marks)*

1. Calculate the rank correlation coefficient for the data and comment on your result. *(07 marks)*
2. The table below shows sales by a local newspaper over a period of 12 weeks.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Week | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Copies sold | 315 | 378 | 490 | 430 | 510 | 580 | 565 | 595 | 640 | 660 | 628 | 670 |

1. Calculate the 3-point week moving average for the copies sold. *(06 marks)*
2. (i) On the same axes, plot the original data and 3-week moving averages.

*(06 marks)*

(ii) Use your graphs to estimate the number of copies sold in the 13th week.

*(03 marks)*

1. (a) The weights of 10,000 cattle on a commercial farm are normally distributed with mean of 115kg and a variance of 9kg.
2. If one of the cattle was selected at random from, find the probability that its weight would lie between 115kg and 118kg. *(03 marks)*
3. Find how many cattle would weigh between 109kg and 121kg.

*(06 marks)*

(b) The marks of 500 candidates in an examination are normally distributed with a mean of 45 marks and standard deviation of 20 marks. Given that the pass mark is 41, estimate the number of candidates who passed the examination.

*(06 marks)*

**END**