**S475/1**

**SUB - MATHEMATICS**

**Paper 1**

**Jul/Aug 2016**

**2 Hours 40 Minutes**



**MUKONO EXAMINATIONS COUNCIL**

**Uganda Advanced Certificate of Education**

**SUB - MATHEMATICS**

Paper 1

**Time: 2 Hours 40 Minutes**

**INSTRUCTIONS TO CANDIDATES**

* *Attempt* ***ALL*** *the Eight questions in section* ***A*** *and not more than* ***Four*** *Questions from Section B.*
* *Any additional questions answered will not be marked*
* ***All*** *working* ***must*** *be shown clearly.*
* *Begin each answer on a fresh sheet of paper.*
* *Graph papers are provided.*
* *Silent non- programmable scientific calculators and mathematical tables with a list of formulae may be used.*
* *Use g = 9.8ms-2 where applicable.*

**SECTION A (compulsory)**

1. The roots of the equation are α and β. Find the equation whose roots are and ***(5 marks)***
2. The eighth term of a geometric progression term is 12 the ninth term is 24. Find the;
3. common ratio
4. first term ***(5 marks)***
5. Three of the digits 1,2,5,8 and 9 were used to form a three digit number. Find the probability that number formed is even and greater than 200. ***(5 marks)***
6. Solve the deferential equation , If when ***(5 marks)***
7. The table shows the ages of 50 students offering a certain course at a college.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Age | 20 | 21 | 22 | 23 | 24 | 25 |
| Number of students | 7 | 9 | 10 | 12 | 7 | 5 |

Find (i) Mode.

(ii) Median

(iii) Mean. ***(5 marks)***

1. Solve the equation , For ***(5 marks)***
2. Two events A and B are independent such that and

Find;

(i)

(ii) P(AnB) ***(5 marks)***

1. A car took 50 minutes to move from town A to town B a distance of 85Km. if it passed town A with a velocity of 12km .

Find; (i) the acceleration of the car between A and B.

(ii) Velocity at B. ***(5 marks)***

**SECTION B**

1. The table below shows marks a warded by three judges in a debating competition.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Debaters | A | B | C | D | E |
| Judge 1 | 50 | 80 | 65 | 45 | 70 |
| Judge 2 | 48 | 75 | 81 | 60 | 55 |
| Judge 3 | 40 | 70 | 66 | 50 | 66 |

If the best debater is obtained by taking the highest average mark of the two judges whose correlation are in more agreement.

Find;

(a) Rank correction coefficients between;

(i) Judges 1 and 2.

(ii) Judges 1 and 3

(iii) Judges 2 and 3.

(b) Use the result in (a) above to find the best debater. ***(12 marks)***

1. (a) The position vectors are joined to form a triangle OPQ.

Determine;

(i) The length of the sides of triangle OPQ.

(ii) The angle between **OP** and **OQ. *(9 marks)***

(b) If and Find Hence find X given that AX = B. ***(6 marks)***

1. The table below shows the prices of five items and their corresponding weights for the years 2013 and 2015.

|  |  |  |  |
| --- | --- | --- | --- |
| ITEM | Price (Ugshs) | | Weight |
| 2013 | 2015 |
| Food | 8400 | 10080 | 43 |
| Clothing | 5200 | 6500 | 40 |
| Housing | 15000 | 18600 | 42 |
| Transport | 7000 | 9450 | 50 |
| School fees | 4000 | 4160 | 35 |

Taking 2013 as the base year

(a) Calculate

(i) Price relative of each commodity.

(ii) Simple aggregate price index and comment on your result. ***(10 marks)***

(b) Find the cost of living index and comment on your result. ***(5 marks)***

1. (a.) Given, Find when ***(4 marks)***

(b.) Given

(i) Determining the turning point and its nature.

(ii) Sketch the curve.

(iii) Find the area of the region enclosed by the curve and the x-axis. ***(11 marks)***

1. A discrete random variable x, has a probability distribution given below

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| X | 0 | 1 | 2 | 3 | 4 | 5 |
| P(X = x) | K | 3k | 8k | 6k | 4k | 2k |

Find;

(i) The value of K.

(ii) Mean and variable of x. ***(7 marks)***

(b) The random variable X has a probability function

Find

(i) The value of K,

(ii)

(iii)

(iv) Mean of x. ***(8 marks)***

1. a) In rectangle OABC, forces 11N, 12N and 6 N acts along the lines CB, BA and AO

respectively find the magnitude of the resultant force and the angle it makes with CB. ***(8 marks)***

(b) A box of mass 65kg is to be pushed along a rough floor by a force acting at the centre of its top surface. The force is in an angle of to the horizontal if the coefficient of friction is 0.25. Calculate the least force which will move the box.

***(7 marks)***

***End -***