**S475/1**

**SUBSIDIARY MATHEMATICS**

**PAPER 1**

**JULY/AUGUST 2019**

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**INTERNAL MOCK EXAMS 2018**

**Uganda Advanced Certificate of Education**

**SUBSIDIARY MATHEMATICS**

**Paper 1**

**2 HOURS 40 MINUTES**

**INSTRUCTIONS TO CANDIDATES**

Answer all the 8 questions in section A and only 4 questions from section B.

Any additional question(s) answered will not be marked.

Each question in section A carries 5marks while each question in section B carries 15marks.

All working must be shown clearly.

A graph paper should be provided.

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

Where necessary acceleration due to gravity g = 9.8ms-2.

**SECTION A**

1. Given the matrices and  find

(a) Matrix R such that  (3marks)

(b) The determinant of matrix R, (2marks)

2. The table shows the marks scored by students in a subsidiary mathematics test.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Marks(%) | 20 | 30 | 40 | 50 | 60 | 70 |
| Number of students | 4 | 8 | 10 | 9 | 5 | 2 |

(a) State the median (2marks)

(b) Calculate the mean mark (3marks)

3. The polynomial is divisible by x -1. It has a remainder of 16 when divided by x -2. Determine the values of a and b. (5marks)

4. A bag contains 4 blue pens and 3 red pens. A teacher picks two pens at random from the bag one at a time without replacement. Find the probability that;

(a) The pens are of different colors (3marks)

(b) All the pens are red (2marks)

5. Solve the differential equation given that y =10 when x =0. (5marks)

6. Solve the equation for  (5marks)

7. The table below shows the prices of items and their weights in the years 2005 and 2009

|  |  |  |  |
| --- | --- | --- | --- |
| **ITEM** | **PRICE(SHILLINGS)** | | **WEIGHTS** |
| 2005 | 2009 |
| Feeding  Rent  fuel | 80,000  51,000  22,000 | 96,000  60,000  32,000 | 5  3  1 |

Use 2005 as the base year, calculate the weighted aggregate price index for 2009. (5marks)

8. A train starts from rest at station A and accelerates uniformly at 2ms-2 for 5seconds and moves at a constant speed for 6 seconds and decelerates uniformly to rest for 4 seconds to station B. find the total distance covered by the train. (5marks)

**SECTION B**

9. The sales ( in thousands of shillings)of a mobile phone company for period 2012 to 2014 are given in the table below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **YEAR** | **Q U A R T E R S** | | | |
| **1** | **2** | **3** | **4** |
| 2012  2013  2014 | 1235  1275  1302 | 1242  1270  1280 | 1410  1450  1510 | 1400  1480  1500 |

(a) Calculate the four point moving averages (6marks)

(b) On the same axes plot graphs of the sales and the moving averages. Comment on the general trend for the 3 year period. (6marks)

(c) Use your graph to estimate the sales for the 1st quarter of 2015. (3marks)

10. (a) Given that . Show that, hence solve the

simultaneous equations and. (7marks)

(b) The roots of the equation are α and β. Find the equation whose roots are and  (8marks)

11. Given that. Find the coordinates of the stationary points of the curve and hence determine their nature. (15marks)

12. The table below shows the number of years a certain patient has taken drinking alcohol and the corresponding percentage of liver damage caused

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Patient | A | B | C | D | E | F | G | H | I | J |
| Number of years | 12 | 22 | 25 | 28 | 31 | 33 | 36 | 39 | 42 | 48 |
| Liver damage (%) | 30 | 50 | 55 | 35 | 60 | 72 | 60 | 72 | 70 | 75 |

(a) Draw a scatter diagram for the data. (4marks)

(b) Draw a line of best fit on your diagram. Use your line of best fit to find the percentage liver damage when the patient has taken 35 years while drinking alcohol. (6marks)

(c) Calculate the rank correlation coefficient and comment on your result. (5marks)

13. A continuous random variable Y has a probability density function given by 

Where k is a constant. Determine the

(a) Value of k (4marks)

(b) P (0 ˂ y ˂ 2) (4marks)

(c) Mean E(Y) (3marks)

(d) Variance, Var (Y) (4marks)

14. (a) A mass of 6kg and mass m kg are attached to each other by a light

inextensible string passing over a fixed light pulley. When the system is released from rest, the tension in the string is 20N, find the

(i) Acceleration of the system (5mrks)

(ii) Mass, m (2marks)

(b) A car of mass 1000kg is driven along on level road at a constant velocity of 80kmh-1. When the engine is working at a constant rate of 5000W, find the

(i) Resistance to motion of the car (3marks)

(ii) Maximum speed at which the car ascends a road of inclination 6o against the same resistance. (5marks)

**END**