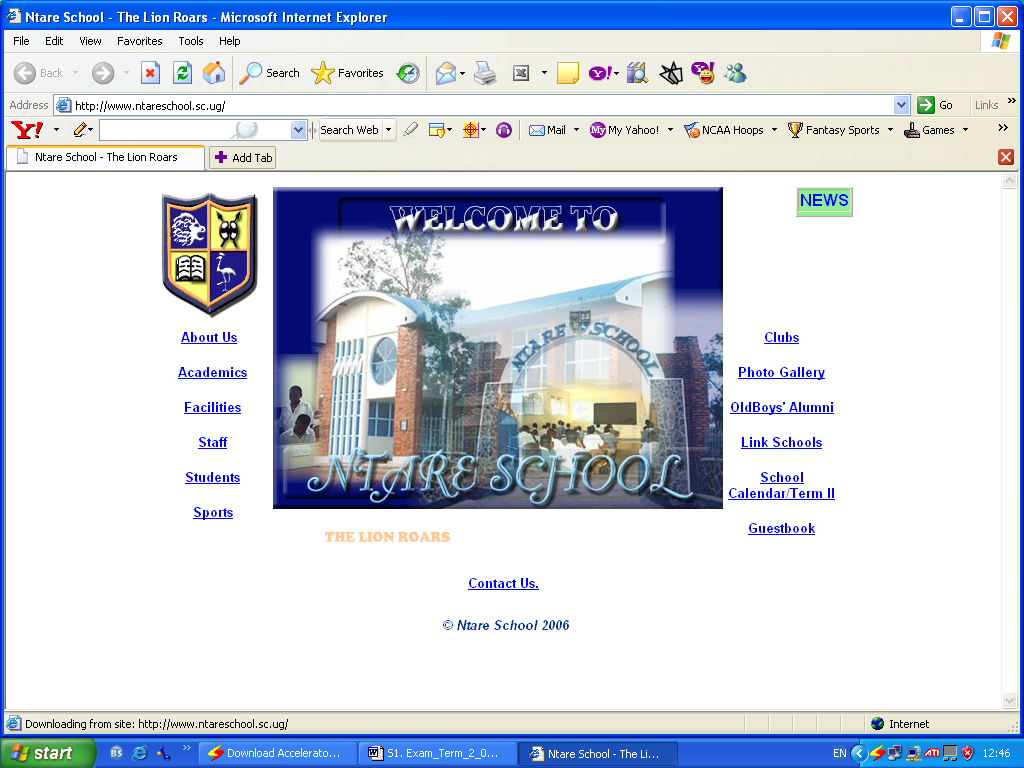
**NTARE** ****SCHOOL

**INTERNAL MOCK EXAMS, 2020**

***Uganda Advanced Certificate of Education***

**S. 6 SUBSIDIARY MATHEMATICS**

**2hrs 30minutes**

**INSTRUCTIONS:**

* *Attempt all questions in section* ***A*** *and not more than* ***4*** *questions from section* ***B****.*

**SECTION A: (40MKS)**

1. Given that (x + 1) and (x – 2) are factors of the Polyromial ax3 – 3x2 – bx + 2. Find the values of **a** and **b**. ***(5mks)***
2. The table below shows the ranks of marks a warded by Judge 1 (Rx) and Judge 2 (Ry) to 7 choir groups **A** to **G**.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Choir** | **A** | **B** | **C** | **D** | **E** | **F** | **G** |
| Rank judge 1(Rx) | 2 | 4 | 6 | 1 | 5 | 3 | 7 |
| Rank judge 2(Ry) | 2 | 3 | 5 | 1 | 6 | 4 | 7 |

Calculate spearman’s rank correlation coefficient between the marks awarded by the two judges.

Comment on your results. ***(5mks)***

1. Find the gradient of the curve y = 4x2(3x+2) at the point (1, 20). ***(5mks)***
2. Three events A, B and C are such that P(A) = 0.6, P(B) = 0.8, P(B/A) = 0.45 and

P(BnC) = 0.28.

Find; (a) P(AnB) ***(3mks)***

(b) P(C/B) ***(2mks)***

1. Given the matrices A = and B = . Find;
2. matrix C such that 3A – 2C + B = I, where **I** is a 2×2 identity matrix. (***3mks)***
3. the determinant of C ***(2mks)***
4. A class of **n** students sat for a mathematics test. Given that , and the mean X = 16, where **x** is the mark and **f** is the frequency, determine the value of;
5. **n**
6. the standard deviation. ***(5mks)***
7. The table below shows the age in years of mothers in the time they had their first child.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Age in years** | 15- | 20- | 25- | 30- | 35- | 40 – 45 |
| **Number of mothers** | 2 | 14 | 29 | 43 | 33 | 9 |

Calculate the modal age of the mothers. ***(5mks)***

1. A cyclist rides along a straight road from shop **P** to shop **Q**. He passes shop **P** with a velocity of 2ms-1 and accelerates uniformly at 1.25ms-2 until he attains a velocity of 12ms-1 at shop **Q**. Find the;
2. time taken by the cyclist to reach **Q**
3. distance **PQ** ***(5mks)***

**SECTION B: (60MKS)**

1. The table below shows the marks of 8 students in the mid – term test and end of term test in Economics.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Mid-term test (x) | 99 | 71 | 50 | 67 | 77 | 81 | 96 | 72 |
| End of term test (y) | 99 | 55 | 35 | 60 | 75 | 70 | 99 | 50 |

1. (i) Draw a scatter diagram for the data. ***(5mks)***

(ii) On the same diagram, draw the line of best fit

(iii) Use the line of best fit to find the value of **y** when **x** = 85. ***(2mks)***

1. Calculate the spearman’s rank correlation coefficient. Comment on your result. (***4mks)***
2. Given the curve y = 3x3 – 4x2 – x.
3. Find the turning points of the curve ***(6mks)***
4. Distinguish between the nature of the turning points. ***(6mks)***
5. The table below shows the number of bags of sugar sold by a certain wholesale shop from the year 2009 to 2012.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Year** |  | **Quarter** |  |  |
|  | **1st** | **2nd** | **3rd** | **4th** |
| 2009 | 192 | 280 | 320 | 260 |
| 2010 | 300 | 360 | 380 | 270 |
| 2011 | 342 | 420 | 430 | 320 |
| 2012 | 424 | 480 | 510 | 412 |

1. Calculate the four-point moving averages for the data. ***(6mks)***
2. (i) On the same axes, plot the original data and the four-point moving averages.

***(5mks)***

(ii) Comment on the trend of the number of bags of sugar sold over the four-year period. ***(1mk)***

(iii) Use your graph to estimate the number of bags to be sold in the first quarter of 2013 ***(3mks)***

1. A continuous random variable X has a probability density function given by;

f(x) =

where K is a constant.

1. Find; (i) the value of k ***(3mks)***

(ii) P(X 1.5) ***(2mks)***

(iii) the mean of X, E(X) ***(3mks)***

1. Sketch the graph of f(x). ***(4mks)***
2. The roots of the equation 2x2-6x+7= 0 areand . Determine the;
3. Values of (- )2 and + ***(6mks)***
4. Quadratic equation with integral coefficient whose roots are

- ) 2 and + ***(6mks)***

1. (a) The diagram below shows three forces FN, 4N and 8N acting on a particle.

4N

300

8N

If the forces are in equilibrium, find the value of;

1. F ***(6mks)***

(b)In the rectangle ABCD, AB = 4m and BC = 3m. Forces of magnitudes 3N, 10N, 4N, 6N and 5N act in the directions of the letters AB, BC, CD, DA and AC respectively. Taking AB as horizontal, find the magnitude of the resultant force. ***(6mks)***

***END.***