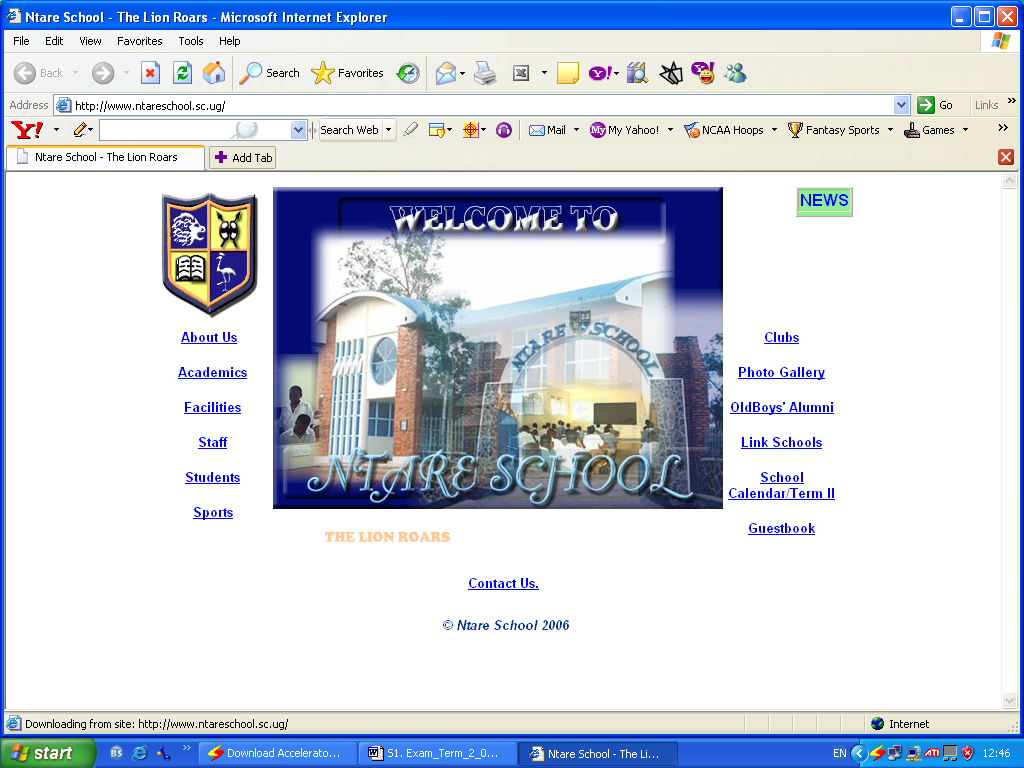
NTARE **** SCHOOL

# S.6 INTERNAL MOCK EXAMS 2020

**P425/2**

# Mathematics

**Paper 2**

**SECTION A: (40MKS)**

1. Forces N, N and N act on a body of mass 2kg. Find the magnitude of the acceleration. ***(5mks)***
2. The table below shows the times to the nearest second taken by 100 students to solve a problem.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Time (s) | 80 – 49 | 50 – 64 | 65 – 69 | 70 – 74 | 75 - 79 |
| No. of students | 10 | 30 | 25 | 20 | 15 |

Calculate the varance of distribution correct to one decimal place. ***(5mks)***

1. (i) Use the trapezium rule with equal strips of width to find an approximation for . Give your answer to 4 significant figures.

(ii) comment on how you could obtain a better approximation to the value of the integral using the trapezium rule.

1. P, Q and R are points of a straight road such that = QR = 0.2m. a cyclist moving with a uniform acceleration passes P and then notices that it takes 10s and 15s to travel between PQ and QR respectively Find
2. his acceleration
3. the velocity with which he passes P.
4. In certain school, 15% of the students like rice. Find the probability that in a sample of 300 students in the school over 50 students like rice.
5. Study the flow chart below.

n=0

n = n+1

1S

T0L ?

?

XnH =

READ: , ToL

YES

RINY N, XnH

1. Using the flow chart perform a dry run for and TOL = 0.0005. ***(04mks)***
2. What is the purpose of the flow chart? ***(01mk)***
3. Find the centre of gravity of the remainder of the square ABCD of the circle radius 3cm is removed as shown below.

D C

3c 3cm

1 10cm

A B

10cm

1. A discrete random variable X has the following probability distribution.

|  |  |  |  |
| --- | --- | --- | --- |
|  | 1 | 2 | 3 |
| P | 0.1 | 0.6 | 0.3 |

Find (i) E

(ii) Var

**SECTION B: (60MKS)**

Answer any five questions from this section. All questions carry equal marks.

1. X is a random variable such that

;

;

0 , elsewhere

(a) (i) Sketch the graph of the p.df

(ii) Determine the value of the constant . (06mks)

(b) Find the

(i) mean of X

(ii) 60th percentile. ***(06mks)***

1. (a) A pump draws water from a tank and issues it at a speed of form the end of a hose of cross sectional area 5cm2, situated 4m above the level from which the water is draw. Find the rate at which the pump is working.  ***(5mks)***

(b) A car of mass 800kg moves against a constant resistance RN, the maximum speeds of the car up and down an incline of 1 in 16 are and respectively. If the rate at which the engine is working is HKW find the

(i) values of R and H.

(ii) Acceleration at the instant when the speed is on level ground. ***(7mks)***

1. Given the equation
2. (i) Show that the equation has a root between ***(03mks)***

(ii) Hence use linear interpolation to obtain an approximation of the root. ***(03mks)***

1. Use Newton Raphson’s formular to find the root of the equation by performing two interactions correct to two decimal places.  ***(06mks)***
2. (a) The marks of a certain electric light bulbs is normally distributed with mean life of 2000 how and standard deviation of 120 hours. Estimate the probability that the life of such bulbs will be
3. Greater than 2015 hours.
4. Between 1850 hours and 2090 hours. ***(08mks)***
5. Wavah industry manufactures light bulbs that have a length of life time that are normally distributed with a standard deviation of 40 hours. It a random sample of 36 bulbs have an average life of 780 hours, find the 99.9% confidence interval for the mean of the entire bulb. ***(04mks)***
6. (a) At a time t, the position vector of a particle of mass 2kg is (cost m. show that the force acting on the particle when seconds of magnitude .

(b) A particle is moving so that at any instant, its velocity vector V is given by V = when it is at the point . Find the magnitude of the acceleration at seconds.

1. The numbers A and B are rounded off to and with errors and respectively.
2. Show that the absolute relative error in the product AB is given by.

***(05mks)***

1. Given that A= 6.43 and B = 37.2 are rounded off to the given number of decimal places medical place indicated
2. State the maximum possible errors in A and B.
3. Determine the absolute error in AB
4. Find the limits with in which the produced AB likes. Give your answer to 4 decimal places.
5. (a) Prove that if a particle moving with linear simple harmonic motion (S.H.M) of amphtude A has a velocity V when distant from the centre of its path then

V = where W = constant

1. A particle is travelling with linear S.H.M has speeds and when distant 1m and 2m respectively from the centre of oscillation. Calculate the amplitude and the maximum velocity of the particle.
2. The table below shows the percentage of sand of in the soil at different depths (in cm)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Soil depth | 35 | 65 | 55 | 25 | 45 | 75 | 20 | 90 | 57 | 60 |
| Percentage of sand | 86 | 70 | 84 | 92 | 79 | 68 | 96 | 58 | 86 | 77 |

1. (i) Calculate the rank correlation coefficient between the two variables.

(ii) Comment on the significance level at 5% level.

1. (i) Draw a scaller diagram for the data and comment on your result.
2. Draw a line of best fit hence estimate the:

* Percentage of sand in the soil at a depth of 31cm.
* Depth of soil with 54% sand.

**END**