DEPARTMENT OF EDUCATION

HIGHER SCHOOL CERTIFICATE EXAMINATIONS

MATHEMATICS *B*

Thursday

21 October 2010

Time allowed:

2 hours and 15 minutes

(8:00am – 10:15 am)

NO EXTRA TIME

(NO OTHER TIME)

Candidates are advised to fully utilise the allocated time

MB

INSTRUCTIONS TO CANDIDATES

To be read by the external invigilator to all candidates

1. There are **4** printed pages in the question booklet and **7 printed** pages in the answer booklet. There is a one-page formula sheet included as an insert.
2. The answer booklet is enclosed in the centre of this booklet. Take out the answer booklet now.
3. Check that you have the correct number of pages.
4. Write your 10-digit candidate number, your name and your school name in the space provided in the answer booklet.
5. This paper contains 14 questions in 2 sections:
   Section A has 7 questions worth 3 marks each. (21 marks)
   Section B has 7 questions worth 7 marks each. (49 marks)
   Total : 70 marks
   Answer **ALL** questions.
6. Calculators, rulers and protractors are allowed.
7. Answer all questions on the answer sheet. Answers on any other paper including rough work paper and the question paper **will not be marked**
8. ALL working must be shown step by step to get full marks. Students may lose marks for writing down final answers only.
9. Enough spaces have been allocated for answers to every question. Questions must be answered in spaces as allocated. Answers all over the answer booklet may not be marked.
10. Erasers and Correctional Fluid are not allowed on the answer sheet. Where you have made an error, cross out all the working and start on a new line.
11. **Graphical Calculators are NOT permitted.**

THE PENALTY FOR CHEATING OR ASSISTING TO CHEAT IN NATIONAL EXAMINATIONS IS NON-CERTIFICATION.

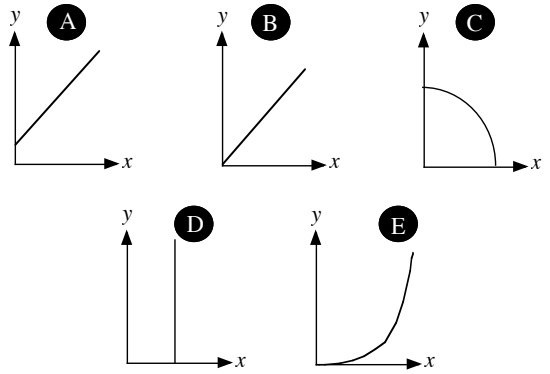
DO NOT TURN OVER THE PAGE AND DO NOT WRITE UNTIL YOU ARE TOLD TO START.

SECTION A (Questions 1 to 7)

These questions are worth 3 marks each.

QUESTION 1

Study the sketches of the 5 graphs below.



Which graph represents

(i) $y = 2x^2$ *(1)*

(ii) $y - 2x = 3$ *(1)*

(iii) $x = 4$ *(1)*

QUESTION 2

Kalaro buys 4 packets of biscuits and three soft bottles of drinks for K11.70. In the same store, Tambala spends K4.70 for 2 packets of biscuits and one bottle soft drink, of the same brands.

Find the cost of one packet of biscuits. *(3)*

QUESTION 3

In a right angled triangle tan ø = $\frac{5}{7}$.

Find the exact values of

(i) sin ø *(1)*

(ii) cos ø *(1)*

(iii) the area of the triangle. *(1)*

QUESTION 4

Areng invests K10,000.00 in an account which pays 5% interest per annum and compounded 6 monthly.

Find the value of Areng's investment after the 10^{th} year.

(3)

QUESTION 5

A die and a 10 toea coin are tossed on a flat table together. Results are then observed.

Find the probability of obtaining

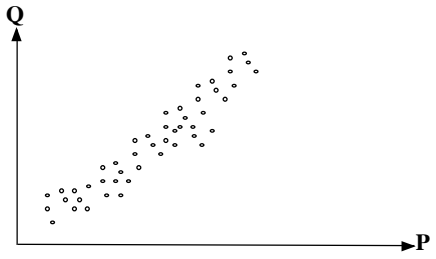
(i) six and a head. *(1)*

(ii) a number greater than 4 and a head. *(1)*

(iii) an even number and a tail. *(1)*

QUESTION 6

Study the scattergram below.



(i) What kind of correlation relationship is there between P and Q? *(1)*

(ii) If the line of best fit passes through the origin and (4,16), determine the equation of the line of best fit.

(2)

QUESTION 7

Solve for x in $\frac{3x-6}{x} = x-2$

(3)

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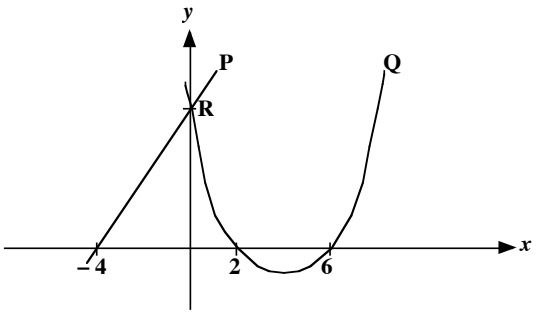
SECTION B (QUESTIONS 8 TO 14)
These questions are worth 7 marks each.

QUESTION 8

The graph below shows straight line P and parabola Q. P and Q intersect at point R.

NOT DRAWN TO SCALE



Given that the coeffecient of a in the quadratic equation $y = ax^2 + bx + c$ is 1.

Use the solutions from the graph to

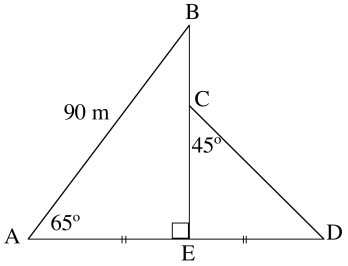
(i) Find the equation of the parabola Q. *(3)*

(ii) Find the coordinates of the point R? *(1)*

(iii) Determine the equation of the line P? *(3)*

QUESTION 9

In the diagram below AB = 90 m; AE is equal to ED, ∠EAB = 65° and ∠ECD = 45°



(i) Calculate the length AE. *(1)*

(ii) Find the distance BC. *(3)*

(iii) Calculate the total area of the figure. *(3)*

QUESTION 10

An aircraft has 36 seats available for passengers. The cost per adult is K948 and K748 per child to fly from Port Moresby to Vanimo. A total of K28,648.00 was raised on this flight which had all seats fully sold out.

Let x be the number of adults.

(i) Write the expression for the number of adults passengers in terms of x. *(1)*

(ii) Express the total number of children in terms of x. *(1)*

(iii) Write the expression for the total amount of money collected using x. *(1)*

(iv) Solve the equation in (iii). *(3)*

(v) How many children were on the flight? *(1)*

QUESTION 11

The bearing of a point A is 330° from P and the bearing of another point B is 290° from P. Both A and B are due north of point C which is 7600 m due west of P.

(i) Draw a diagram to represent the above information. *(3)*

(ii) Find the distance AB *(4)*

QUESTION 12

Use the information in the table below to answer the questions that follow.

Score (x)	Frequency (f)
1	5
2	4
3	3
4	2
5	1

(i) Draw a histogram to illustrate the data above on your answer sheet. *(3)*

(ii) What is the total of all the scores? *(1)*

(iii) What is the modal score? *(1)*

(iv) If 1 is subtracted from each score, what happens to the mean and standard deviation? *(2)*

QUESTION 13

Study the two cases below.

1. Taniwei invests K8,600 in a bank. The bank pays 10% interest compounded annually.
2. Waflou decides to invest the same amount in a bank that pays 15% simple interest per annum.

Calculate the difference in the interest earned by Taniwei and Waflou after 10 years. *(7)*

QUESTION 14

Auli buys a used car from Japan for 2,600 US dollars at the exchange rate of

1PNG Kina = 0.334 US Dollars.

The car was shipped to PNG. Before he could collect the car, Auli must pay 85% of the cost of purchase as wharfage fees and customs taxes.

(i) Calculate the price of the car in PNG Kina. *(1)*

(ii) Calculate the amount paid as customs taxes and wharfage fees. *(1)*

(iii) Calculate the total cost incurred by Auli before he could get the vehicle. *(2)*

(iv) If he decides to sell the vehicle for 20% profit, what should be the selling price? *(2)*

END OF EXAMINATION