09010021/2&1 B.B.E.K.O
October 2021
MATHEMATICS 2&1
Essay & Objective
2 hours

2 &1

Name.....

Index Number.....

BEST BRAIN EXAMINATIONS KONSORTIUM

GHANA

Special Private Mock Examinations For BECE Candidates

October 2021

MATHEMATICS 2 & 1

2 hours

Do **not** *open this booklet until you are told to do so. While you are waiting, read and observe the following instructions. Write your* **name** *and* **index number** *in the spaces provided above.*

This booklet consists of two papers. Answer Paper **2** *which comes first, in your answer booklet and Paper* **1** *on your Objective Test answer sheet. Paper* **2** *will last* **1** hour *after which the answer booklet will be collected. Do* **not** *start Paper* **1** *until you are told to do so. Paper* **1** *will last* **1** hour.

The use of calculators is **not** *allowed.*

PAPER 2
Essay

1 hour

Answer **four** *questions* **only.**

All questions carry equal marks

All workings must be clearly shown. Marks will **not** *be awarded for correct answers without corresponding working.*

1. (a) The lengths of the sides of a triangle are in the ratio 2: 3: 4. The shortest side is 14cm long, find the;

(i) lengths of the other two sides.

(ii) difference between the longest and the shortest sides.

(b) The volume, V of cone of height, h and base radius is given by the formula $V=\frac{1}{3}\pi r^2 h$

(i) Make r the subject of the formula.

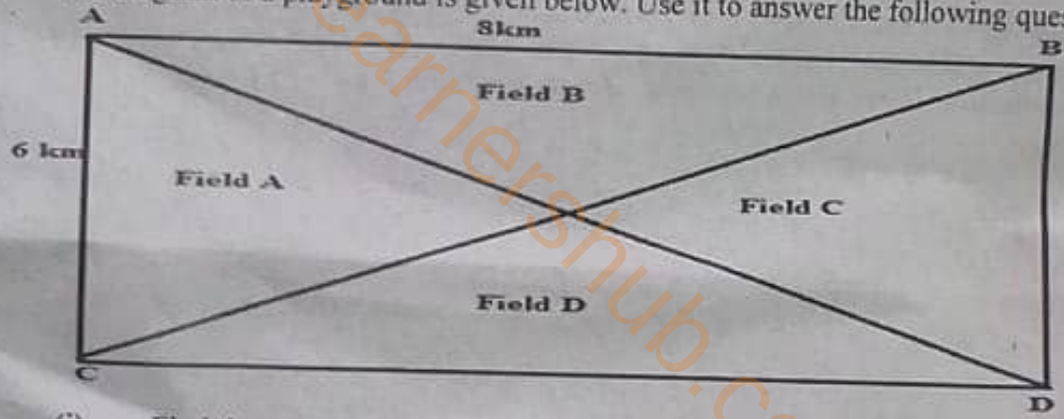
(ii) Find the base radius of a cone of height 14cm and volume $14\frac{2}{3}cm^3$ [Take $\pi = \frac{22}{7}$]

(c) In a school of 900 pupils, 30% study English, $\frac{2}{5}$ study Social studies and 150 study RME. If the remaining study Mathematics, Find the

(i) number of pupils who study mathematics;

(ii) percentage for Mathematics.

(d) The diagram of a playground is given below. Use it to answer the following questions.



(i) Find the total area of the rectangular field.

(ii) Find the perimeter of the entire field.

(iii) If during a competition, Field A and D are used, find the perimeter of ACD.

(iv) An investor took a loan of 300, 000 Ghana Cedis from the bank to buy Field B and C from the school. The school decides to sell it using this ratio 1km: 10,000 Ghana Cedis. Find the total amount the investor has to pay for the plot of land and the remaining balance.

2. (a) The data shows the distribution of marks in a Mathematics class test.

16	23	13	22	9
41	26	16	35	42
29	24	38	24	6
17	18	12	7	12
26	17	25	18	7
24	15	18	33	25

(i) Make a Stem and Leaf plot of the data;

(ii) Find the mode and median of the data.

(iii) What is the probability of a student scoring greater than 20 marks?

(b) Atsu and Sabu shared an amount of money in the ratio 3:7 respectively. Sabu received GH₵20.00 more than Atsu.
(i) How much was shared?
(ii) Find each person's share.

(c) The table below shows the sales of different items of a baker's shop. Illustrate the information on a pie chart.

Item	Regular Bread	Tea Bread	Wheat Bread	Cakes	Biscuits
Sales (Ghc)	320	80	160	120	40

(d) A map is drawn to a scale of 1: 50 000. Find the:
(i) distance on the map between two places that are 10 km apart.
(ii). actual distance between two places that are 8.5cm apart on the map.

3. (a) Evaluate the following:

(i) $\frac{0.0048 \times 0.81 \times 10^{-7}}{0.027 \times 0.04 \times 10^{6}}$, leaving your answer in the form $ax10^{n}$, where n is an integer and $a<10$

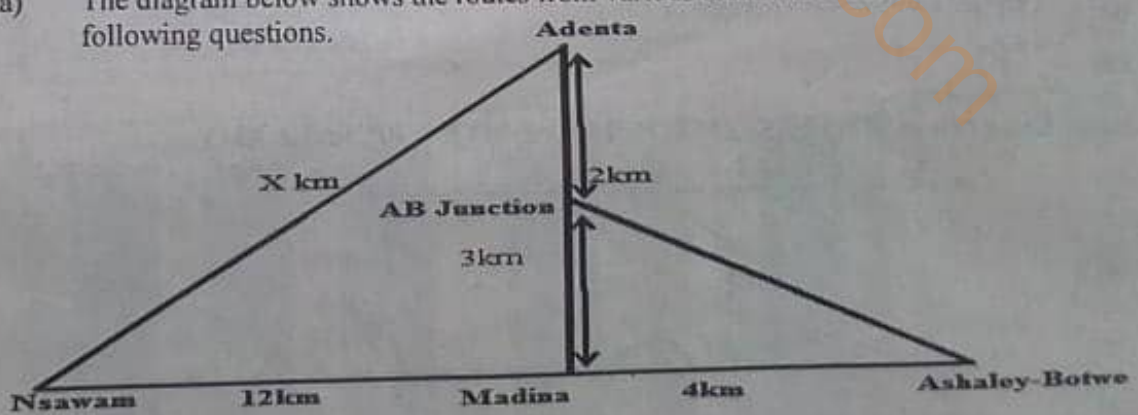
(ii) $(3t)^2 - 3m^2, if\ t = -2\ and\ m = -3.$

(b) In Amasaman district, 50,000 people were vaccinated against covid 19, with 25,000 taking the Astra-Zeneca (AZ) shot and 30,000 took the Moderna (M) shot.
(i) Using a scale of 1: 1,000 individuals, represent the data on a Venn-diagram.
(ii) Find the total number of people who took both vaccines. Convert the number back into the raw values using the scale.
(iii) With the exception of the Moderna vaccine, the other vaccines are supposed to be taken twice. If the government supplied 10,000 jabs of the Astra-Zeneca, how many people are not going to be fully vaccinated?
(iv) If the total population of the inhabitants of Amasaman is 150,000 and the government supplies 50,000 samples of Pfizer vaccine, find the new number of those vaccinated.

(c) A cylinder has diameter 14cm and volume 924cm^3. Taking $\pi = \frac{22}{7}$, find the
(i) height of the cylinder;
(ii) curved surface area of the cylinder.

(d) In a church, $\frac{7}{10}$ of the congregation are women. Half of the women are not married. If there are 240 people in the congregation, how many women are married?

4. (a) The diagram below shows the routes from various locations to Adenta. Use it to answer the following questions.



(i) Calculate the distance from Nsawam to Adenta.
(ii) Calculate the distance from Ashaley-Botwe to AB Junction.
(iii) What is the shortest and longest distance to Madina?
(iv) What is the distance from Nsawam to AB Junction and then to Ashaley-Botwe?
(v) If the fare per km is 2 Cedis, calculate the respective fares of Nsawam to Adenta, AB Junction to Adenta and Madina to Nsawam.

Turn over

(b) The sum of the interior angles of a regular polygon is 900^0.
(i) Find the number of sides of the polygon.
(ii) What is the name of the polygon?

(c) Find the solution set of the inequality $\frac{1}{3}(5x-2) > \frac{4}{9}(7x-4) - \frac{1}{3}$, where $x \in \{-3, -2, -1, 0, 1, 2, 3, 4\}$

(d) A number is chosen at random from the integers 10 to 30 inclusive.
(i) Write down the set of outcomes.
(ii) Find the probability that the number is a multiple of 3.
(iii) Find the chance of obtaining a multiple of 5.
(iv) Find the probability that the number is a perfect square.

5. (a) Using a ruler and a pair of compasses only,
(i) construct triangle ABC such that $|AB| = 8cm$, $\angle CBA = 45° \angle CAB = 60°$;
(ii) draw the bisector of $\angle ACB$ to meet $|AB|$ at T;

(b) From the figure drawn in (a) above,
(i) measure $|CT|$
(ii) measure $\angle CTB$

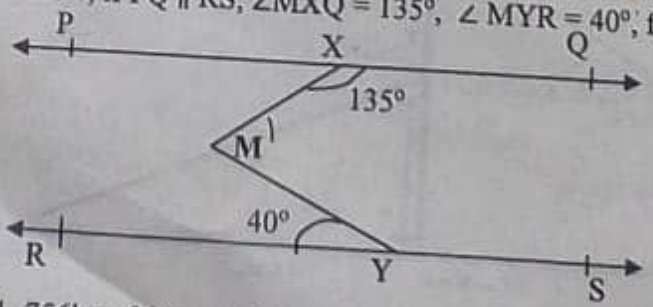
(c) A car consumes 10 gallons of fuel to travel a distance of 220 miles. Assuming a constant rate of consumption, how many gallons are needed to travel 330 miles?

(d) If the VAT rate is 15% and a person buys an item for $3,000 VAT inclusive, calculate the
(i) real cost of the item.
(ii) VAT paid by the person.

6. (a) Using a scale of 2cm to 2 units on both axes, draw on a sheet of graph paper two perpendicular axes Ox and Oy for the intervals $-10 \leq x \leq 10$ and $-10 \leq y \leq 10$. Draw on this graph, indicating the coordinates of all vertices:
(i) Δ **PQR** with vertices **P**(4, 1), **Q** (2, 5), and **R**(-2, 0)
(ii) The image Δ **ABC** of Δ PQR under the mapping $\begin{pmatrix} x \\ y \end{pmatrix} \rightarrow \begin{pmatrix} 2y \\ x-y \end{pmatrix}$ where P → **A**, Q→ **B** and **R**→ **C**.
(iii) The image Δ **DEF** of Δ **PQR** under an enlargement from the origin with scale factor -2 where **P**→ **D**, **Q**→ E, and **R** → **F**

(b) From the above, find
(i) $|\overrightarrow{BE}|$
(ii) $|\overrightarrow{CF}|$

(c) In the figure below, if PQ ∥ RS, ∠MXQ = 135°, ∠ MYR = 40°, find ∠ XMY



(d) Julie bought 1, 756kg of frozen chicken weight, 675g of vegetables and 95g of corn oil from a shopping mall? What is the total weight of the items she bought in kilograms?

END OF ESSAY TEST