WASSCE / WAEC MAY / JUNE 2016 CORE / GENERAL MATHEMATICS PAPER 2 (THEORY)

SC 4022
WASSCE 2016
GENERAL
MATHEMATICS/
MATHEMATICS
[CORE] 2

2

$2\frac{1}{2}$ hours

Name:.....

Index Number:.....

THE WEST AFRICAN EXAMINATIONS COUNCIL

West African Senior School Certificate Examination for School Candidates

GENERAL MATHEMATICS/MATHEMATICS [CORE] 2

SC 2016 [100 marks] $2\frac{1}{2}$ hours

Write your **name** *and* **index number** *in the spaces provided at the top right-hand corner of this booklet.*

Answer **ten** questions in all; **all** *the questions in* Section A *and* **five** *questions from* Section B.

In **each** *question, all necessary details of working, including rough work,* **must** *be shown with the answer.*

Give answers as accurately as data and tables allow.

Graph papers are provided for your use in the examination.

The use of non-programmable, silent and cordless calculator is allowed.

SECTION A

[40 marks]

Answer **all** *the questions in this section.*

All *questions carry equal marks.*

1. *(a)* Without using Mathematical tables or calculators,

evaluate $\frac{0.09 \times 1.21}{3.3 \times 0.00025}$,

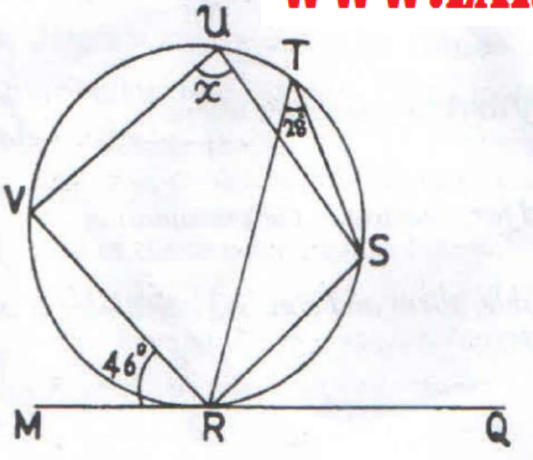
leaving the answer in standard form (Scientific Notation).

(b) A principal of GH¢5,600.00 was deposited for 3 years at compound interest. If the interest earned was GH¢1,200.00, find, correct to 3 significant figures, the interest rate per annum.

2. *(a)* Solve: $7(x + 4) - \frac{2}{3}(x - 6) \leq 2[x - 3(x + 5)]$.

(b) A transport company has a total of 20 vehicles made up of tricycles and taxicabs. **Each** tricycle carries 2 passengers while **each** taxicab carries 4 passengers. If the 20 vehicles carry a total of 66 passengers at a time, how many tricycles does the company have?

3. *(a)*



In the diagram, $\angle RTS = 28^\circ$, $\angle VRM = 46^\circ$, MQ is a tangent to the circle $VRSTU$ at the point R. Find $\angle VUS$.

(b) A cylindrical tin, 7 *cm* high, is closed at one end. If its total surface area is 462 cm^2, calculate its radius.

[Take $\pi = \frac{22}{7}$]

4.

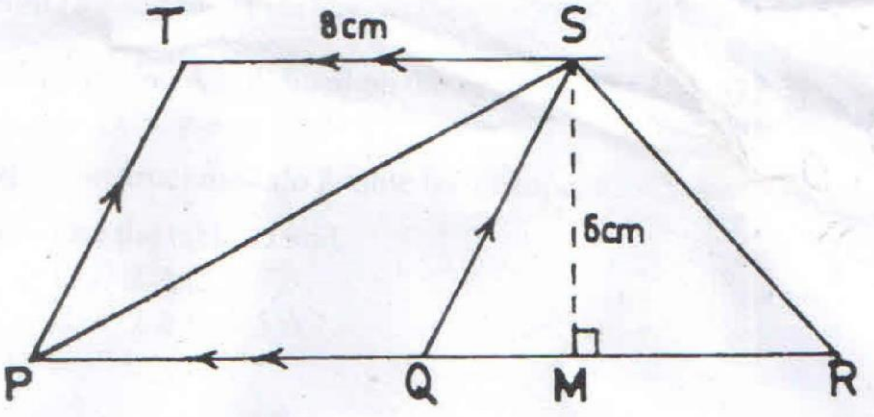
Scores	1	2	3	4	5	6
Frequency	25	30	x	28	40	32

The table shows the outcome when a die is thrown a number of times. If the probability of obtaining a 3 is 0.225:

(a) how many times was the die thrown?

(b) calculate the probability that a trial chosen at random gives a score of an even number **or** a prime number.

5. *(a)*



In the diagram, *PQST* is a parallelogram, *PR* is a straight line, $|TS| = 8\ cm$, $|SM| = 6\ cm$ and area of triangle $PSR = 36\ cm^2$. Find the value of $|QR|$.

(b) A tree and a flagpole are on the same horizontal ground. A bird on top of the tree observes the top and bottom of the flagpole below it at angles of 45° and 60° respectively. If the tree is 10.65 *m* high, calculate, correct to 3 significant figures, the height of the flagpole.

SECTION B

[60 marks]

Answer **five** *questions* **only** *from this section.*

All *questions carry equal marks.*

6. *(a)* Find the sum of the Arithmetic Progression (*AP*) 1, 3, 5, ..., 101.

(b) Out of the 95 travellers interviewed, 7 travelled by bus and train only, 3 by train and car only and 8 travelled by all three means of transport. The number, x, of travellers who travelled by bus only was equal to the number who travelled by bus and car only. If 47 people travelled by bus and 30 by train:

(i) represent this information in a Venn diagram;

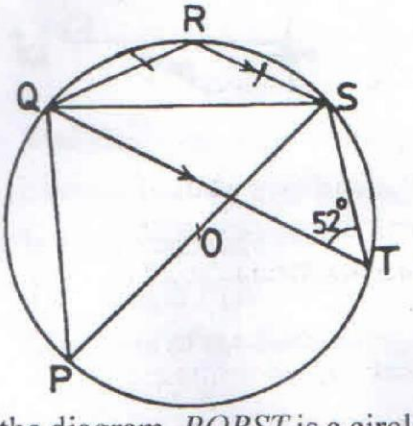
(ii) calculate the

I. value of x;

II. number who travelled by **at least** two means.

7. *(a)* Using completing the squares method, solve, correct to 2 decimal places, $\frac{x-2}{4} = \frac{x+2}{2x}$.

(b)

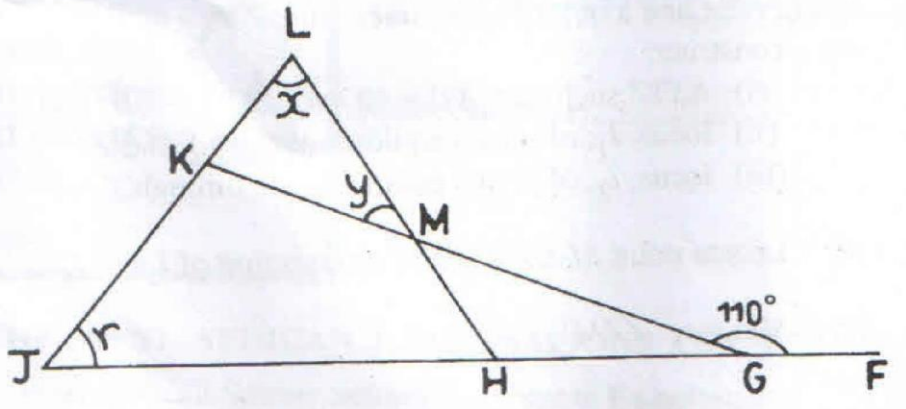


In the diagram, $PQRST$ is a circle with centre O. If PS is a diameter, $RS//QT$, $|QR| = |RS|$ and $\angle QTS = 52^\circ$, find:

(i) $\angle SQT$;

(ii) $\angle PQT$.

8. *(a)*



In the diagram, $\angle KLM = x$, $\angle LMK = y$, $\angle KJH = r$ and $\angle KGF = 110°$. If $2x = r = y$, find the value of x.

(b) Ten boys and twelve girls collected donations for a project. The total amount collected by the boys was ₦600.00 greater than that collected by the girls. If the average collection of the boys was ₦100.00 greater than the average collection of the girls, how much was collected by the two groups?

9. The weight (in *kg*) of 50 contestants at a competition is as follows:

65	66	67	66	64	66	65	63	65	68
64	62	66	64	67	65	64	66	65	67
65	67	66	64	65	64	66	65	64	65
66	65	64	65	63	63	67	65	63	64
66	64	68	65	63	65	64	67	66	64

(a) Construct a frequency table for the discrete data.

(b) Calculate, correct to 2 decimal places, the:
(i) mean;
(ii) standard deviation;
of the data.

Turn over

10. Using ruler and a pair of compasses only,

(a) construct:

(i) ΔXYZ such that $|XY| = 10\ cm$, $\angle XYZ = 30°$ and $\angle YXZ = 45°$;

(ii) locus, l_1, of points equidistant from Y and Z;

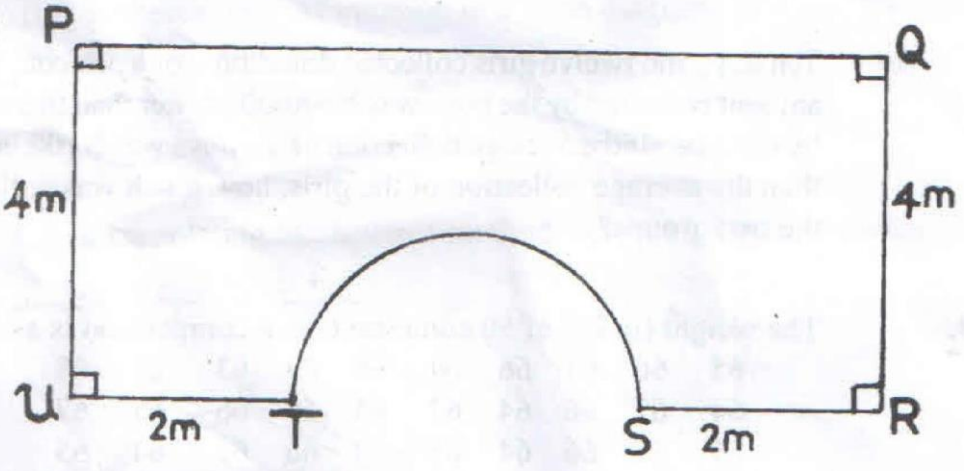
(iii) locus, l_2, of points parallel to XY through Z.

(b) Locate point M, the point of intersection of l_1 and l_2.

(c) Measure $\angle ZMY$.

11. *(a)* If $\frac{3p + 4q}{3p - 4q} = 2$, find $p : q$.

(b)



The diagram shows the cross section of a bridge with a semi circular hollow in the middle. If the perimeter of the cross section is 34 m, calculate the:

(i) length PQ;

(ii) area of the cross section.

[Take $\pi = \frac{22}{7}$]

12. *(a)* Copy and complete the table of values, correct to one decimal place, for the relation $y = 3\sin x + 2\cos x$ for $0^\circ \leq x \leq 360^\circ$.

x	0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°	360°
y	2.0			3.0	1.6		−2.0		−3.6	−3.0			2.0

(b) Using scales of 2 *cm* to 30° on the x-axis and 2 *cm* to 1 unit on the the y-axis, draw the graph of the relation $y = 3\sin x + 2\cos x$ for $0° \leq x \leq 360°$.

(c) Use the graph to solve:

(i) $3\sin x + 2\cos x = 0$;

(ii) $2 + 2\cos x + 3\sin x = 0$.

13. *(a)* Find the equation of a straight line which passes through the point $(2, -3)$ and is parallel to the line $2x + y = 6$.

(b) The operation Δ is defined on the set $T = \{2, 3, 5, 7\}$ by $x \Delta y = (x + y + xy) \bmod 8$.

(i) Construct modulo 8-table for the operation Δ on the set T.

(ii) Use the table to find:

I. $2 \Delta (5 \Delta 7)$;

II. $2 \Delta n = 5 \Delta 7$.