Royal College – Colombo 07

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Grade 10- Second Term Test – 2024 (August)

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Mathematics-I

ගණිතය - I

Time: 2 hours
කාලය : පැය 2

Name / Index No:.....

Certified Correct

.....
Signature of Invigilator

Important:

- This paper consists of 8 pages.
- Write your **Index Number** correctly in the appropriate places on this page and on page three.
- Answer all questions on this paper itself.
- Use the space provided under each question for working and writing the answer.
- It is necessary to indicate the relevant steps and the correct units in answering the questions.
- Marks will be awarded as follows.
  Two marks each for questions 1 - 25 in part **A**.
  Ten marks each for questions in part **B**.
- A blank paper can be obtained for rough work from the supervisor on your request.

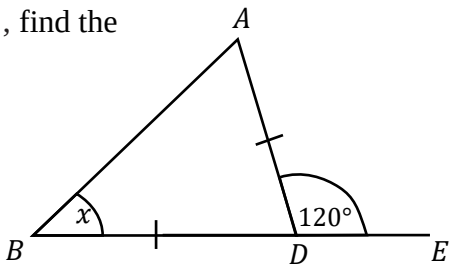
For Marking Examiner's use only		
Part	**Question Number**	**Marks**
A	**1 - 25**	
B	**1**	
	2	
	3	
	4	
	5	
Total		
Signature of Invigilator		

PART A

*Answer **all questions** on the **paper itself***

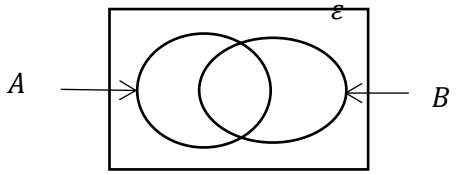
1) If customs duty of 10% of the value of the item has to be paid when a certain type of clock is imported, how much duty has to be paid when a clock of this type of value $Rs.\,5\,000$ is imported?

2) In the triangle ABD, the side BD has been produced to E. If $BD = AD$, find the value of x according to the information given in the figure.



3) Simplify: $\frac{2n}{5m^2} - \frac{3}{2m}$

4) In the given Venn diagram, shade the region $A \cap B'$



5) Simplify and express the answer with positive index: $\frac{x^2(y^{-1})^2}{xy}$

6) Factorize: $x^2 - 9$

7) Find the least common multiple of the following algebraic terms.
$m^2n,\ mn,\ mn^2$

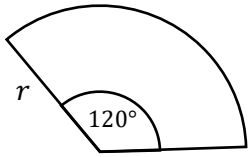
8) Make u the subject of the formula, $n = m^2 - 2us$

9) Solve: (x - 3)(x+2) = 0

10) It takes 2 hours for a certain vehicle travelling at a speed of 60 kmh^{-1} to complete a certain journey. Find the time in hours that it would take the vehicle to complete the same journey, if it travels at a speed of 40 kmh^{-1}.

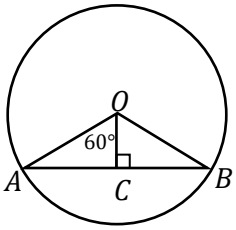
11) In the triangles ABC and PQR, $A\hat{B}C = P\hat{Q}R = 90^{O}$ and $BC = QR$. If these two triangles are congruent under the case of RHS, write the other pair of elements that must be equal using a diagram.

12) If the area of the sector is 462 cm^2,find the radius of it.



13) In a bag, there are 3 red beads and 5 blue beads which are identical in shape and size. If a bead is drawn out at random, find the probability of drawing a red bead.

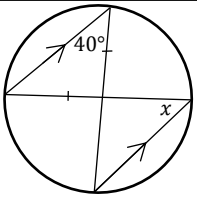
14) O is the centre of the circle. Find the value of $A\hat{B}O$ based on the information given in the figure.



15) Write down the gradient and the intercept of the straight line, $y = 3x - 2$

16) A man's age is now four times of his son's age. Six years ago, his age was six times of his son's age. Find the man's present age.

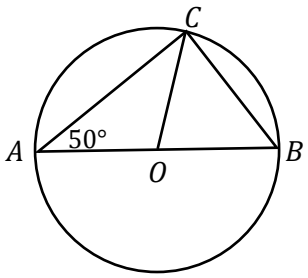
17) Find the values of *x* based on the information given the figure.



18) Find the first approximation of $\sqrt{245}$.

19) If $4x - 5y = -7$, $4y - 3x = 12$, Find the value of $(x - y)$, without solving these simultaneous equations.

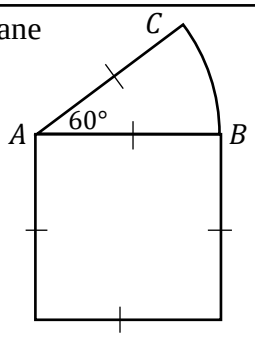
20) The centre of the given circle is O and AB is a diameter, find the value of,



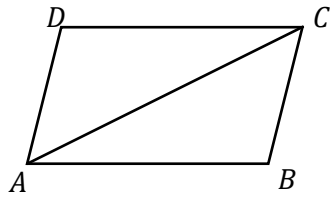
i. $A\hat{C}B$ = ...

ii. $A\hat{B}C$ = ...

21) If the arc length of the sector BC is $22\ cm$, find the perimeter of the compound plane figure.



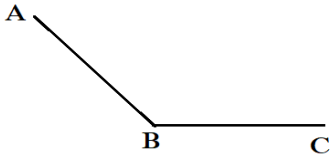
22) If the area of the parallelogram $ABCD$ is $82cm,^2$ find the area of the triangle ABC.



23) Solve the inequality $3x \leq 15$ and represent solutions on a number line.

24) It takes 8 men 9 days to complete a certain task. If four more men are assigned the task, how many days will it take them to complete the task?

25) The diagram shows two boundaries of a street AB and BC. It is required to erect a lamp post which is at an equal distance from AB and BC and $5\ m$ from the junction B. Using the knowledge on loci, complete the sketch indicating where the lamp post should be placed.



PART B

*Answer **all questions** on the **paper itself***

1) From the books available at Gunasekara bookstore, $\frac{1}{3}$ of the books are subject related books in the school curriculum and $\frac{2}{3}$ of the remaining books are novels. The rest of the books are short stories and translations. There are equal number of short story books and translation books. Mr.Gunasekara states that there are total of 720 translations books packed in steel racks worth $RS.15\,000$.

i) What fraction of the total number of books are not subject related books.

ii) What fraction of the total number of books are novels?

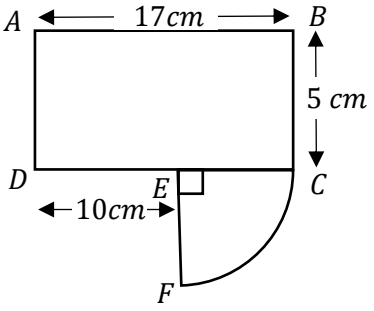
iii) What fraction of the total number of books are translation books?

iv) Find total number of books in the Gunasekara book shop.

v) Find total cost of steel racks required to pack all the books in the Gunasekara book shop, assuming that the same amount of space is required to pack each book.

2) The figure shows a piece of sheet consisting of a rectangular portion $ABCD$ and a sector of a circle of radius EF.

i) Find the radius of the sector.



ii) Find the perimeter of the sheet.

iii) Find the total area of the sheet.

iv) If the mass of $1\ cm^2$ of this sheet is $20.5\ g$, find the total mass of the sheet.

3) The 12 men employed to complete a certain task were able to complete only $\frac{3}{5}$ of the total task in six days.

i) Find is the magnitude of the task completed in man days?

ii) Find what fraction of the task to be completed and find the magnitude of that task.

iii) What is the magnitude of the whole task in man days?

iv) If another12 men are assigned for the work at the beginning, how many days will it take to complete the entire task?

v) If one man is paid $Rs.5000$ per day. Calculate the total cost to complete the task.

4) The details of 40 vehicles that traveled on the "Rajakeeya Mawatha" on a certain day are given below.

Type of vehicle	Number of vehicles	Angle at the centre
Bus	10	……
Car	……..	……
Van	8	…….
Motorcycle	2	…….

i) Find the number of cars.

ii) Fill in the blanks in the above table.

iii) Draw the Pie chart related to the above information.

iv) 20% of those vehicles were fined by the traffic police for parking on the side of the road. If Rs. 1500 is charged for each fine, how much money did the traffic police receive on that day?

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5) (a) In a bag, there are 5 mango flavoured toffees and 3 wood apple flavoured toffees which are of the same size and shape. A toffee is drawn randomly from the bag by Charuka.

i) Write the sample space (S) of all the possible outcomes of this experiment.

ii) Find the probability of drawing a mango flavoured toffee.

iii) Find the probability of not drawing a mango flavoured toffee.

(b) Consider the following sets.

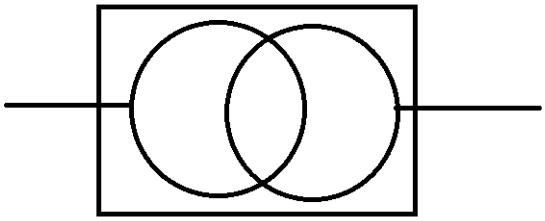
A = {Letters of the word "CHARACTERISTICS"}
B = {Letters of the word "EXPERIMENTS"}

i) Write the elements of the sets A and B

ii) Find $n(A)$ and $n(B)$.

iii) Express $A \cup B$ and $A \cap B$ in terms of their elements.

iv) Represent set A and B in the given Venn diagram.



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Grade 10- Second Term Test –2024(August)
දෙවන වාර පරීක්ෂණය – 2024 (අගෝස්තු) - 10 ශ්‍රේණිය

Time: 3 hours
කාලය : පැය 3

Mathematics-II
ගණිතය - II

Instructions:

- *Answer 10 questions selecting **five** questions from* **part A** *and **five** questions from* **part B**.
- *Write the **relevant steps** and the **correct units** in answering the questions.*
- *Each question carries* **10** *marks.*

Part - A

Answer **five** questions **only**.

(1) **(a)** An annual rates of 6% has to be paid to a provincial council institution for a house of assessed annual value of Rs. 250 000.

(i) How much has to be paid as rates for a year?

(ii) How much has to be paid as rates for a quarter?

(iii) If the provincial council institution decided to increase the assessed annual value of the house by 20%, calculate the extra amount that has to be paid for a quarter.

(b) When a certain item is imported, 35% of its value is charged as custom duty. If the value of the item with the custom duty included is Rs.81 000, what is the value of the item without the custom duty?

(2) An incomplete table of values prepared to draw the graph of the function $y = x^2 - 6$ is given below.

x	-3	-2	-1	0	1	2	3
y	3	-2	……	-6	-5	-2	3

(i) Find the values of y when $x = -1$.

(ii) Using a suitable scale, draw the graph of the above function on a graph paper.

(iii) Using the graph that you drew, find the roots of the equation $x^2 - 6 = 0$

(iv) Write the interval of values of x for which the function increases negatively.

(v) Write down the equation of the new graph which is obtained when the above graph is shifted upwards by 3 units in the coordinate plane, without changing its shape.

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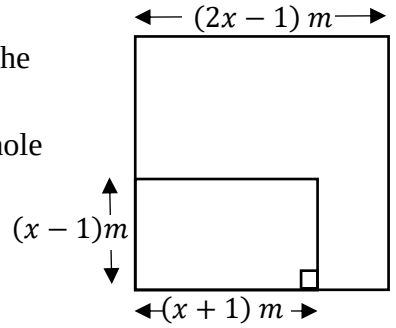
(3) A square shape plot of land of side length $(2x-1)\ m$ is shown in the figure. A swimming pool of length $(x+1)\ m$ and breadth $(x-1)\ m$ has been constructed in it.

(i) Write down an expression to show the area of the remaining potion after constructing the swimming pool.

(ii) If the area of the remaining plot is $9\ m^2$,show that x satisfies the quadratic equation $3x^2-4x-7=0$

(iii) Solve the above equation and find the value of x to the nearest whole number, hence find the area of the swimming pool



(4) **(a)**15 workers are assigned for a dengue eradication program in a school. If the number male workers is one less than three times the number of female workers. Construct a pair of simultaneous equations by taking the number of male workers as x and the number of female workers as y, solve the pair of simultaneous equations and hence find separately number of male workers and female workers.

(b) Simplify: $\frac{x-2}{2x-1}-\frac{3x-1}{2x-1}$

(5) A person standing at point **A** on a straight road that runs from West to East, observes a coconut tree located at point **C** on a bearing of 115^0.when he walks $180\ m$ to the East along the road, he sees the coconut tree on a bearing of 220^0 from a point **B**.

(i) Draw a rough sketch based on the above information.

(ii) Draw a scale diagram using a suitable scale and find the distance to the coconut tree from the point A.

(6) Information on the electricity consumption of 35 shops in a certain city during a day is given in the following table.

Number of electricity units	10	12	14	16	18	20
Number of shops	3	4	6	9	8	5

(i) Find the mode of the above data set.

(ii) Find the mean number of electricity units used by a shop in a day.

(iii) If the price of a unit of electricity is Rs.40, calculate the monthly electricity bill of a shop in this city using the above mean number of electricity units.

Part - B

Answer **five** questions **only**.

(7) A tube has been cut into pieces to be used for a decoration. When these pieces of the tube are arranged in sequence by length, the longest piece is $60\ cm$ and each of the remaining pieces are $8\ cm$ less than the previous piece.

(i) Write down the lengths of the first three pieces respectively.

(ii) Find the general term T_n for the length of the n^{th}piece of tube, in terms of *n.*

(iii) Using the general term, find the length of the 6th piece of tube.

(iv) Sumith says that there is a certain piece of tube of length 16 cm here. State with reasons whether his statement is true or false.

(v) Find the maximum number of pieces of tubes that can be cut in the above manner.

(8) Use only a straight edge with cm/mm scale and a pair of compasses for the following geometric constructions. Show your construction lines clearly.

(i) Construct the triangle ABC such that $AB = 8.5\ cm$, $A\hat{B}C = 60^o$ and $BC = 7\ cm$.

(ii) Construct the angle bisector of the $A\hat{B}C$.

(iii) Construct a perpendicular to AB from C and mark the point it meets AB as D

(iv) Name the point of the intersection of angle bisector of $A\hat{B}C$ and CD as O. Construct a circle with OB as radius and O as the centre.

(v) Give reasons why $O\hat{C}B = O\hat{B}C$

(9) **(a)** Write down the theorem related to isosceles triangles.

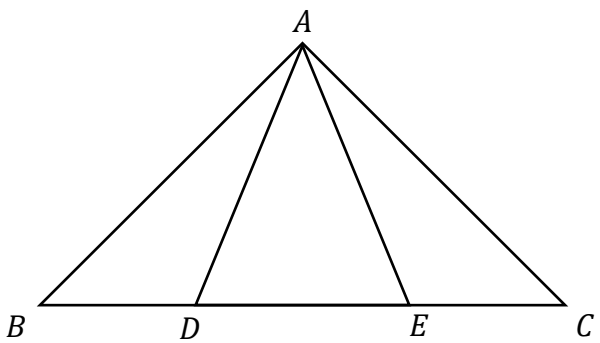
(b) In the triangle ABC given in the figure, $AD = AE$. The points D and E lie on the side *BC* such that $BD = EC$

(i) Copy the given figure onto your answer script and include above information in it.

(ii) Show that the triangles AEC and ABD are congruent

(iii) Show that ABC is an isosceles triangle.

(iv) Show that $B\hat{A}E = C\hat{A}D$



(10) The length, breadth and height of a cuboid shaped household tank are $200\ cm$, $150\ cm$ and $150\ cm$ respectively.

(i) Find the capacity of the tank in m^3?
(ii) What is the capacity of the tank in litres?
(iii) If a water supply of $150\ l$ per minute is given, find the time taken to fill the tank completely.
(iv) It has been estimated that in a house of five members, one member uses $180\ l$ of water per day. If all the residents use water for three days without refilling the tank, when the tank is completely full of water.
(a) Find the volume of water left in the tank in litres.
(b) Find the height of the water level in the tank in centimeters.

(11) There are 125 students studying in a mixed school in grade 10, out of which 70 are girls. 10 girls participate in athletics. The number of boys who do not participate in athletics is 40.
(i) Represent above information in a Venn diagram
(ii) Find the number of girls who do not participate in athletics
(iii) Shade the region that represent the boys who participate in athletics
(iv) Find the total number of students who participate athletics.

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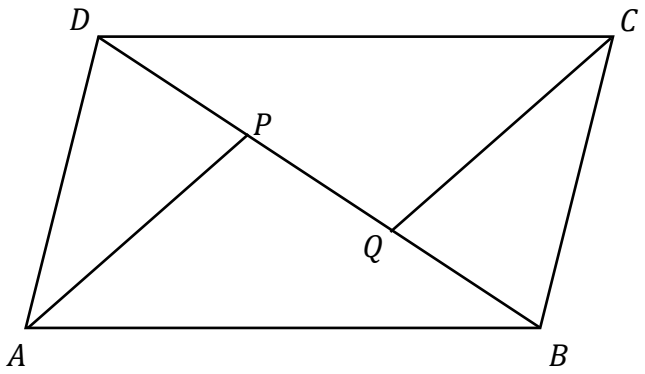
(12) **(a)** Write down two conditions that need to be satisfied for a quadrilateral to be a parallelogram.

(b) In the parallelogram $ABCD$ shown in the figure, the points P and Q lie on the diagonal BD such that $DP = BQ$.

(i) Copy the given figure onto your answer script and include the above information in it
(ii) Show that $AP = QC$
(iii) Show that $AP // QC$
(iv) Show that the triangles APQ and PQC are equal in area.



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