OL/2021(2022)/32/E-I

ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව **ලංකා විභාග දෙපාර්තමේන්තුව** විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව
இலங்கை பரீட்சைத் திணைக்களம் இலங்கை பரீட்சைத் திணைக்களம் இலங்கை பரீட்சைத் திணைக்களம் இலங்கை பரீட்சைத்
Department of Examinations, Sri Lanka Department of E **இலங்கை பரீட்சைத்திணைக்களம்** tions, Sri Lanka Depart
ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව
இலங்கை பரீட்சைத் திணைக்களம் இலங்கை பரீ **Department of Examinations, Sri Lanka** இலங்கை பரீட்சைத் திணைக்களம்

| 32 | E | I |

අධ්‍යයන පොදු සහතික පත්‍ර (සාමාන්‍ය පෙළ) විභාගය, 2021(2022)
கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2021 (2022)
General Certificate of Education (Ord. Level) Examination, 2021(2022)

ගණිතය	I
கணிதம்	I
Mathematics	**I**

පැය දෙකයි
இரண்டு மணித்தியாலம்
Two hours

Index Number: ....

Certified Correct

....
Signature of Invigilator

Important:

∗ This question 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 question paper itself**.

∗ Use the space provided under each question for working and writing the answer.

∗ Indicate the **relevant steps** and the **correct units** when answering the questions.

∗ Marks are awarded as follows:

In Part A
2 marks for each question

In Part B
10 marks for each question

∗ Blank papers can be obtained for scratch work.

For Marking Examiners' Use Only

Part	Question Numbers	Marks
A	1 – 25	
B	1	
	2	
	3	
	4	
	5	
Total		

.... First Examiner	.... Code Number
.... Second Examiner	.... Code Number
.... Arithmetic Checker	.... Code Number
.... Chief Examiner	.... Code Number

[see page two

8. *ABCD* is a parallelogram. *DC* has been produced to *E* such that *AC // BE*. If *BE* = 6 cm and *DP* = 3 cm, find the area of the trapezium *ABED*.
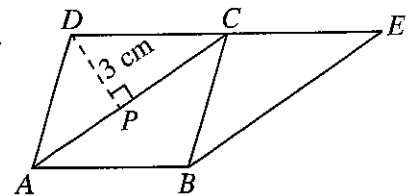
**9.** Find the least common multiple:

$$4x^2y, \quad 6xy, \quad 3y^2$$

10. A person who deposits 6000 rupees in a bank for 2 years at an annual interest rate of 5% compounded annually, receives 300 rupees as interest for the first year. How much interest does he receive for the second year?

11. The first quartile of a collection of data arranged in ascending order is in the 4th position. In which position is the median of this collection of data?
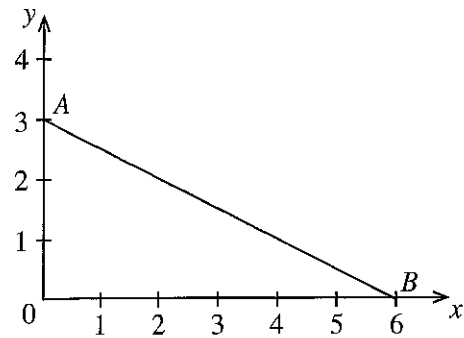
12. Find the minimum area of a sheet of paper that can be used to completely cover the curved surface of a solid right circular cylinder of radius 7 cm and height 5 cm.

(Take the value of π as $\frac{22}{7}$.)

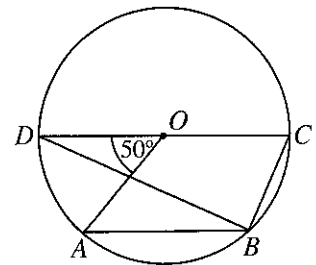**13.** Find the magnitude of $B\hat{A}C$, based on the information in the figure.
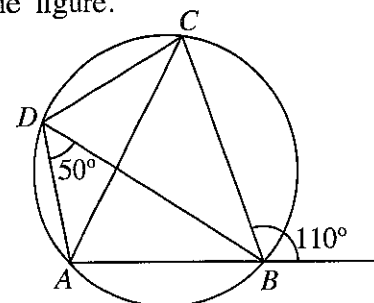
[see page four

20. Obtain the equation of the straight line *AB* shown in the figure.

21. The 6ᵗʰ term of a geometric progression with common ratio 5 is 80. What is the 8ᵗʰ term of this progression?

22. The centre of the given circle is *O*. Find the magnitude of *A$\hat{B}$C*.

23. $A = (1\ -3)$ and $B = \begin{pmatrix} -1 & 2 \\ -1 & 1 \end{pmatrix}$. Find the matrix *AB*.

24. A bag contains only identical red and black balls. The probability of a ball drawn at random from the bag being red is $\frac{2}{7}$. If there are 15 black balls in the bag, how many balls in total are there in the bag?

25. *AB* and *AC* are two perpendicular boundaries of a land. It is required to plant a tree at the point *P* which is 4 m from *AB* and 5 m from the corner *A*. An incomplete sketch relevant to finding this location is shown in the figure. Complete the figure using the knowledge on loci, and mark the point *P*.

※ ※

[see page six

50
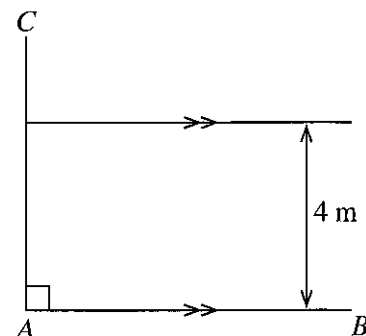
3.

> **'Sundara' Company**
> Price of a share is 50 rupees.
> Dividends of 2.50 rupees per
> share is paid annually.

Aruna invested 60 000 rupees to buy shares in the above company.

(i) How many shares did he buy?

(ii) After receiving dividends from the company at the end of a year, Aruna sells all the shares at 55 rupees per share. How much does he obtain in total as dividends and from selling all the shares?

(iii) Aruna deposits the total amount he gets in a bank for one year. If he receives 3450 rupees as interest from the bank for the year, what is the annual interest rate the bank pays?
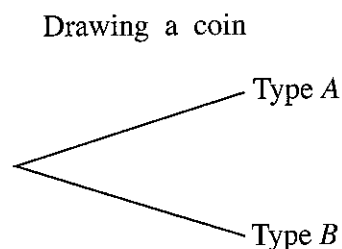
10

4. (a) In a bag there are 10 coins of two types as follows, which are identical in shape and size.

        Type A – 7 fair coins

        Type B – 3 coins with Head marked on both sides

(i) A coin is drawn at random from the bag. Complete the following incomplete tree diagram relevant to this.

Drawing a coin

(ii) The coin which is drawn is tossed and the side which falls face up is observed. Extend the tree diagram accordingly and include the relevant probabilities.

(iii) Find the probability of obtaining a head in the above experiment of drawing a coin and tossing it.

[*see page eight*

OL/2021(2022)/32/E-II

ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව **ශ්‍රී ලංකා** **විභාග** **දෙපාර්තමේන්තුව** විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව
இலங்கைப் பரீட்சைத் திணைக்களம் இலங்கைப் பரீட்சைத் திணைக்களம் இலங்கைப் பரீட்சைத் திணைக்களம்

Department of Examinations, Sri Lanka Department of E**இலங்கை பரீட்சைத் திணைக்களம்**tions, Sri Lanka Depart

ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව
இலங்கைக் பரீட்சைத் திணைக்களம் இலங்கைப் பரீட்சைத்**Department of Examinations, Sri Lanka** இலங்கைப் பரீட்சைத் திணைக்களம்

32	E	II

අධ්‍යයන පොදු සහතික පත්‍ර (සාමාන්‍ය පෙළ) විභාගය, 2021(2022)
கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2021(2022)
General Certificate of Education (Ord. Level) Examination, 2021(2022)

ගණිතය	**II**
கணிதம்	**II**
Mathematics	**II**

පැය තුනයි
மூன்று மணித்தியாலம்
Three hours

අමතර කියවීම් කාලය	- මිනිත්තු 10 යි
மேலதிக வாசிப்பு நேரம்	- 10 நிமிடங்கள்
Additional Reading Time	**- 10 minutes**

Use additional reading time to go through the question paper, select the questions and decide on the questions that you give priority to in answering.

Instructions:

* Answer **ten** 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.
* The volume of a right circular cylinder of base radius r and height h is $\pi r^2 h$.
* The volume of a sphere of radius r is $\frac{4}{3}\pi r^3$.

Part A
Answer five questions only.

1. An incomplete table of y values corresponding to several x values of the quadratic function $y = x^2 - 2x - 2$ is given below.

x	−3	−2	−1	0	1	2	3	4
y	13	6	1	−2	−3	−2	...	6

   (a) (i) Find the value of y when $x = 3$.

   (ii) Using the standard system of axes and a suitable scale, draw the graph of the given quadratic function on the provided graph paper, according to the above table.

   (b) Using the graph that you drew,

   (i) write the interval of values of x on which the function is positive and increasing.

   (ii) write the coordinates of the minimum point of the graph and thereby write the quadratic function in the form $y = (x - a)^2 + b$. Here a and b are constants.

   (c) By considering the x-coordinate of an intersection point of the graph and the line $y = 0$, find a value for $\sqrt{3}$ to the nearest first decimal place.

2.

> A television set can be purchased by making an initial payment of 8000 rupees and paying the remainder in instalments.

A television set which is sold outright for 80 000 rupees can be purchased by making a down payment of 8000 rupees and paying the remainder in 18 equal monthly instalments. Here, an annual interest rate of 24% is charged and the interest is calculated on the reducing loan balance. How much is a monthly instalment that has to be paid when a television set is purchased in this manner?

[see page two

Part B
Answer five questions only.

7. As shown in the figure, a tap and 18 flowering bushes are located such that they are collinear. The distance from the tap to the first flowering bush is 5 m and the distance between every two consecutive flowering bushes is 2 m.
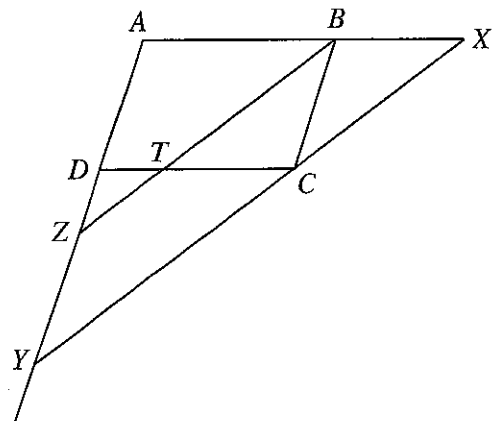

5 m   2 m   2 m   2 m
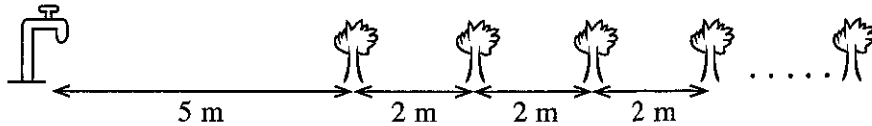
   (i) Write separately, the distance from the tap to the first, second and third flowering bushes respectively.
   (ii) How far is the 8ᵗʰ flowering bush from the tap?
   (iii) Which flowering bush is 37 m from the tap?
   (iv) Piyumi fills a bucket with water from the tap, carries it to the first flowering bush, waters it and returns to the tap. She fills the bucket again with water, carries it to the second flowering bush, waters it and returns to the tap. She waters the flowering bushes up to the 18ᵗʰ one in this manner by carrying a separate bucket of water to each flowering bush respectively. Finally, she places the empty bucket next to the tap. Show that the total distance she walks during this activity is more than 790 metres.

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

   (i) Construct the triangle ABC such that $AB = 8.5$ cm, $A\hat{B}C = 90°$ and $BC = 8.5$ cm.
   (ii) Construct the bisector of $A\hat{B}C$. Name the point at which it meets AC as D.
   (iii) Find the centre of the circle that has BD as a diameter and construct this circle.
   (iv) Give reasons why the line AC is the tangent to the circle at D.
   (v) Construct another tangent to the circle from A.

9. (*a*) Prove the theorem, 'The opposite sides of a parallelogram are equal'.

   (*b*) $ABCD$ is a parallelogram. The bisector of $A\hat{B}C$ meets CD at T. The straight line drawn through C parallel to BT meets AB produced at X and AD produced at Y. Moreover, BT produced meets AY at Z.
   Show that DZT is an isosceles triangle and thereby show that $AB + AD = BX + DY$.