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Mathematics – I ගණිතය - I			Time: 2 hours ໝາලය : ບາດ 2					
Name / Index No: Certified Correc  Signature of Invigil	t ator							
<ul> <li>Important:</li> <li>This paper consists of 8 pages.</li> <li>Write your Index Number correctly in the</li> </ul>	For D Part	For Marking Examiner's use only           Question         Marks           Part         Number						
appropriate places on this page and on page three.	A	1 - 25						
<ul> <li>Answer all questions on this paper itself.</li> </ul>		1						
Solution for working and writing the answer.		2						
<ul> <li>It is necessary to indicate the relevant steps and the correct units in answering the</li> </ul>		3						
<ul> <li>A marks will be awarded as follows.</li> <li>Two marks each for questions 1 - 25 in part A.</li> </ul>	D D	4						
Ten marks each for questions in part <b>B</b> . $\triangle$ blank paper can be obtained for rough work		5						
from the supervisor on your request.	Total							
	Signature	of Invigilator						

$\left( \right.$	Part A
	Answer all questions on this question paper itself
1)	In how many years will an interest of <i>Rs</i> . 12 000 be earned on a loan of <i>Rs</i> . 50 000 given at an annual simple interest rate of 8%.
2)	Find the time taken by a train travelling at a uniform speed of 100 kilometers per hour to travel a distance of 20 kilometers in minutes?
3)	Represent in index form: $lg 2 = 0.3010$
4)	Simplify: $\frac{3}{5a^2} + \frac{1}{a}$
5)	Find the value of $B\hat{A}C$ using the information given in the figure. $A$ $105^{o}$ $C$ $D$
6)	It takes 6 men 5 days to complete a certain task. How many men should be worked to complete the same task within 3 days?
7)	Find the least common multiple of the two algebraic expressions $5a^2b$ and $4ab^2c$
8)	Find the first approximation of $\sqrt{52}$ .

9)	The angle of elevation of a point B on the top of a vertical tower from a point A on the horizontal ground is 60°. Find the angle of depression of the point <i>A</i> , when observed from the point B.	В
10)	) In the given Venn diagram, shade the region that represents $(A \cap B)'$ .	
		В
11)	) Factorize: $a^2 - 7a - 30$	
12)	The probability that Sri Lanka will win the next cricket match between India and Sri Lanka is 0.3. Fir the probability that India will win the next match. (Consider that one team will either win or lost)	nd
13)	) In the given figure, <i>P</i> , <i>Q</i> , <i>R</i> are three points that lie on the circle with centre <i>O</i> . If $P\hat{O}Q = 80^{\circ}$ , find the value of $P\hat{R}Q$ . R Q	
14)	) Solve: $x(x - 5) = 0$	



**21)** In the given figure P and Q are two houses located on the same side of a straight road. The perpendicular distance from Q to the road is 9 m. It is required to install a lamp post on the same side of the road where the houses P and Q are located such that equidistant from the two houses and 5 meters from the road. Draw a sketch of the construction lines needed to find the position of the lamppost and name it as R.



- 22) If the area of the triangular cross section of a right prism of length 8 cm is 15  $cm^2$ , find the volume of the prism.
- 23) PQ is a chord of the circle with centre O. The perpendicular drawn from O to the chord PQ intersects the chord at A, and meets the circle at B. If AB = 4 cm and the radius of the circle is 10 cm find the length of the chord PQ.



24) In the given figure, *A*, *B*, *C* are three points that lie on the circle with centre *O*. If AB = AC and  $B\hat{O}C = 120^{\circ}$ , find the value of *x*.



**25**) The intercept of the graph of a straight line is 2. If this straight line passes through the point (1,3), write the equation of the straight line.

## PART B Answer all questions on the paper itself 1) $\frac{1}{2}$ of the total number of students obtained less than 40 marks and $\frac{3}{5}$ of the remaining students obtained 75 or more marks for a Mathematics paper in a term test. What fraction of the total number of students who received 40 or more marks? i. ii. What fraction of the total number of students who received 75 or more marks? iii. If the number of students who received 40 or more marks and less than 75 marks is 40, find the total number of students who faced for the Mathematics paper. iv. A special program was implemented to improve the mathematics achievement levels of students with scores below 40 but only $\frac{3}{5}$ of students with scores below 40 participated in this program. Indicate the number of students who did not participate in this program with less than 40 marks as a percentage of the total number of students. 42 m 2) The sketch of a rectangular shaped home garden ABCD D is given in the figure. Chillie are grown in a semicircular part of diameter 28 m. 22 m i. Find the arc length of the semicircular section. ii. Find the area of the portion where chillies are grown. iii. In the next season, it has been decided to divide the portion where chillies are grown onto two sectors and grow chillies and tomatoes separately. If the ratio between the area of chilli bed and area of tomato bed is expected to be 1:3, find the perimeter of the tomatoes bed. iv. It is intended to construct a right-angled triangular poid that is of area equal to the area of $\frac{1}{12}$ of the area of the whole garden, with AE as one side and the other side alone AD. Draw with measurements, a sketch of the pond to be constructed in the above diagram.

- 3) (a) Food sufficient for 20 people for 10 days was stored in a displacement camp.i. For how many days is the food in the camp sufficient for one person?
  - ii. If a new group of people arrived at the displacement camp after two days, then the remaining food would be sufficient for only four days. How many new people have arrived?
  - (b) If a person who gave a loan of Rs. 25000 received a total amount of Rs. 28000 at the end of two years, find the simple interest rate that was charged.
  - 4) The pie chart given in the figure shows how students selected group 1 subjects in grade10 of a certain school.



i. Find the total number of students in grade 10 of this school.

- The number of students who study Business and Accounting is 180.
  - ii. Find the magnitude of the central angle of the sector that represent the students who selected Business and Accounting.

iii. Find the number of students who selected Citizenship Education.

iv. If three students who had selected citizenship education, changed their subject to Business and Accounting, find the angle at the centre of the sector corresponding to Business and Accounting in a new pie chart.

- 5) (a) In a bag there are three white balls marked W<sub>1</sub>, W<sub>2</sub> and W<sub>3</sub> and two green balls marked G<sub>1</sub> and G<sub>2</sub>. All balls are of the same size. Sachin draws randomly a ball from the bag, notes down its colour and returns it back to the bag. A ball is randomly taken from the bag again and its colour is recorded.
  - i. Indicate the relevant sample space of the above random experiment of drawing a ball in the given grid using the mark "×".



ii. Encircle event of drawing a green ball at least once in the grid and write down its probability.

- (b) Kasun and Vipula are facing for a competitive exam and it is assumed that the probability of Kasun passing the exam is  $\frac{1}{3}$  and Vipula passing the exam is  $\frac{1}{2}$ 
  - i. An incomplete tree diagram to represent that Kasun is passing or not passing the exam is given below. Write down the corresponding probabilities on the branches.



ii. Extend the above tree diagram to include the probabilities that Vipula passing or not passing the exam.

iii.Hence find the probability that only one person passing the exam.

## G10/2023(2024)/III/32/E-II

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Grade 10 – Third Term Test – 2023 (February 2024) කෙවන වාර පරීක්ෂණය – 2023 (2024 පෙබරවාරි) - 10 ශේණිය									
Mathematics II Time: 3 hours									
		G	ාණිතය –	II		2	කලය : පැය 3		
<ul> <li>Instructions:</li> <li>Answer 10 questions selecting <i>five</i> questions from part A and <i>five</i> questions from part B.</li> <li>Write the <i>relevant steps</i> and the <i>correct units</i> in answering the questions.</li> <li>Each question carries 10 marks.</li> </ul>									
Part - A									
Answer five questions only. 1) An incomplete table of values prepared to draw the graph of the function $y = -x^2 + 4$ given below.									
$\begin{array}{c} x \\ y \end{array}$	-3 -5	-2 -	$   \frac{-1}{3}  \frac{0}{4} $	1 3	2 0	3 -5			
<ul> <li>i) Find the values of y when x = -2.</li> <li>ii) Using the scale of 10 small divisions as one unit along the x axis and y axis, draw the graph of the above function.</li> <li>iii)Answer the following questions using the graph.</li> </ul>									
<ul> <li>(a) Write the coordinates of the turning point.</li> <li>(b) Find the range of values of x for which y ≥ -1.</li> <li>(c) Write down the equation of the graph which is obtained when the above graph is shifted upwards along the y axis by 3 units.</li> </ul>									
2) Information collected on the lifespan of electrical appliances manufactured by a certain electrical appliances manufacturing company is given in the following frequency table. Here, 60-120 denotes the lifespan interval "greater than 60 hours and less than or equal 120 hours".									
Lifespan	60-120	120-180	180-240	240-300	300-360	360-420	420-480		
Number of electric appliances	2	6	8	14	11	7	2		
<ul> <li>i) Write down the modal class of this frequency distribution.</li> <li>ii) What is the expected maximum lifespans of an electrical appliance manufactured by this company in hours?</li> <li>iii) Using the mid value of the class interval 240 – 300 as the assumed mean, find the mean lifespan of an electrical appliance to the nearest hour.</li> </ul>									

iv) If the operating time of an electrical appliance is 3 hours a day. Estimate the period in months that an electrical appliance purchase from this company can be used.

- 3) (a) The rates paid by a man for a quarter for his house is Rs. 1600. The annual assessed value of this house is Rs. 320 000.
  - i) Find the annual tax
  - ii) Find the annual rates percentage charged by the relevant urban council.

(b) The income tax department imposes tax as follows,

- Initial Rs. 500 000 is exempt from income tax
- Next Rs. 500 000, the tax is 4%
- Next Rs. 500 000, the tax is 8%
- 10% income tax has to be paid for every amount above that.

Jagath pays 84 000 rupees as income tax for a year, based on the above information. What is his annual income?

4) An observer, from the window *D* of a vertical building on a level ground, observes a shining object at point *A* on the ground with an angle of depression of 35°. The window *D* is situated 21 *m* above the foot of the building. The angle of depression of the object *A*, when observed from the highest point of the building directly above the window *D* is 48°. Using a suitable scale diagram, find the height of the building and the distance from *A* to the foot of the building.

5) (a) Simplify: 
$$\frac{x+3}{x^2-1} - \frac{3}{2(x-1)}$$

- (b) A cyclist travelled a certain distance at a speed of  $10 ms^{-1}$  and the remaining distance at  $5 ms^{-1}$ . He took 55 seconds to cover the whole distance of 500 m.
  - i) Construct a pair of simultaneous equations by taking the distance covered in the first part of the journey as x meters and the remaining distance as y meters.
  - Solving the pair of simultaneous equations and find separately the distance travelled in each speed.

6) A rectangular frame is prepared by bending a wire of  $28 m \log n$ .

- i) Taking the length of the frame as x meters, write its width in terms of x.
- ii) If the area enclosed by the frame is  $48 \ cm^2$ . Show that x satisfied by the quadratic equation  $x^2 14x + 48 = 0$
- iii) Solve above equation and find the length and breadth of the wire frame.

## **Part** – **B** Answer **five** questions **only**.

- 7) (a) The  $2^{nd}$  and  $5^{th}$  term of an arithmetic progression is 0 and 9 respectively.
  - i) Find the first term and the common difference.
  - ii) Write down the first four terms of this sequence.
  - (b) A father gifted his daughter *Rs* 5000 on her fifth birthday. Thereafter every birthday, she was gifted with an amount of one thousand times her age.
    - i) How much was the gift she got on her sixth birthday?
    - ii) What is the total amount she had by her tenth birthday?
    - iii) How long will it take her to collect an amount of *Rs*. 110 000?
- Use only a straight edge with cm/mm scale and a pair of compasses for the following Constructions. The constructions lines should be drawn clearly.
  - i) Construct a triangle ABC is which AB = 8cm,  $A\hat{B}C = 60^{0}$  and BC = 10m
  - ii) Construct a straight line parallel to *BC* through *A*.
  - iii) Mark the point *X* on that line such that AX = CX.
  - iv) Complete the quadrilateral *AXCB*. Measure and write the magnitudes of the angles  $X\hat{A}C$  and  $B\hat{A}C$ .
- 9) In the square *ABCD*, the side DB has been produced up to Y such that DB = BY and CB has been produced up to X such that CB = BX.
  - i) Draw a diagram and mark the given data on it.
  - ii) Show that *XYCD* is a parallelogram.
  - iii) Show that DC = XY.
  - iv) Show that BD = AX.

10) *AB* and *CD* are two equal chords of a circle with center *O*. Two chords, *AB* and *CD* produced meet at *X*. Perpendiculars drawn from *O* to *AB* and *CD* are *OP* and *OQ* respectively. Prove that *OX* is the bisector of  $P\hat{X}Q$ .



- 11) The length and breadth of a label which was pasted to cover completely the curved surface of a right circular cylindrical vessel prepared for painting, are 44 *cm* and 21 *cm* respectively.
  - i) Find the radius of the bottom of the cylindrical vessel.
  - ii) If the height of the cylindrical container is *h cm* and the maximum volume of paint that can be filled is *V* liters, show that  $V = \frac{77}{500}h$ .
  - iii) If h=27, find the value of V to the nearest whole number by using the logarithm table.
- 12) Out of 41 students who participated in Sinhala Language competitions from a school, 22 students participated in the essay competition. 19 students participated in the copy writing and the remaining 7 students participated in the reading competition.



- i) Copy the given Venn diagram and represent the above information.
- ii) Find the number of students who participated only in essay competition.
- iii) How many students participated in both essay writing and copy writing competitions?
- iv) How many students participated in only one competition?

\*\*\*\*\*\*



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