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සියලුම හිමිකම් ඇවිරිණි / முழுப் பதிப்புரிமையுடையது /All Rights Reserved]

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

32 E I

අධ්‍යයන පොදු සහතික පත්‍ර (සාමාන්‍ය පෙළ) විභාගය, 2024(2025)
கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2024(2025)
General Certificate of Education (Ord. Level) Examination, 2024(2025)

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 **only** 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

Part A

Answer ***all questions on this question paper itself.***

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

1. It is estimated that six men will take eight days to paint the walls of a house. If it is required to complete this task in three days, how many more men need to be engaged?

2. Find the magnitude of $B\hat{A}E$ based on the information given in the figure.

3. Simplify: $\frac{2}{3x}+\frac{5}{6x}-\frac{7}{12x}$

4. From the shapes given below, select and underline the one that **cannot** be the shape of a face of a right prism with a triangular cross section.

(i) Square (ii) Rhombus (iii) Rectangle

5. Based on the information in the given pie chart, if the number of students who study Drama & Theatre is 30, how many students study Dancing?

6. O is the centre of the given circle. The chord AB is bisected by the straight line DOC. Find the magnitude of $C\hat{D}B$.

7. Find the factors: $2x^2 - 18$

[see page three

8. Taking that $10^{0.6375} = 4.34$, find the value of lg 43.4.

9. In the given figure, AB is a vertical tree and there is a bird at point B. There is a child at point C. Moreover AC is horizontal. If the child observes the bird with an angle of elevation of $a°$ and the bird observes the child with an angle of depression of $b°$, represent these angles in the figure. Write the relationship between a and b. (Disregard the height of the child.)

10. The height of a solid right circular cylinder is three times its base radius r. How many times of the paint required to paint only the base is needed to paint the curved surface of the cylinder completely? (The area of the curved surface of a solid right circular cylinder of base radius r and height h is $2\pi rh$.)

11. Find the probability of obtaining 10 as the sum of the two digits on the face that falls downwards when an unbiased tetrahedral die with its four faces marked as 1, 3, 5, 7 is tossed up twice.

12. Find the value of x based on the information given in the figure. Here, ABC is a straight line.

13. If ε = {Integers between 0 and 7},
A = {Prime numbers between 0 and 7},
B = {Multiples of 2 between 0 and 7},

select and underline the correct statement from the statements given below.

(i) $A \cup B = \varepsilon$

(ii) $A \cap B = \{2, 4\}$

(iii) $n(A) = 3$

[see page four

14. Simplify: $3x^2 \times 2y \div 8xy$

15. The second term of a geometric progression is –6 and the third term is –12. What is the fifth term of this progression?

16. A cyclic quadrilateral $ABCD$ is shown in the figure. $A\hat{D}C$ is bisected by BD. The side AB is produced to E. Find the magnitude of $C\hat{B}E$, based on the information in the figure.

17. Find the least common multiple of the following algebraic terms:
$6x^2$, $5xy$, $2y^2$

18. The area of the triangular cross section of a right prism is 616 cm^2. The volume of a right circular cylinder of the same height as the prism, and base radius r, is equal to the volume of the prism. Find the value of r in centimetres. (The volume of a right circular cylinder of base radius r and height h is $\pi r^2 h$.)

19. The midpoints of the sides AB and AC of the given triangle ABC are D and E respectively and $A\hat{D}E = 90°$. Find the perimeter of the quadrilateral $BCED$ in centimetres.

[see page five

20. Find the equation of the straight line that passes through the points (4, 6) and (6, 9) in the Cartesian plane.

21. The centre of the given circle is O. Moreover, $ABCD$ is a parallelogram and $AOBEF$ is a straight line. Find the magnitude of $D\hat{E}F$ based on the information in the figure.

22. Ramani deposited a certain amount of money for two years in a finance company that pays an annual interest rate of 10%, with the interest compounded annually. The interest that she received for the second year only is 660 rupees and the total amount she received at the end of two years is 7260 rupees. Find the amount she deposited.

23. In the given circle, C is the centre and $AC \parallel BD$. Find the magnitude of $A\hat{E}B$.

24. Find the **negative integral** solutions of the inequality $3x + 11 > 2$.

25. ABC is an acute triangle as given in the figure. This incomplete sketch has been drawn to find the centre O of the circle that touches the side AB at the point B and also touches the side AC. Using the knowledge on loci, complete the sketch and mark O.

50

* *

[see page six

Part B

*Answer **all** questions **on this question paper itself.***

1. Janaka pays income tax of 6% on the amount that he earns above 100 000 rupees, when his monthly salary is more than this amount. In a certain month, he puts aside for food, $\frac{1}{6}$ of the amount he received after paying the tax. He puts aside $\frac{3}{5}$ of the remaining amount for other expenses.

(i) What fraction of the amount Janaka received remains after he puts aside $\frac{1}{6}$ of it for food?

(ii) What fraction of the amount he received remains with Janaka after he puts aside an amount for food and for other expenses?

(iii) If the amount that remains now is 39 600 rupees, find separately how much he received after paying the tax and how much he put aside for food.

(iv) What was his salary before paying the tax?

(v) At some stage, due to the limit over which income tax is charged being increased, if Janaka doesn't have to pay tax, and if the amount he spends on food remains the same as before, how much does he now spend on food as a percentage of his salary?

10

2. (*a*) Saman travels from his home to a friend's home in 30 minutes, at a uniform speed. He spends 30 minutes at his friend's home and returns to his home along the same road in 45 minutes, travelling at a uniform speed.

(i) An incomplete distance-time graph drawn to represent this information is shown here. Complete the graph based on the above information.

(ii) Find the speed at which Saman travels back home, in kilometres per hour.

(*b*) This figure consists of a semicircular part *AEB* of diameter 28 cm and a rectangular part *ABCD*, with the length of *BC* equal to 77 cm.

(i) Find the perimeter of this composite figure.

(ii) How many times of the area of the semicircular part is the area of the rectangular part?

10

[see page seven

3. Kamal rented his house for a year at 8000 rupees per month and obtained the total amount in a single payment. The urban council to which the house belongs has assessed the annual value of the house as 12 000 rupees and charges 18% for a year as rates.

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

(ii) 10% of the amount obtained by renting the house is spent on house maintenance. How much money remains with Kamal after paying the rates and spending on maintenance?

(iii) Now Kamal adds a certain amount to the amount remaining with him, and invests it to buy 50 rupee shares of a company. The company pays annual dividends of 2.50 rupees per share. He receives 6000 rupees as the dividend income at the end of a year.

(*a*) How many shares did Kamal buy?

(b) Write the extra amount Kamal added to invest in the company, as a percentage of the total amount he invested in the company.

10

4. A frequency polygon and an incomplete grouped frequency table drawn based on the marks obtained by a group of students for a test are given below. In this table, the interval 10 – 20 denotes 10 or more than 10 and less than 20.

Marks	Number of students	Cumulative frequency
10 – 20	20	20
20 – 30	.....	.....
30 – 50	60	.....
50 – 60	.....	.....
60 – 90	.....	.....

(i) In the table, fill in the blanks in the column denoting the number of students, according to the frequency polygon.

(ii) On the given frequency polygon, draw the histogram corresponding to these marks.

(iii) Complete the cumulative frequency column in the table.

(iv) Find the probability of a student picked at random from this group of students being someone who has obtained 50 marks or more.

10

[*see page eight*

5. In a school, for a certain sport, there are four boys and a girl in the grade 10 team and two boys and three girls in the grade 11 team. For the first round of a competition between the two teams, a child from grade 10 and a child from grade 11 are picked randomly.

(i) By considering that the boys are denoted by B_1, B_2, B_3, B_4, B_5, B_6 and the girls are denoted by G_1, G_2, G_3, G_4, mark the sample space relevant to randomly picking two children on this grid with the symbol 'X'.

(ii) On the grid, encircle the event of exactly one boy being picked for the first round of the competition and find its probability.

(iii) It is given that when the two participants in the first round of the competition are selected in the above manner, if exactly one of the two is a boy, the probability of Grade 10 winning is $\frac{4}{10}$ and if either both are boys or both are girls, the probability of Grade 10 winning is $\frac{3}{10}$. Accordingly, write the relevant probabilities on the branches of the tree diagram given below, to predict whether Grade 10 wins or not.

(iv) Calculate the probability of Grade 10 not winning in this competition round.

10

* * *

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

32 E II

අධ්‍යයන පොදු සහතික පත්‍ර (සාමාන්‍ය පෙළ) විභාගය, 2024(2025)
கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2024(2025)
General Certificate of Education (Ord. Level) Examination, 2024(2025)

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 pyramid of base area A and height h is $\frac{1}{3}Ah$.*
* *The volume of a right circular cylinder of base radius r and height h is $\pi r^2 h$.*

Part A

*Answer **five** questions only.*

1. A stock of television sets worth 84 000 rupees each is available for sale. The method used by Ruvini to buy a television set and the method used by Manel to buy another television set is given below.

Ruvini: A loan of 84 000 rupees is taken from a finance company for a year at an annual simple interest and the television set is bought. At the end of the year, the loan is settled by paying the loan amount and interest of 10 920 rupees.	**Manel**: The television set is bought on hire purchase with the amount and interest to be paid in 12 equal monthly installments. Here, the interest is calculated on the reducing balance. When the payment of the installments is completed in a year, the same total interest of 10 920 rupees that is paid by Ruvini has been paid.

Find separately the annual interest rates at which the interest is paid by the two of them and show that the annual interest rate charged in the hire purchase method is more than the annual interest rate charged by the finance company.

2. An incomplete table showing the y-values corresponding to several x-values of a quadratic function of the form $y = f(x)$, within the interval $-2 \leq x \leq 4$ is given below.

x	-2	-1	0	1	2	3	4
y	-5	0	3	4	...	0	-5

(i) By considering the symmetry of the quadratic function, find the value of y when $x = 2$.

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

(iii) (*a*) Write the coordinates of the two points of intersection of the graph and the x-axis.

(*b*) By considering the coordinates of the two points mentioned in the above part, write the given quadratic function in the form $y = -(x+p)(x+q)$.

(iv) Let us take that the line $y = 1$ intersects the graph at the points A and B.

(*a*) Write the interval of values of x on which $y > 1$.

(*b*) Obtain the length of AB to the nearest first decimal place.

[see page two

3. In a competition, the competitors had to run up an inclined plane, climb up a vertical ladder and then slide down another inclined plane. The side view of the two inclined planes and the vertical ladder used for this are denoted by AC, DE and CD respectively in the figure. Here, ABE is a horizontal plane, $AC = BE = 50$ m, $C\hat{A}B = 26° 10'$, BCD is perpendicular to ABE, and $DC = BC$.

Copy the given figure in your answer script and include the given information in it.

Using trigonometric ratios, show that the difference between the incline of DE (that is $D\hat{E}B$) and the incline of AC (that is $C\hat{A}B$) is more than 15°.

4. The top of a birthday cake is in the shape of a right angled isosceles triangle. Its two equal sides are of length $2x$ cm each. As shown in the figure, the words 'HAPPY BIRTHDAY' are written on a rectangular piece of white icing of length $(x+2)$ cm and breadth $(x-4)$ cm. The remaining portion is decorated in pink and is of area 132 cm^2.

(i) Show that x satisfies the equation $x^2 + 2x - 124 = 0$ and find the value of x to the nearest centimetre. (Take the value of $\sqrt{5}$ to be 2.24)

(ii) Show that the length of the longest side of the top of the cake is given by $2\sqrt{2}\,x$ and show that this length is greater than 28 cm. (Take the value of $\sqrt{2}$ to be 1.41)

5. Packs of 10 small plates each and packs of 5 large plates each were bought to serve sweetmeats to the adults and children who attended a party. The price of a pack of small plates was 150 rupees and the price of a pack of large plates was 120 rupees. The total number of plates that were bought was 200 and the total cost of these plates was 3720 rupees.

(i) By taking the number of packs of small plates bought as x and the number of packs of large plates bought as y, construct a pair of simultaneous equations and by solving them, find separately the number of packs of small plates and the number of packs of large plates that were bought.

(ii) Each small plate had the same number of sweetmeats and each large plate had two sweetmeats more than a small plate. If the total number of sweetmeats that were served was 1160, find the number of sweetmeats that a small plate had.

6. The frequency table given below provides information related to the number of hires a certain three-wheeler engaged in each week.

Number of hires	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39
Number of weeks	1	3	4	6	5	7	4

(i) Find the mean number of times the three-wheeler was hired a week.

(ii) How many hires can the three-wheeler driver expect in total in 52 weeks?

(iii) Let us take that the average distance of a hire is 5 km. If the three-wheeler driver charged a fee of 100 rupees per kilometre, what can he expect as his income for four weeks?

(iv) What is the minimum number of times the three-wheeler may have been hired in total in the weeks in which the number of times it was hired was less than 20?

[see page three

Part B

*Answer **five** questions only.*

7. Use only a straight edge with a cm/mm scale and a pair of compasses for the following geometric constructions. The construction lines should be clearly drawn.

(i) Construct a straight line segment AB of length 6 cm. Construct an angle of $60°$ at B on AB and bisect it.

(ii) Construct the isosceles triangle ABC such that $AB = AC$ and $A\hat{B}C = 30°$.

(iii) Construct the perpendicular bisector of AC. Construct a semicircle on the side AC, outside the triangle ABC, such that AC is its diameter.

(iv) Construct a straight line through A parallel to BC such that it intersects the semicircle at D, and join CD.

(v) What is the magnitude of $A\hat{C}D$?

8.

In the figure, $ABCD$ is a parallelogram. E is the midpoint of BC and F is a point on DC such that $DF = \frac{1}{3}DC$. Here, the line AB produced meets the line FE produced at G and the line AD produced meets the line EF produced at H.

Copy the given figure in your answer script.

(i) Show that $\triangle BGE \equiv \triangle CFE$.

(ii) Join BF and GC and give reasons why $BGCF$ is a parallelogram.

(iii) Show that $\triangle DFH$ and $\triangle BGE$ are equiangular.

(iv) Show that $DH = \frac{1}{4}AD$.

9. Nine small solid metal right pyramids, each with a square base of side length a, and height $2a$, are melted and a solid right circular cylinder of base radius r and height $3r$ is made without any wastage of metal.

Show that $a^3 = \frac{\pi}{2}r^3$.

If $r = 1.725$ cm, by taking $\pi = 3.14$, find the value of a^3 using the logarithms table and obtain the side length a of the base of a pyramid to the nearest centimetre.

From a solid cuboid with a square cross section of side length a, and height $2a$, if one small pyramid with the above mentioned measurements is cut and removed, find the volume of metal that is remaining. (Use the above obtained value of a.)

[see page four

10. Amala and Sumana decide to read a certain novel during the holidays. Amala reads 20 pages on the first day and on each day thereafter she reads three pages more than the previous day.

(i) Write the number of pages that Amala reads on the 1st, 2nd and 3rd days respectively.

(ii) How many pages does Amala read on the 16th day?

(iii) If she completes the novel on the 16th day, how many pages does the novel consist of?

(iv) How many pages does Sumana read on the first day if she takes 17 days to complete the novel and if on each day after the first, she reads 4 pages more than the previous day?

(v) If the two of them started reading the novel on the same day, on which day do they both read the same number of pages?

11. In the given figure, AB is a diameter of the circle with centre O and CD is a chord which is bisected at X by AB. Moreover, CP is perpendicular to PAR, the tangent to the circle at A.

Copy the given figure in your answer script and join OC.

(i) Show that $PAXC$ is a cyclic quadrilateral and that the chord AC bisects $P\hat{C}O$.

(ii) State with reasons two angles which are equal to $D\hat{A}R$.

12. An incomplete Venn diagram with information on 100 customers who came to a certain store is shown here.

* 14 customers did not buy fish, lentils or eggs. 60 customers bought lentils.

Copy the given figure in your answer script and enter the given information in it.

(i) How many customers bought exactly one of the three items fish, eggs and lentils?

(ii) If the number of customers who bought all these three items is equal to the number of customers who bought exactly two of these items, how many customers bought all three items?

(iii) If the number of customers who bought only eggs and lentils is twice the number of customers who bought only fish and lentils, how many customers bought eggs and lentils?

(iv) If the number of customers who bought fish is 52, how many customers bought only eggs?

* * *

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Department of Examinations-Sri Lanka

G.C.E(O/L) Examination - 2024 (2025)

32 – Mathematics

Marking Scheme

Batman equation

$$\left(\left(\frac{x}{7}\right)^2\sqrt{\frac{\left||x|-3\right|}{|x|-3}}+\left(\frac{y}{3}\right)^2\sqrt{\frac{\left|y+\frac{3\sqrt{33}}{7}\right|}{y+\frac{3\sqrt{33}}{7}}}-1\right)\cdot\left(\left|\frac{x}{2}\right|-\left(\frac{3\sqrt{33}-7}{112}\right)x^2-3+\sqrt{1-\left(\left||x|-2\right|-1\right)^2}-y\right)$$
$$\cdot\left(9\sqrt{\frac{|(|x|-1)(|x|-.75)|}{(1-|x|)(|x|-.75)}}-8|x|-y\right)\cdot\left(3|x|+.75\sqrt{\frac{|(|x|-.75)(|x|-.5)|}{(.75-|x|)(|x|-.5)}}-y\right)$$
$$\cdot\left(2.25\sqrt{\frac{|(x-.5)(x+.5)|}{(.5-x)(.5+x)}}-y\right)\cdot\left(\frac{6\sqrt{10}}{7}+(1.5-.5|x|)\sqrt{\frac{\left||x|-1\right|}{|x|-1}}-\frac{6\sqrt{10}}{14}\sqrt{4-(|x|-1)^2}-y\right)=0$$

This document has been prepared for the use of Marking Examiners. Some changes would be made according to the views presented at the Chief Examiners' Meeting

Amendments are to be included.

අ.පො.ස. (සා.පෙළ) විභාගය - 2024 (2025)
32 - ගණිතය
ලකුණු දීමේ පටිපාටිය

ගණිතය I

මෙම පත්‍රය A හා B යනුවෙන් කොටස් දෙකකින් යුක්තය. A කොටස, කෙටි පිළිතුරු අපේක්ෂිත ප්‍රශ්න 25 කින් ද, B කොටස ව්‍යුහගත ප්‍රශ්න පහකින් ද සමන්විතය. මෙම ප්‍රශ්න සියල්ලටම, ප්‍රශ්න පත්‍රයෙහි එක් එක් ප්‍රශ්නය සමග දී ඇති ඉඩ ප්‍රමාණය තුළ පිළිතුරු සැපයිය යුතුය. කාලය පැය දෙකකි.

ගණිතය II

මෙම පත්‍රය ද A හා B යනුවෙන් කොටස් දෙකකින් යුක්තය. A කොටසෙහි දී ඇති ප්‍රශ්න හයෙන් ප්‍රශ්න පහක් ද, B කොටසෙහි දී ඇති ප්‍රශ්න හයෙන් ප්‍රශ්න පහක් ද වශයෙන් තෝරාගත් ප්‍රශ්න 10 කට පිළිතුරු සැපයිය යුතුය. පිළිතුරු සැපයීම සඳහා ලියන පොත් හෝ කඩදාසි භාවිත කළ යුතුය. කාලය පැය තුනකි.

මුළු ප්‍රශ්න ගණන	පිළිතුරු සැපයිය යුතු ප්‍රශ්න ගණන	එක් ප්‍රශ්නයකට ලකුණු	ලබා ගත හැකි උපරිම ලකුණු
ගණිතය - I පත්‍රය A කොටස - 25	25	02	02 × 25 = 50
B කොටස - 5	5	10	10 × 5 = 50
			එකතුව = 100
ගණිතය - II පත්‍රය A කොටස - 6	5 (කැමති පරිදි තෝරාගත්)	10	10 × 5 = 50
B කොටස - 6	5 (කැමති පරිදි තෝරාගත්)	10	10 × 5 = 50
			එකතුව = 100
			මුළු එකතුව = 200

I හා II පත්‍ර දෙකම සඳහා අපේක්ෂකයකු ලබාගන්නා මුළු ලකුණු සංඛ්‍යාව 2 න් බෙදා අවසාන ලකුණ ගණනය කෙරේ.

වැදගත් :-

1. මෙම ලකුණු දීමේ පටිපාටියෙන් බැහැරව ලකුණු නොදෙන්න.
2. ගණිතය II පත්‍රයෙහි ප්‍රශ්න 10 තෝරා ගත යුත්තේ A හා B යන එක් එක් කොටසෙන් ප්‍රශ්න පහ බැගිනි. නියමිත සංඛ්‍යාවට වඩා වැඩියෙන් පිළිතුරු සපයා ඇති ප්‍රශ්න සඳහා ලකුණු නොලැබේ.
3. ගැටලු මතුවූ විට ප්‍රධාන පරීක්ෂකගේ උපදෙස් ලබා ගන්න.
4. උත්තරපත්‍ර ලකුණු කිරීම සඳහා රතු පෑනක් පමණක් පාවිච්චි කරන්න.

ගණිතය - I

I පත්‍රය ලකුණු කිරීම සඳහා උපදෙස්

❖ උත්තර ලිවීම සඳහා නියමිත ඉඩ ප්‍රමාණය තුළ ගණන සාදා ඇත්නම් ලකුණු ප්‍රදානය කරන්න.

A කොටස

- අංක 1 සිට 25 තෙක් ප්‍රශ්න 25 හි පිළිතුරුවලට අදාළ ලකුණුවල එකතුව අදාළ රවුම් තුළ සඳහන් කරන්න.
- A කොටසට හිමි මුළු ලකුණු පළමුවන පිටුවේ අදාළ ස්ථානයේ සටහන් කරන්න.

B කොටස

- ප්‍රශ්න 5 සඳහා ලකුණු 10 බැගින් ප්‍රදානය කරන්න. එම ලකුණු ද පළමුවන පිටුවේ අදාළ ස්ථානයේ සටහන් කරන්න.

ගණිතය - II

II පත්‍රය ලකුණු කිරීම සඳහා උපදෙස්

1. මෙම ලකුණු දීමේ පටිපාටියේ දක්වා ඇති කොටස් සඳහා ලකුණු තවදුරටත් නොබිඳින්න.

2. යම් ප්‍රශ්නයක් කොටස් කිහිපයකින් සමන්විත වන විට එක් කොටසක් සඳහා ලැබුණු වැරදි උත්තරයක්, ඊට පසු එන කොටසකට උත්තරයක් ලබා ගැනීමට භාවිත කොට ඇත්නම් එම දෙවන කොටසේ ක්‍රමය සඳහා දෙන ලෙස දක්වා ඇති ලකුණු දෙන්න.

3. දත්ත පිටපත් කිරීමේදී හෝ පියවරින් පියවර යාමේදී හෝ අත්වැරැද්දක් සිදුවී ඇත්නම් අ.වැ. යනුවෙන් එතන ලකුණු කොට ඒ සඳහා ලකුණු එකක් අඩු කරන්න. එම අත්වැරැද්දට අනුකූලව ඊළඟට එන පියවර නිවැරදි නම් ඒවාට නියමිත ලකුණු දෙන්න. එහෙත් එම කොටසේම දෙවන අත්වැරැද්ද සිදුවී ඇත්නම් අ.වැ. යනුවෙන් එතනදී ද ලකුණු කර එම ප්‍රශ්නයට ඉන් ඔබ්බට ලකුණු නොදී නවතින්න.

   සැ.යු. යම් වැරැද්දක් අත්වැරැද්දක් ලෙස සැලකිය යුත්තේ ඒ හේතුවෙන් පිළිතුරු සැපයීම පහසු වී නැතිනම් පමණි. විෂය කරුණු පිළිබඳ වැරදි, අත්වැරදි ලෙස සැලකිය යුතු නොවේ.

4. අවසාන උත්තරයේ ඒකකය දක්වා නැතිනම් හෝ වැරදි ලෙස දක්වා ඇත්නම් හෝ ලකුණු එකක් අඩු කරන්න.

5. මෙම ලකුණු දීමේ ක්‍රමය අනුව එක් එක් ප්‍රශ්නයේ ඒ ඒ කොටසේ අතරමැද පියවරවලට දියයුතු කොටස් ලකුණු එම පියවර අසලින් සටහන් කොට, අදාළ කොටස සඳහා මුළු ලකුණු ගණන එම කොටස අවසානයේදී කඩදාසියේ දකුණුපස තීරය සමීපයේ කවයක් තුළ ලියන්න.
   මෙසේ ..... ⑥

6. එක් එක් ප්‍රශ්නය සඳහා දෙන ලද මුළු ලකුණු ගණන උත්තරය අවසානයේදී ප්‍රශ්න අංකය ද සමග මෙසේ ලියා දක්වන්න. 3 — $\boxed{05}$ හතරැස් කොටුව තුළ දැක්වෙන්නේ ලැබූ ලකුණු ගණනයි.

7. ලකුණු ඇතුළත් කිරීම හා අවසාන ලකුණු (ප්‍රතිශතය) සටහන් කිරීම පිළිබඳ උපදෙස් මෙහි අවසානයේ දක්වේ.

අ.පො.ස. (සා.පෙළ) විභාගය - 2023 (2024)
උත්තරපත්‍ර ලකුණු කිරීමේ පොදු ශිල්පීය ක්‍රම

උත්තරපත්‍ර ලකුණු කිරීමේ හා ලකුණු ලැයිස්තුවල ලකුණු සටහන් කිරීමේ සම්මත ක්‍රමය අනුගමනය කිරීම අනිවාර්යයෙන් ම කළ යුතු වේ. ඒ සඳහා පහත සඳහන් පරිදි කටයුතු කරන්න.

1. සෑම සහකාර පරීක්ෂකවරයකුම උත්තරපත්‍ර ලකුණු කිරීමට රතුපාට බෝල් පොයින්ට් පෑනක් පාවිච්චි කරන්න.
2. ප්‍රධාන පරීක්ෂක විසින් දම්පාට බෝල් පොයින්ට් පෑනක් පාවිච්චි කළ යුතුය.
3. සෑම උත්තරපත්‍රයක ම මුල් පිටුවේ සහකාර පරීක්ෂක සංකේත අංකය සටහන් කරන්න. ලකුණු සටහන් කිරීමේදී **පැහැදිලි ඉලක්කමෙන්** ලියන්න.
4. ඉලක්කම් ලිවීමේදී යම් වැරදීමක් සිදු වුවහොත් එය පැහැදිලිව තනි ඉරකින් කපා හැර නැවත ලියා අත්සන යොදන්න.
5. එක් එක් ප්‍රශ්නයේ අනු කොටස්වල පිළිතුරු සඳහා හිමි ලකුණු ඒ ඒ කොටස අවසානයේ △ ක් තුළ භාග සංඛ්‍යාවක් ලෙස ලියා දක්වන්න. අවසාන ලකුණු ප්‍රශ්න අංකයත් සමඟ □ ක් තුළ, භාග සංඛ්‍යාවක් ලෙස ඇතුළත් කරන්න. ලකුණු සටහන් කිරීම සඳහා පරීක්ෂකවරයාගේ ප්‍රයෝජනය සඳහා ඇති තීරුව භාවිත කරන්න.
6. ගණිත පරීක්ෂක විසින් ලකුණු නිවැරදි බව සටහන් කිරීමට නිල් හෝ කළු පෑනක් භාවිතා කළ යුතුය.

උදාහරණ : ප්‍රශ්න අංක 03

(i) ..... √ $\frac{4}{5}$

(ii) ..... √ $\frac{3}{5}$

(iii) ..... √ $\frac{3}{5}$

03 එකතුව → $\frac{10}{15}$

බහුවරණ උත්තරපත්‍ර :

01. කවුළු පත්‍රය සැකසීම

I. ලකුණු දීමේ පටිපාටිය අනුව නිවැරදි වරණ කවුළු පත්‍රයේ සටහන් කරන්න.

II. එසේ ලකුණු කළ කවුළු බ්ලේඩ් තලයකින් කපා ඉවත් කරන්න.

III. කවුළු පත්‍රය උත්තරපත්‍රය මත නිවැරදිව තබා ගත හැකි වන පරිදි විභාග අංක කොටුව හා නිවැරදි පිළිතුරු ගණන දැක්වෙන කොටුව ද කපා ඉවත් කරන්න.

IV. හරි පිළිතුරු හා වැරදි පිළිතුරු ලකුණු කළ හැකි වන පරිදි එක් එක් වරණ පේළිය අවසානයේ හිස් තීරයක් ද කපා ඉවත් කරන්න.

V. විෂය අංකය හා විෂය පැහැදිලිව පෙනෙන ආකාරයට එම කොටු ද කපා ඉවත් කරන්න.

VI. කපා ගත් කවුළු පත්‍රය ප්‍රධාන පරීක්ෂකවරයා ලවා අත්සන් යොදා අනුමත කර ගන්න.

02. **අනතුරුව උත්තරපත්‍ර හොඳින් පරීක්ෂා කර බලන්න. කිසියම් ප්‍රශ්නයකට එක් පිළිතුරකට වඩා ලකුණු කර ඇත්නම් හෝ එකම පිළිතුරක්වත් ලකුණු කර නැත්නම් හෝ වරණ කැපී යන පරිදි ඉරක් අඳින්න. ඇතැම් විට අයදුම්කරුවන් විසින් මුලින් ලකුණු කර ඇති පිළිතුරක් මකා වෙනත් පිළිතුරක් ලකුණු කර තිබිය හැක. එසේ මකන ලද අවස්ථාවකදී පැහැදිලිව මකා නොමැති නම් මකන ලද වරණය මත ද ඉරක් අඳින්න.**

03. කවුළු පත්‍රය උත්තරපත්‍රය මත නිවැරදිව තබන්න. නිවැරදි පිළිතුර ✓ ලකුණකින් ද, වැරදි පිළිතුර x ලකුණකින් ද ලකුණු කරන්න. නිවැරදි පිළිතුරු සංඛ්‍යාව ඒ ඒ වරණ තීරයට පහළින් ලියා දක්වන්න. අනතුරුව එම සංඛ්‍යා එකතු කර මුළු නිවැරදි පිළිතුරු සංඛ්‍යාව අදාළ කොටුව තුළ ලියන්න.

ව්‍යුහගත රචනා හා රචනා උත්තරපත්‍ර :

1. අයදුම්කරුවන් විසින් උත්තරපත්‍රයේ හිස්ව තබා ඇති පිටු හරහා රේඛාවක් ඇඳ කපා හරින්න. **වැරදි හෝ නුසුදුසු පිළිතුරු යටින් ඉරි ඇඳ වැරදි දමන්න. ලකුණු දිය හැකි ස්ථානවල හරි ලකුණු යෙදීමෙන් එය පෙන්වන්න.**

2. ලකුණු සටහන් කිරීමේදී ඕවර්ලන්ඩ් කඩදාසියේ දකුණු පස තීරය යොදා ගත යුතු වේ.

3. සෑම ප්‍රශ්නයකට ම දෙන මුළු ලකුණු උත්තරපත්‍රයේ මුල් පිටුවේ ඇති අදාළ කොටුව තුළ ප්‍රශ්න අංකය ඉදිරියෙන් **අංක දෙකකින් ලියා දක්වන්න.** ප්‍රශ්න පත්‍රයේ දී ඇති උපදෙස් අනුව ප්‍රශ්න තෝරා ගැනීම කළ යුතුවේ. සියලු ම උත්තර ලකුණු කර ලකුණු මුල් පිටුවේ සටහන් කරන්න. ප්‍රශ්න පත්‍රයේ දී ඇති උපදෙස්වලට පටහැනිව වැඩි ප්‍රශ්න ගණනකට පිළිතුරු ලියා ඇත්නම් අඩු ලකුණු සහිත පිළිතුරු කපා ඉවත් කරන්න.

4. පරීක්ෂාකාරීව මුළු ලකුණු ගණන එකතු කොට මුල් පිටුවේ නියමිත ස්ථානයේ ලියන්න. උත්තරපත්‍රයේ සෑම උත්තරයකටම දී ඇති ලකුණු ගණන උත්තරපත්‍රයේ පිටු පෙරළමින් නැවත එකතු කරන්න. එම ලකුණ ඔබ විසින් මුල් පිටුවේ එකතුව ලෙස සටහන් කර ඇති මුළු ලකුණට සමාන දැයි නැවත පරීක්ෂා කර බලන්න.

ලකුණු ලැයිස්තු සකස් කිරීම :

I. එක් පත්‍රයක් පමණක් ඇති විෂයන් හැර ඉතිරි සියලු ම විෂයන්හි අවසාන ලකුණු ඇගයීම් මණ්ඩලය තුළදී ගණනය කරනු නොලැබේ.

II. එක් එක් පත්‍රයට අදාළ අවසාන ලකුණු වෙන වෙනම ලකුණු ලැයිස්තුවලට ඇතුළත් කළ යුතුය.

III. I පත්‍රයට අදාළ ලකුණු, ලකුණු ලැයිස්තුවේ "Total Marks" තීරුවේ **ඇතුළත් කර අකුරෙන් ද ලියන්න.**

IV. II පත්‍රයේ ලකුණු ලැයිස්තුව සැකසීමේ දී විස්තර ලකුණු ඇතුළත් කිරීමෙන් අනතුරුව II පත්‍රයේ අවසාන ලකුණු, ලකුණු ලැයිස්තුවේ "Total Marks" තීරුවේ ඇතුළත් කරන්න.

V. 43 චිත්‍ර විෂයයේ I, II හා III පත්‍රවලට අදාළ ලකුණු වෙන වෙනම ලකුණු ලැයිස්තුවල ඇතුළත් කර **අකුරෙන් ද ලිවිය යුතු වේ.**

VI. 21 - සිංහල භාෂාව හා සාහිත්‍යය, 22 - දෙමළ භාෂාව හා සාහිත්‍යය යන විෂයන්හි I පත්‍රයේ ලකුණු ඇතුළත් කර අකුරෙන් ලිවිය යුතු ය. II හා III පත්‍රවල විස්තර ලකුණු ඇතුළත් කර ඒ ඒ පත්‍රයේ මුළු ලකුණු, ලකුණු ලැයිස්තුවට ඇතුළත් කළ යුතු ය.

සැ.යු :- (I) සෑම විටම එක් එක් පත්‍රයට අදාළ මුළු ලකුණු පූර්ණ සංඛ්‍යාවක් ලෙස ලකුණු ලැයිස්තුවට ඇතුළත් කළ යුතු ය. කිසිදු අවස්ථාවක පත්‍රයේ අවසාන ලකුණු දශම සංඛ්‍යාවකින් හෝ භාග සංඛ්‍යාවකින් නොතැබිය යුතු ය.

(II) ලකුණු ලැයිස්තුවල සෑම පිටුවකම ලකුණු ඇතුළත් කළ සහකාර පරීක්ෂක, ලකුණු පරීක්ෂා කළ සහකාර පරීක්ෂක, ඇගයීම් ලකුණු තහවුරු කිරීමේ පරීක්ෂක හා ප්‍රධාන පරීක්ෂක තම සංකේත අංකය යොදා අත්සන් කිරීමෙන් නිරවද්‍යතාව තහවුරු කිරීම අනිවාර්ය වේ.

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32 - ගණිතය

II පත්‍රය

නිපුණතා සහ ඉගෙනුම් පල

01. **නිපුණතාව 5 :**

ප්‍රතිශත යොදා ගනිමින් නූතන ලෝකයේ සාර්ථක ලෙස ගනුදෙනු කරයි.

- මූල්‍ය ආයතනයකින් ලබාගත් ණය මුදලක් සඳහා වර්ෂයකට ගෙවිය යුතු සුළු පොලිය දී ඇති විට ණය සඳහා අයකරන වාර්ෂික සුළු පොලී අනුපාතිකය ගණනය කරයි.
- භාණ්ඩයක් අත්පිට මුදලට ගැනීමේදී ගෙවිය යුතු මුදලත් එම මුදල වාරිකව ගෙවීමට හැකියාව ඇති විට ගෙවිය යුතු වාරික ගණනත් එම වාරික ගණනට අදාළ පොලියත් දී ඇති විට හීන වන ශේෂ ක්‍රමය යටතේ අය කරනු ලබන වාර්ෂික පොලී අනුපාතිකය ගණනය කර ඉහත සුළු පොලිය සමඟ සන්සන්දනය කරයි.

02. **නිපුණතාව 20 :**

විවිධ ක්‍රම විධි ගවේෂණය කරමින් විචල්‍ය දෙකක් අතර පවතින අන්‍යෝන්‍ය සම්බන්ධතා පහසුවෙන් සන්නිවේදනය කරයි.

i. වර්ගජ ශ්‍රිතයක සමමිතිය සැලකීමෙන් දෙන ලද x අගයට අනුරූප y අගය සොයයි.

ii. සම්මත අක්ෂ පද්ධතිය හා සුදුසු පරිමාණයක් යොදා ගනිමින් ශ්‍රිතයේ ප්‍රස්තාරය අඳියි.

iii. ප්‍රස්තාරය, x අක්ෂය ඡේදනය වන ලක්ෂ්‍යවල ඛණ්ඩාංක ලියා දක්වයි.

ඉහත ලක්ෂ්‍යවල ඛණ්ඩාංක ආධාරයෙන්, දී ඇති වර්ගජ ශ්‍රිතය $y = -(x+p)(x+q)$ ආකාරයට ලියා දක්වයි.

iv. $y = a$ රේඛාව හා ප්‍රස්තාරය ඡේදනය වන ලක්ෂ්‍ය සලකා $y > a$ වන xහි අගය ප්‍රාන්තරය ලියා දක්වයි.

$y = a$ රේඛාව ප්‍රස්තාරය ඡේදනය කරන A හා B ලක්ෂ්‍යවල ඛණ්ඩාංක ඇසුරෙන් AB දිග ආසන්න පළමු දශමස්ථානයට සොයයි.

03. **නිපුණතාව 13 :**

විවිධ ක්‍රම විධි ගවේෂණය කරමින් ප්‍රායෝගික අවස්ථා සඳහා ත්‍රිකෝණමිතිය භාවිත කරයි.

ආනත තල දෙකක් හා සිරස් ඉනිමඟක් දැක්වෙන රූපයකට අදාළ තොරතුරු හා අවශ්‍ය මිනුම් දී ඇති විට,

- එම මිනුම් දී ඇති රූපයේ ලකුණු කරයි.
- ත්‍රිකෝණමිතික අනුපාත භාවිතයෙන් නම් කරන ලද කෝණයක විශාලත්වය ගණනය කරයි.
- ආනත තල දෙකෙහි තිරසට ආනති අතර වෙනස සොයයි.

04. **නිපුණතාව 17 :**

එදිනෙදා ජීවිතයේ අවශ්‍යතා සාක්ෂාත් කර ගැනීම සඳහා සමීකරණ විසඳීමේ ක්‍රම විධි හසුරුවයි.

සමද්විපාද සෘජුකෝණික ත්‍රිකෝණයක සෘජුකෝණය අඩංගු පාද දෙකෙහි දිග ද එම ත්‍රිකෝණය තුළ අඩංගු සෘජුකෝණාස්‍රයක දිග හා පළල ද x ඇසුරින් දී ඉතිරි කොටසෙහි වර්ගඵලය වර්ග සෙන්ටිමීටරවලින් දී ඇති විට,

i. x මගින් දෙන ලද වර්ගජ සමීකරණයත් තෘප්ත වන බව පෙන්වයි.

ii. ත්‍රිකෝණයේ දිගම පැත්තෙහි දිග x ඇසුරින් සොයා, එම දිග, දෙන ලද අගයකට වඩා වැඩි බව පෙන්වයි.

05. **නිපුණතාව 17 :**

එදිනෙදා ජීවිතයේ අවශ්‍යතා සාක්ෂාත් කර ගැනීම සඳහා සමීකරණ විසඳීමේ ක්‍රම විධි හසුරුවයි.

i. දී ඇති තොරතුරු පදනම් කර ගනිමින් අඥාත දෙකක් සහිත සමගාමී සමීකරණ යුගලයක් ගොඩනගයි.

ii. සමීකරණ යුගලය විසඳීමෙන් අඥාත දෙකේ අගය වෙන වෙනම සොයයි.

iii. දෙන ලද ද්‍රව්‍ය ප්‍රමාණයක් දී ඇති අවශ්‍යතාවකට ගැළපෙන සේ කාණ්ඩ දෙකකට වෙන් කරයි.

06. **නිපුණතාව 29 :**

දෛනික කටයුතු පහසු කර ගැනීම සඳහා විවිධ ක්‍රම මගින් දත්ත විශ්ලේෂණය කරමින් පුරෝකථනය කරයි.

එක් ත්‍රිරෝද රථයක් එක් එක් සතියක යෙදුණු කුලී ගමන් වාර සංඛ්‍යාව ආශ්‍රිත තොරතුරු ඇතුළත් සංඛ්‍යාත ව්‍යාප්තියක් දී ඇති විට

i. සතියකදී යෙදුණු මධ්‍යක කුලී ගමන් වාර සංඛ්‍යාව සොයයි.

ii. සතිවලින් දී ඇති කාලයකදී අපේක්ෂා කළහැකි කුලී ගමන්වාර සංඛ්‍යාව නිමානය කරයි.

iii. එක් කුලී ගමනක මධ්‍යක දුර හා කිලෝමීටරයකට අයකරන මුදල දී ඇති විට සති වලින් දෙන ලද කාල සීමාවකදී අපේක්ෂිත ආදායම ගණනය කරයි.

iv. සතියකට යෙදුණ කුලී ගමන් වාර සංඛ්‍යාව දී ඇති අගයකට වඩා අඩු වූ සතිවලදී ගමන්කර ඇති අවම ගමන් වාර සංඛ්‍යාව සොයයි.

07. **නිපුණතාව 27 :**

ජ්‍යාමිතික නියම අනුව අවට පරිසරයේ පිහිටීම්වල ස්වභාවය විශ්ලේෂණය කරයි.

කවකටුව හා cm/mm පරිමාණයක් සහිත සරල දාරයක් පමණක් භාවිතයෙන්,

i. දී ඇති දිගකින් යුත් සරල රේඛා ඛණ්ඩයක් නිර්මාණය කර එහි නම් කළ කෙළවරකදී දී ඇති විශාලත්වයකින් යුත් කෝණයක් නිර්මාණය කර එම කෝණයේ සමච්ඡේදකය නිර්මාණය කරයි.

ii. දී ඇති තොරතුරු ඇසුරින් සමද්විපාද ත්‍රිකෝණයක් නිර්මාණය කරයි.

iii. නිර්මාණය කරන ලද ත්‍රිකෝණයේ නම් කරන ලද පාදයක ලම්බ සමච්ඡේදකය නිර්මාණය කර එම පාදය විෂ්කම්භය වන අර්ධ වෘත්තයක් නිර්මාණය කරයි.

iv. ඉහතින් ලැබෙන රූපයේ දෙන ලද ලක්ෂ්‍යයක් හරහා දෙන ලද රේඛාවකට සමාන්තර රේඛාවක් නිර්මාණය කර එම සමාන්තර රේඛාව ඉහතින් නිර්මාණය කළ අර්ධ වෘත්තය ඡේදනය වන ලක්ෂ්‍යය නම් කරයි. දී ඇති ලක්ෂ්‍ය දෙකක් යා කරයි.

v. නම් කරන ලද කෝණයක විශාලත්වය ගණනය කරයි.

08. **නිපුණතාව 23 :**

සරල රේඛීය තල රූප ආශ්‍රිතව ජ්‍යාමිතික සංකල්ප පදනම් කර ගනිමින් එදිනෙදා ජීවිතයේ කටයුතු සඳහා අවශ්‍ය නිගමනවලට එළඹෙයි.

සමාන්තරාස්‍රයක රූපයක් ආශ්‍රිතව දෙන ලද දත්ත අනුව

i. නම් කරන ලද ත්‍රිකෝණ යුගලයක් අංගසම බව පෙන්වයි.

ii. නම් කරන ලද චතුරස්‍රයක් සමාන්තරාස්‍රයක් වීමට හේතු දක්වයි.

iii. නම් කරන ලද ත්‍රිකෝණ යුගලයක් සමකෝණික බව පෙන්වයි.

iv. පාද දෙකක් අතර දෙන ලද සම්බන්ධතාවක් සත්‍ය බව පෙන්වයි.

09. **නිපුණතාව 10 :**

පරිමාව පිළිබඳව විචාරශීලීව කටයුතු කරමින් අවකාශයේ උපරිම ඵලදායිතාව ලබා ගනියි.

පතුලේ පැත්තක දිග හා උස දී ඇති පතුල සමචතුරස්‍රාකාර පිරමීඩ කිහිපයක් උණුකර ලෝහ අපතේ නොයන පරිදි දී ඇති අරයක් හා උසක් සහිත සිලින්ඩරයක් සාදන බව දී ඇති විට

- පිරමීඩයේ පැත්තක දිග හා සිලින්ඩරයේ අරය අතර දී ඇති සම්බන්ධතාවයත් සත්‍ය බව පෙන්වයි.
- සිලින්ඩරයේ අරය හා π හි අගය සංඛ්‍යාත්මකව දුන් විට ඉහත සම්බන්ධය හා ලඝුගණක වගු ඇසුරින් සිලින්ඩරයේ අරය ආසන්න සෙන්ටිමීටරයට ලබා ගනියි.
- සමචතුරස්‍රාකාර ආධාරකයේ පැත්තක දිග හා එමෙන් දෙගුණයක් දිග සහිත ඝනකාභයක අදාළ මිනුම් දී ඇති විට එම ඝනකාභයේ පතුලේ වර්ගඵලයට සමාන පතුලක් හා උසක් සහිත පිරමීඩයක් ඉවත් කළ විට් ඉතිරි වන ලෝහ පරිමාව ගණනය කරයි.

10. **නිපුණතාව 02 :**

සංඛ්‍යා රටාවල විවිධ සම්බන්ධතා විමර්ශනය කරමින් ඉදිරි අවශ්‍යතා සඳහා තීරණ ගනියි.

එක් එක් දිනයේදී කියවන පිටු ගණන සමාන්තර ශ්‍රේණියක පද ආකාරයට පිහිටන පරිදි දෙදෙනකු විසින් පොතක් කියවීමට අදාළ විස්තර දී ඇති විට

i. එක් අයකු පළමු දිනය තුළ කියවන ලද පිටු සංඛ්‍යා අනුපිළිවෙළින් ලියා දක්වයි.

ii. නම් කරන ලද දිනයකදී එක් අයකු කියවන ලද පිටු ගණන සොයයි.

iii. ඉහත දිනය තෙක් කියවන ලද මුළු පිටු ගණන සොයයි.

iv. දී ඇති තොරතුරු භාවිත කරමින් දෙවැන්නා පළමු දිනයේ කියවූ පිටු ගණන සොයා දක්වයි.

v. දෙදෙනාම එකම පිටු ගණනක් කියවූ දිනය සොයයි.

11. **නිපුණතාව 24 :**

වෘත්ත ආශ්‍රිත ජ්‍යාමිතික සංකල්ප පදනම් කර ගනිමින් නිගමනවලට එළඹීම සඳහා තර්කානුකූල චින්තනය මෙහෙයවයි.

දී ඇති වෘත්තයක් මත වූ ලක්ෂ්‍යයකදී එම වෘත්තයට අඳින ලද ස්පර්ශකය හා එම ස්පර්ශ ලක්ෂ්‍යයේදී අඳින ලද විෂ්කම්භයක්ද එම විෂ්කම්භය මගින් සමච්ඡේදනය වන ජ්‍යායක් ද ඇතුළුව දෙන ලද ජ්‍යාමිතික රූපයක් පිටපත් කර ගනිමින් දී ඇති තොරතුරු සහ වෘත්ත ජ්‍යාමිතිය ආශ්‍රිත ප්‍රමේයය භාවිත කරමින්,

i. එම රූපයේ අඩංගු නම් කරන ලද චතුරස්‍රයක් වෘත්ත චතුරස්‍රයක් බවත් දී ඇති කෝණයක් දී ඇති රේඛා ඛණ්ඩයකින් සමච්ඡේදනය වන බවත් විධිමත්ව සාධනය කරයි.

ii. නම් කරන ලද කෝණයකට සමාන වන කෝණ දෙකක් හේතු දක්වමින් නම් කරයි.

12. **නිපුණතාව 30 :** එදිනෙදා ජීවිතයේ කටයුතු පහසු කර ගැනීම සඳහා කුලක ආශ්‍රිත මූලධර්ම හසුරුවයි.

වෙළෙඳසලකට පැමිණි පාරිභෝගිකයන් සංඛ්‍යාව ද එම පාරිභෝගිකයින් මිලදී ගන්නා ලද ආහාර වර්ග තුනක් පිළිබඳ දත්ත දෙකක්ද එම ප්‍රකාශවලට අදාළ අසම්පූර්ණ වෙන් සටහනක් ද දී ඇති විට දී ඇති අසම්පූර්ණ වෙන් සටහන පිටපත් කර, සපයා ඇති දත්ත එම වෙන් සටහනේ ඇතුළත් කර

i. දෙන ලද ආහාර වර්ග තුන අතුරින් එක් වර්ගයක් පමණක් මිලදී ගත් පාරිභෝගිකයන් සංඛ්‍යාව සොයයි.

ii. මිල දී ගත් ආහාර වර්ග පිළිබඳව දී ඇති තොරතුරු ආධාරයෙන් ආහාර වර්ග තුනම මිලදී ගත් සංඛ්‍යාව සොයයි.

iii. මිල දී ගත් ආහාර වර්ග තුන පිළිබඳව දෙන ලද තොරතුරු ආධාරයෙන් නම් කරන ලද උපකුලකයක අවයව සංඛ්‍යාව සොයයි.

iv. එක් ආහාර වර්ගයක් මිල දී ගත් මුළු සංඛ්‍යාව දී ඇති විට නම් කරන ලද ආහාර වර්ගයක් පමණක් මිලදී ගත් සංඛ්‍යාව සොයයි.

G.C.E.(O/L) EXAMINATION - 2023 (2024)
Common Techniques of Marking Answer Scripts.

It is compulsory to adhere to the following standard method in marking answer scripts and entering mark sheets.

1. Each Assistant Examiner should use red colour ball-point pen for marking answer scripts.
2. A purple colour ball-point pen should be used by Chief Examiners.
3. Code number of the Assistant Examiner should be noted down on front page of each answer script. Enter marks in **clear numerals.**
4. Write off incorrectly written numerals with a clear single line and authenticate the alterations with Examiner's initial.
5. Enter the marks of each subsection of a question as a rational number in the given space of Δ and the final marks of each question should be entered as a total rational number in the given space of □ by denoting respective question number as well. Use the column assigned for the Examiners to write marks.
6. Evaluation Mark Finalizer should use blue or black colour pen to verify the accuracy of the marks.

Example: **Question No. 03**

(i) ..... √ $\frac{4}{5}$

(ii) ..... √ $\frac{3}{5}$

(iii) ..... √ $\frac{3}{5}$

03 (i) $\frac{4}{5}$ + (ii) $\frac{3}{5}$ + (iii) $\frac{3}{5}$ = $\frac{10}{15}$

MCQ answer scripts: (Template)

1.
   i. Mark the correct options on the template according to the Marking Scheme.
   ii. Cut off the marked windows with a blade.
   iii. Cut off the cages for Index Number and the number of correct options so as to be able to keep the template correctly on the answer script.
   iv. Cut off a blank space to the right of each options column to mark the answers.
   v. Cut off the cages for the subject number and the subject to be clearly visible.
   vi. Submit the prepared template to the Chief Examiner for approval.

2. Then, check the answer scripts carefully. If there are more than one or no answers marked to a certain question write off the options with a line. Sometimes candidates may have erased an option marked previously and selected another option. In such occasions, if the erasure is not clear write off those options too.

3. Place the template on the answer script correctly. Mark the right answers with a '√' and the wrong answers with a 'X' against the options column. Write down the number of correct answers inside the cage given under each column. Then, add those numbers and write the number of correct answers in the relevant cage.

Structured essay type and essay type answer scripts:

1. Cross off any pages left blank by candidates. **Underline wrong or unsuitable answers and write cross mark. Point-out areas by a check mark, where marks can be offered.**
2. Use the right margin of the overland paper to write down the marks.
3. Write down the marks given for each question against the question number in the relevant cage on the front page in **two digits.** Selection of questions should be in accordance with the instructions given in the question paper. Mark all answers and transfer the marks to the front page, and write off answers with lower marks if extra questions have been answered against instructions.
4. Add the total marks carefully and write in the relevant cage on the front page. Turn pages of answer script and add all the marks given for all answers again. Check whether that total tallies with the total marks written on the front page.

Preparation Of Mark Sheets.

Except for the subjects with a single question paper, final marks of two papers will not be calculated within the evaluation board. Therefore add separate mark sheets for each of the question paper. Enter paper I marks in "Total Marks" column of the mark sheet and write them in words as well. Enter paper II Marks in the " Total Marks" Column and include the relevant details. For the subject 43 Art, Paper I, II and III Marks should be entered numerically in the separate mark sheets and **should also be written in words.**

For subjects 21 Sinhala language and literature and 22 Tamil Language and literature, paper I marks once entered numerically should be written in words. Use separate marks sheets for the papers II and III and enter the total marks in the "Total marks column". Write the relevant detailed marks against each of the total mark.

N.B.:-

I. Final marks for paper I, paper II or paper III should always be rounded up to the nearest whole number and they should never be kept as decimal or half values.

II. Each page of the mark sheet should be compulsorily verified by the Assistant Examiner who entered marks to the mark sheet, Assistant Examiner who checked the mark sheet, the Verifying Examiner of the evaluation marks and Chief Examiner by placing respective code number and the signature.

***

இலங்கை பரீட்சைத் திணைக்களம்
க.பொ.த (சாதாரண தர)ப் பரீட்சை -2024(2025)
32- கணிதம்
புள்ளி வழங்கும் திட்டம்

கணிதம் - I

இவ்வினாத்தாள் A, B ஆகிய இரு பகுதிகளைக் கொண்ட பகுதி A யில் 25 சிறு வினாக்களும், பகுதி B யில் 5 கட்டமைப்பு வினாக்களும் உள்ளடக்கப்பட்டுள்ளது. எல்லா வினாக்களுக்கும் விடை அளிக்க வேண்டும். நேரம் 2 மணித்தியாலம்

கணிதம் II

இவ் வினாத்தாள் A, B ஆகிய பகுதிகளைக் கொண்டது. பகுதி A யில் உள்ள 6 வினாக்களில் எவையேனும் 5 வினாக்களுக்கும், பகுதி B யிலுள்ள 6 வினாக்களில் எவையேனும் 5 வினாக்களுக்குமாக எல்லாமாக 10 வினாக்களுக்கு மட்டும் விடையளிக்க வேண்டும். நேரம் 3 மணித்தியாலம்

மொத்த வினாக்களின் எண்ணிக்கை	விடையளிக்க வேண்டிய வினாக்களின் எண்ணிக்கை	விடைகளுக்குரிய புள்ளிகள்	பெறக்கூடிய உச்ச புள்ளிகள்
கணிதம் - I பகுதி A - 25 பகுதி B - 5	25 5	பத்திரம் - I வினா இல 1 - 25 வரை 2 புள்ளி வீதம் வினா இல 1 - 5 வரை 10 புள்ளி வீதம் மொத்தப் புள்ளி	02 × 25 = 50 10 × 5 = 50 100
கணிதம்- II A பகுதி - 6 B பகுதி - 6	5 5	பத்திரம் - II ஒரு வினாவுக்கு 10 புள்ளி வீதம் ஒரு வினாவுக்கு 10 புள்ளி வீதம் மொத்த புள்ளி	10 × 5 = 50 10 × 5 = 50 100

இரு பத்திரங்களில் ஒரு பரீட்சார்த்தி பெறும் மொத்தப் புள்ளியை 2 ஆல் வகுத்து இறுதிப் புள்ளி பெறப்படும். 2 ஆல் வகுக்கும்போது மீதி ஏற்படின் இறுதிப்புள்ளியை அடுத்துள்ள முழு எண்ணிற்கு மட்டம் தட்டுக.

முக்கியம் :-

1. இப்புள்ளி வழங்கும் திட்டத்துக்கு புறம்பாகப் புள்ளியை வழங்க வேண்டாம்.
2. கணிதம் II வினாத்தாளின் பிரிவு A,B இலிருந்து தலா ஐந்து வினாக்கள் வீதம் மொத்தம் 10 வினாக்களுக்கு புள்ளி வழங்கப்பட வேண்டும். நிர்ணயிக்கப்பட்ட எண்ணிக்கைக்கு மேல் விடையளிக்கும் வினாக்களுக்கு புள்ளி வழங்க வேண்டாம்.
3. பிரச்சினை ஏற்படும் போது பிரதம பரீட்சகரின் ஆலோசனையைப் பெறுக.
4. புள்ளி வழங்குவதற்காகச் சிவப்பு நிற மை பயன்படுத்தப்படுதல் வேண்டும்.

கணிதம் - I

குறிக்கோள்

1. பரீட்சார்திகள் பாடத்திட்டத்துக்கு அமைவாக கற்றுள்ள கணித அலகுகளுடன் தொடர்புடைய தத்துவங்களை கிரகித்திருக்கும் மட்டங்களையும்
2. கணிதத்துடன் தொடர்புடைய தொடர்பாடல் ஆற்றலும் தொடர்பு காணும் திறன்களையும்
3. பல்வேறு கணிதச் செய்கைகளை அடிப்படையாகக் கொண்ட எண்களைச் சரியாக ஒழுங்குபடுத்தும் ஆற்றலையும்
4. குறித்த நிபுணத்துவங்களை மாணவர் அடைந்துள்ளனரா எனவும், இவ்வினாப்பத்திரம் மூலமாக பரீட்சிக்க எதிர்பார்க்கப்படுகிறது.

பத்திரம் I இற்கு புள்ளி வழங்குவது தொடர்பான அறிவுறுத்தல்கள்

விடை அளிப்பதற்காக ஒதுக்கப்பட்டுள்ள இடத்தில் விடைகள் எழுத்தப்பட்டிருப்பின் முழுப்புள்ளிகளையும் வழங்குக.

A - பகுதி

வினா இல 01- 25 வரையிலான 25 வினாக்களுக்கு 02 புள்ளி வீதம்

வினா இல 01-07 வரை இறுதியில் அந்த 07 வினாக்களுக்குமான மொத்த புள்ளிகளையும்
08-12 வரை இறுதியில் அந்த 06 வினாக்களுக்குமான மொத்த புள்ளிகளையும்
13-19 வரை இறுதியில் அந்த 06 வினாக்களுக்குமான மொத்த புள்ளிகளையும்
20-25 வரை இறுதியில் அந்த 06 வினாக்களுக்குமான மொத்த புள்ளிகளையும்
தரப்பட்ட சதுரக் கூட்டில் எழுதுக.

மொத்தப் புள்ளிகளை இறுதியிலுள்ள வட்ட கூட்டில் எழுதிய பின் முன் பக்கத்தில் உரிய கூட்டினுள் பதிக.

பகுதி B

ஐந்து வினாக்களுக்கு 10 புள்ளி வீதம் புள்ளி வழங்கவும். இப்புள்ளிகளை முதற்பக்கத்தில் உரிய கூட்டினுள் பதியவும்.

முன்பக்கத்தில் குறித்த கூடுகளில் இட்ட புள்ளிகளை கூட்டி மொத்தப் புள்ளியை எழுதுக.

கணிதம் II

குறிக்கோள்கள்

1. பரீட்சார்த்திகள் பாடத்திட்டத்துக்கு அமைவாக கற்றுள்ள கணித எண்ணக் கருக்கள், தத்துவங்கள், கணிதச் செய்கைகள் பற்றிய அறிவைப் பெற்றிருத்தல் அவற்றோடு தொடர்பான திறன்களை விருத்தி செய்தல்.
2. வாய்மொழியாக, எழுத்து மூலமாக வரிப்படங்கள் மூலமாக, வரைபுகள் மூலமாக மாதிரிகள் மூலமாக அட்சர கணித முறையாகத் தொடர்பாடலைச் செய்யும் திறன்களைப் பரீட்சார்த்திகள் பெறுதல்
3. கணிதத்தில் வெவ்வேறு விடயங்களுக்கு இடையிலும், கணிதத்துக்கும் வேறு பாடப் பரப்புக்களுக்கு இடையிலும் காணப்படும் தொடர்புகளை இனங்காண்பதன் மூலம் பெறப்படும் அறிவைப் புதிய சந்தர்ப்பங்களில் உபயோகிக்கும் திறன்களைப் பரீட்சார்த்திகள் பெற்றிருத்தல்
4. மேற்கூறிய விடையங்களுக்காக தேவையான தர்க்க ரீதியான வாதங்களை உருவாக்குவதற்கும் அவ்விடயங்களை மதிப்பீடு செய்வற்குமான தேர்ச்சிகளைப் பரீட்சார்த்திகளிடம் விருத்தி செய்தல்.
5. உரிய கணிதச் செய்கைளின் மூலம் எண்களைச் சரியாக கையாளும் சந்தர்ப்பங்களில் பிரசினம் தீர்க்கும் திறனைப் பெற்றிருத்தல்.

போன்ற விடயங்கள் தொடர்பான அடைவு மட்டங்கள் எய்தப்பட்டுள்ளனவா என்பது இப்பத்திரத்தின் ஊடாக எதிர்பார்க்கப்படகின்றது.

பத்திரம்- II இற்கு புள்ளி வழங்குவது தொடர்பான அறிவுறுத்தல்கள்

1. இப்புள்ளித் திட்டத்தில் காட்டப்பட்டுள்ள பகுதிப் புள்ளிகளை மேலும் பிரிக்க வேண்டாம்

2. ஏதேனும் ஒரு வினா பல பகுதிகளைக் கொண்டதாக இருக்கும்போது ஒரு பகுதியில் பெற்ற பிழையான விடையை அதற்குப் பின்னர் வரும் பகுதியின் விடையைப் பெறுவதற்குப் பயன்படுத்தி இருப்பின், இரண்டாவது பகுதியில் முறை (Method) என்பதற்கு வழங்குவதற்காக காட்டப்பட்டுள்ள புள்ளியை வழங்குக. எனினும் இவ்விரண்டாம் பகுதியின் பிழையான விடைக்குப் புள்ளி வழங்க வேண்டாம்.

3. தரவுகளைப் பிரதி செய்யும்போதோ, படிக்கும்படி சொல்லும்போதோ "வழு" ஏற்படின் "வழு" (Slip) என அவ்விடத்தில் குறிப்பிட்டு 01 புள்ளியைக் குறைக்க. அவ்வழுவிற்கு ஏற்ப அடுத்துவரும் படிகள் சரி எனின் அவற்றிற்குரிய புள்ளிகளை வழங்கவும். எனினும் அப்பகுதியில் இரண்டாவது "வழு" ஏற்படின் "வழு" (Slip) என அவ்விடத்தில் குறிப்பிட்டு அதன்பின்னர் புள்ளி வழங்குவதை நிறுத்தவும்

குறிப்பு:
எந்தவொரு பிழையையும் அதனால் அப்பிரச்சினையைத் தீர்த்தல் கடினமாகும் போது வழு எனக் கொள்ளப்படும். பாட விடயம் தொடர்பான பிழையை "வழு" எனக் கருத்தக்கூடாது.

4. இறுதி விடையில் "அலகு" குறிப்பிடாவிட்டால் அல்லது பிழையாக குறிப்பிட்டிருந்தால் 1 புள்ளியைக் குறைக்க.

5. இறுதிப்புள்ளி வழங்கல் முறைக்கு ஏற்ப ஒவ்வொரு வினாவுக்கும், அவ்வப்பகுதிகளில் உள்ள படிகளுக்கு வழங்க வேண்டிய பகுதிப்புள்ளிகளை அப்படிகளுக்கே அருகே குறித்து பகுதிக்குரிய மொத்தப் புள்ளியை அப்பகுதியின் இறுதியில் தாளின் வலதுபக்க நிரலுக்கு அருகே வட்டம் ஒன்றினுள் ⑥ என்றவாறு எழுதுங்கள்.

6. ஒவ்வொரு வினாவிற்கும் வழங்கும் மொத்தப் புள்ளியை விடையின் இறுதியில் வினா இலக்கத்தடன் சதுரக்கூடு ஒன்றினுள் வலதுபக்க நிரலில் 04 - $\boxed{06}$ என்றவாறு எழுதுங்கள்

7. புள்ளிகளை பதிதல், இறுதியில் புள்ளிக்கான நுற்று வீதத்தை குறித்தல் போன்ற விடயங்கள் தொடர்பான அறிவுறுத்தல்கள் இதன் இறுதியில் தரப்பட்டுள்ளன.

விடைப்பத்திரத்திற்கு புள்ளி வழங்கும் பொது அறிவுறுத்தல்

விடைப்பத்திரத்திற்கு புள்ளி வழங்கலுக்கும் புள்ளி பதிதலுக்கும் அறிவுறுத்தல்களைக் கட்டாயம் பின்பற்றப்பட வேண்டும். அதற்காக பின்வரும் நடைமுறைகள் கையாளப்பட்ட வேண்டும்

- ☆ விடைப்பத்திரங்களுக்குப் புள்ளி வழங்கும் போது சிவப்பு நிறப்பென்சில் அல்லது சிவப்பு நிற குமிழ்முனைப் பேனை என்பவற்றைப் பயன்படுத்தவும்
- ☆ சகல விடைத்தாளிலும் பரீட்சகரின் குறியீட்டு எண் எழுதப்பட வேண்டும்
- ☆ இலக்கங்களை எழுதும் போது கீழே குறிக்ப்பட்ட விதிமுறைகளைக் கையாளவும்
- ☆ இலக்கங்களை எழுதும் போது பிழைகள் ஏற்படின் தனிக் கோட்டினால் வெட்டி திரும்பவும் தெளிவாக இலக்கங்களை எழுதி சிற்றொப்பம் வைக்கவும்
- ☆ கணிதம் I வினாக்களும் விடைகளும்
- ☆ A பகுதி வினாக்களுக்கு (2) புள்ளிகள் வழங்கப்பட இருப்பின் சரியான விடை மாத்திரம் இருப்பின் 02 புள்ளிகளை வழங்கவும்
- ☆ படிமுறை தொடர்பாக (1) + (1) எனக் குறிப்பிட்டிருப்பின் உரிய படிமுறைகளுக்கு ஒரு புள்ளி விதம் வழங்குக.
    - ○ விடைத்தாளில் புள்ளியிடப்பட்ட பின்னர் A, B பகுதிகளின் கூட்டுத்தொகையை விடைத்தாளின் முன்பக்கத்தில் அதற்குரிய பக்கத்தில் பதிய வேண்டும். சரியான கூட்டுத்தொகை எழுதப்படல் வேண்டும்.

க.பொ.த (சா.தர)ப் பரீட்சை - 2024 (2025)
விடைத்தாள்களுக்குப் புள்ளியிடலுக்கான பொது நுட்ப முறைகள்

விடைத்தாள்களுக்குப் புள்ளியிடும் போதும், புள்ளிப்பட்டியலில் புள்ளிகளைப் பதியும் போதும் ஓர் அங்கீகரிக்கப்பட்ட முறையைக் கடைப்பிடித்தல் கட்டாயமானதாகும். அதன் பொருட்டு பின்வரும் முறையில் செயற்படவும்.

1. சகல உதவிப் பரீட்சகர்களும் விடைத்தாள்களுக்குப் புள்ளியிடுவதற்கு சிவப்பு நிற மைப் பேனாவை பயன்படுத்தவும்.
2. பிரதம பரீட்சகர் ஊதாநிற மைப்பேனாவைப் பயன்படுத்த வேண்டும்.
3. சகல விடைத்தாள்களினதும் முதற்பக்கத்தில் உதவிப் பரீட்சகரின் குறியீட்டெண்ணைக் குறிப்பிடவும். இலக்கங்கள் எழுதும் போது **தெளிவான இலக்கத்தில்** எழுதவும்.
4. இலக்கங்களை எழுதும் போது பிழைகள் ஏற்பட்டால் அவற்றைத் தனிக்கோட்டினால் கீறிவிட்டு, மீண்டும் பக்கத்தில் சரியாக எழுதி, ஒப்பம் இடவும்.
5. ஒவ்வொரு வினாவினதும் உபபகுதிகளின் விடைகளுக்காக பெற்றுக்கொண்ட புள்ளியை பதியும் போது அந்த வினாப்பகுதிகளின் இறுதியில் △ இன் உள் பின்னங்களாகப் பதியவும். இறுதிப் புள்ளியை வினா இலக்கததுடன் □ இன் உள் பின்னமாகப் பதியவும். புள்ளிகளைப் பதிவதற்கு பரீட்சகர்களுக்காக ஒதுக்கப்பட்ட நிரலை உபயோகிக்கவும்.
6. எண்கணித பரீட்சகரினால் புள்ளிகள் பிழையற்றது என உறுதிப்படுத்த நீலநிற அல்லது கறுப்புநிறப் பேனாவினை உபயோகிக்கவும்.

உதாரணம் - வினா இல 03

(i) ..... ✓ △ $\frac{4}{5}$

(ii) ..... ✓ △ $\frac{3}{5}$

(iii) ..... ✓ △ $\frac{3}{5}$

03 $\quad (i)\ \frac{4}{5} + (ii)\ \frac{3}{5} + (iii)\ \frac{3}{5} = \boxed{\frac{10}{15}}$

பல்தேர்வு விடைத்தாள்

1. துளைத்தாள் தயாரித்தல்
   - I. புள்ளி வழங்கும் திட்டத்தின் படி சரியான தெரிவைத் துளைத்தாளில் அடையாளமிடவும்.
   - II. அவ்வாறு அடையாளமிடப்பட்ட இடத்தை வெட்டி நீக்கித் துளைத்தாளைத் தயாரிக்கவும்.
   - III. துளைத்தாளை விடைகளின் மீது சரியாக வைத்துக் கொள்ளக்கூடியதாகச் சுட்டெண் அடைப்பையும் வெட்டி நீக்கவும். சரியான விடைகளின் எண்ணிக்கையைக் காட்டும் அடைப்பையும் வெட்டி நீக்கவும்.
   - IV. சரியான, பிழையான விடைகளை குறிப்பிடக்கூடியதாக ஒவ்வொரு வரிசைக்கும் இறுதியில் வெற்று நிரையொன்றை வெட்டி ஏற்படுத்திக் கொள்ளவும்.
   - **V. வெட்டிக்கொண்ட துளைத்தாளில் பிரதம பரீட்சகரிடம் கையொப்பம் பெற்று அங்கீகரித்துக் கொள்ளவும்.**

2. **அதன் பின்னர் விடைத்தாளை நன்கு பரிசீலித்துப் பார்க்கவும். ஏதாவது வினாவுக்கு, ஒரு விடைக்கும் அதிகமாக குறியிட்டிருந்தாலோ, ஒரு விடைக்காவது குறியிடப்படாமலிருந்தாலோ தெரிவுகளை வெட்டிவிடக்கூடியதாக கோடொன்றைக் கீறவும். சில வேளைகளில் பரீட்சார்த்தி முன்னர் குறிப்பிட்ட விடையை அழித்து விட்டு வேறு விடைக்குக் குறியிட்டிருக்க முடியும். அவ்வாறு அழித்துள்ள போது நன்கு அழிக்காது விட்டிருந்தால், அவ்வாறு அழிக்கப்பட்ட தெரிவின் மீதும் கோடிடவும்.**
3. துளைத்தாளை விடைத்தாளின் மீது சரியாக வைக்கவும். சரியான விடையை √ அடையாளத்தாலும் பிழையான விடையை X அடையாளத்தாலும் இறுதி நிரலில் அடையாளமிடவும். சரியான விடைகளின் எண்ணிக்கையை அவ்வவ் தெரிவுகளின் இறுதி நிரையின் கீழ் எழுதவும். அத்துடன் அவற்றை கூட்டி சரியான புள்ளியை உரிய கட்டத்தில் எழுதவும்.

கட்டமைப்பு கட்டுரை மற்றும் கட்டுரை விடைத்தாள்கள்

1. பரீட்சார்த்திகளினால் விடைத்தாளில் வெறுமையாக விடப்பட்டுள்ள இடங்களையும், பக்கங்களையும் குறுக்குக் கோடிட்டு வெட்டிவிடவும், **பிழையான பொருத்தமற்ற விடைகளுக்குக் கீழ் கோடிடவும். புள்ளி வழங்கங்கூடிய இடங்களில் √ அடையாளமிட்டு அதனைக் காட்டவும்.**
2. புள்ளிகளை குறிப்பிடும் போது ஓவலண்ட் கடதாசியின் வலது பக்க நிரலைப் பயன்படுத்தவும்.
3. சகல வினாக்களுக்கும் கொடுத்த முழுப் புள்ளியை விடைத்தாளின் முன்பக்கத்திலுள்ள பொருத்தமான பெட்டியினுள் வினா இலக்கத்திற்கு நேராக **2 இலக்கங்களில் பதியவும்.** வினாத்தாளில் உள்ள அறிவுறுத்தலின் படி வினாக்கள் தெரிவு செய்யப்படல் வேண்டும். எல்லா வினாக்களினதும் புள்ளிகளும் முதல் பக்கத்தில் பதியப்பட்ட பின் விடைத்தாளில் மேலதிகமாக எழுதப்பட்டிருக்கும் விடைகளின் புள்ளிகளில் குறைவான புள்ளிகளை வெட்டிவிடவும்.
4. மொத்தப் புள்ளிகளை கவனமாக கூட்டி முன்பக்கத்தில் உரிய கூட்டில் பதியவும். விடைத்தாளில் ஒவ்வொரு விடைக்கும் வழங்கப்பட்டுள்ள புள்ளிகளின் தொகையினை ஒவ்வொரு பக்கமாக கூட்டவும். அக்கூட்டுத்தொகை உங்களால் முன்பக்கத்தில் மொத்தம் எனக் குறிப்பிட்ட மொத்தபுள்ளிகளுக்கு சமமானதா? என பரீட்சிக்கவும்?

★ புள்ளிப்பட்டியல் தயாரித்தல்

I. ஒரு வினாப்பத்திரம் உள்ள பாடங்கள் தவிர ஏனைய சகல பாடங்களுக்குமான இறுதிப்புள்ளி குழுவினுள் கணிப்பிடப்பட மாட்டாது.

II. ஒவ்வொரு வினாப்பத்திரத்துக்குமான இறுதிப்புள்ளி தனித்தனியான புள்ளிப்பட்டியலில் பதியப்படவேண்டும்.

III. வினாப்பத்திரம் I இற்கான புள்ளிப்பட்டியலில் **"Total Marks"** என்ற நிரலில் பதிந்து **எழுத்திலும் எழுத வேண்டும்.**

IV. வினாப்பத்திரம் II இற்கான புள்ளிப்பட்டியலை தயார் செய்யும் போது பகுதிப் புள்ளிகளைப் பதிவதோடு வினாப்பத்திரம் II இன் இறுதிப் புள்ளிகளை புள்ளிப் பட்டியலில் **"Total Marks"** என்ற நிரில் பதியவும்.

V. 43 சித்திரப் பாடத்திற்குரிய I,II மற்றும் III ஆம் வினாப்பத்திரங்களுக்குரிய புள்ளிகளை தனித்தனியாக புள்ளிப்பட்டியிலில் பதிந்து **எழுத்திலும் எழுத வேண்டும்.**

VI. 21 - சிங்களமொழியும் இலக்கியமும், 22 - தமிழ்மொழியும் இலக்கியமும் ஆகிய இரு பாடங்களும் வினாப்பத்திரம் I இற்குரிய புள்ளிப் பட்டியலில் பதிந்து எழுத்திலும் எழுத வேண்டும். வினாப்பத்திரம் II, III இற்கான பகுதிப் புள்ளிகளை உள்ளடக்கி அவ் வினாப்பத்திரத்தின் மொத்தப் புள்ளிகளை, புள்ளிப்பட்டியலில் பதிய வேண்டும்.

முக்கிய குறிப்பு:

I. சகல சந்தர்ப்பங்களிலும் ஒவ்வொரு வினாப்பத்திரத்திற்கும் உரிய முழுப் புள்ளியானது முழுத்தானத்தில் புள்ளிப் பட்டியலில் பதியப்படுதல் வேண்டும். எந்த விதமான காரணங்களிற்காகவும் வினாப்பத்திரத்தின் இறுதிப் புள்ளியானது தசம தானங்களில் பதியப்படலாகாது.

II. புள்ளிப் பட்டியலின் சகல பக்கங்களிலும் புள்ளிகளைப் பதிந்த உதவிப்பரீட்சகர், புள்ளிகளை சரிபார்த்த உதவிப்பரீட்சகர், மதிப்பீட்டுப் புள்ளிகளை உறுதிப்படுத்தும் எண்கணித பரீட்சகர் மற்றும் பிரதம பரீட்சகர் தமது குறியீட்டு இலக்கத்தை எழுதி கையொப்பமிட்டு உறுதிப்படுத்துவது கட்டாயமாகும்.

கணிதம்- 32
தேர்ச்சிகளும் குறிக்கோள்களும்
கணிதம்- II

01. **தேர்ச்சி - 5**

நவீன உலகில் வெற்றிகரமான கொடுக்கல் வாங்கல்களைப் பயன்படுத்தி மேற்கொள்வார்.

- கடன் தொகையும் ஆண்டு வட்டியும் தரப்படும் போது ஆண்டு எளிய வட்டி வீதத்தைக் காண்பார்.
- குறித்த தொகையும் மொத்த வட்டியும் காலமும் தரப்படும் குறைந்து செல்லும் மீதிக்கு வட்டி கணித்தல் முறையில் ஆண்டுகளுக்கான வட்டி வீதத்தை காண்பர்
- இரு வட்டி வீதங்களையும் ஒப்பிடுவார்.

02. **தேர்ச்சி - 20**

பல்வேறு முறைகளை ஆராய்ந்து இருமாறிகளுக்கிடையில் காணப்படும் தொடர்பை இலகுவாக தொடர்படுவார்.

- $\boldsymbol{y = f(x)}$ இல் உள்ள ஒர் இருபடிச் சார்பின் ஆயிடை $\boldsymbol{a \leq x \leq b}$ $(\boldsymbol{a, b,} \in \mathbb{Z})$ பூரணமற்ற அட்டவணைதரப்படும் போது

i. சமசீரை அடிப்படையாகக் கொண்டு x = ஆகும் போது y ன் பெறுமானத்தைக் காண்பார். $(\in \mathbb{Z}^+)$

ii. உகந்த அளவிடையைப் பயன்படுத்தி நியம அச்சுத் தொகுதியில் சார்பின் வரையை வரைவார்.

iii. (a) வரைபும் x அச்சும் இடைவெட்டும் இரு புள்ளிகளினதும் ஆள் கூறுகளை எழுதுக.

(b) மேலே a இல் பெற்ற இருபள்ளிகளினதும் ஆள்கூறுகளைக் கருதி, வரைபின் இருபடிச் சார்பை $y = -(x+p)(x+q)$ வடிவில் எழுதுவார்.

iv. சார்பை $y = a$ ஆனது வரைபை A,B ஆகிய புள்ளிகளில் இடைவெட்டுகின்றன எனக்கொண்டு

(a) $y > a$ ஆக இருக்கும் x அன் ஆயிடையை எழுதுவார்

(b) AB இன் நீளத்தை கிட்டிய முதலாம் தசமதானத்தில் பெறுவார்.

03. **தேர்ச்சி – 13**

பல்வேறு முறைகளை ஆராய்ந்து நடைமுறையில் அளவிடைப் படங்கள் அல்லது திரிகோண கணித விகிதங்களை பயன்படுத்துவார்.

- தரப்பட்ட உருவில் தரவுகளைக் குறிப்பார்.
- திரிகோண விகிதங்களை பயன்படுத்த பொருத்தமான காரணங்களைக் காண்பர்.
- ஒரு நீளமும், கோணமும் தரப்படும் போது மற்றய தொடு நீளத்தை காண்பார்.
- இரு நீளங்கள் தரப்படும் போது குறித்த கோணத்தைக் காண்பார்.
- இரு கோணங்களின் வித்தியாசத்தை குறித்த அளவில் கூடியது என காட்டுவார்.

04. தேர்ச்சி – 17

அன்றாட வாழ்ககையில் தேவைகளை நிறைவேற்றி கொள்வதற்கு சமன்பாடுகளை உருவாக்கி தீர்ப்பதில் பல்வேறு முறைகளை நுட்பங்களை கையாள்வார்.

- ஒரு செங்கோண முக்கோணியும் செவ்வகமும் தரப்படும் போது தரப்பட்ட அளவுகளைக் கொண்டு பரப்பளவைக் கண்டு அதனைத் தொடர்புபடுத்தி தரப்பட்ட இருபடிச் சமன்பாட்டை திருப்திப்படுத்தும் எனக்காட்டி தீர்வை கிட்டிய பெறுமானத்தில் காண்பார்.
- செங்கோண முக்கோணியின் செம்பக்கத்தின் நீளமானது தரப்பட்ட பெறுமானம் எனக் காட்டி, அது குறித்த அளவிலும் கூடியது எனக் காட்டுவார்.

05. தேர்ச்சி - 17

அன்றாட வாழ்க்கையில் தேவைகளை நிறைவேற்றி கொள்வதற்கு சமன்பாடுகளை உருவாக்கி தீர்ப்பதில் பல்வேறு முறைகளை நுட்பங்களை கையாள்வார்.

i. தரப்பட்ட தரவுகளைக் கொண்டு இருமாறிகளுக்கிடையிலான ஒழுங்கமைச் சமன்பாட்டுச் சோடியை உருவாக்கி அவற்றைத் தீர்ப்பதன் மூலம் இரு மாறிகளுக்கான பெறுமானங்களை தனித்தனியாகக் காண்பார்.

ii. இரு மாறிகளுக்கிடையிலான இன்னுமொரு தொடர்பு தரப்படும் போது அதன் தீர்வைக் காண்பார்.

06. தேர்ச்சி - 20

நாளாந்த தேவைகளை இலகுவாக்கிக் கொள்ள பல்வேறு முறைகளில் தரவுப் பகுப்பாய்வு செய்து எதிர்வு கூறுவார்.

i. கூட்டமாக்கப்பட்ட தரவுத் தொகுதியின் இடையைக் காண்பார்.

ii. இடையைப் பயன்படுத்தி குறித்த அளவுகளுக்கு எதிர்வு கூறுவார்.

iii. குறித்த அளவுகளுக்கான வருமானம் தரப்படும் போது வேறு ஒரு அளவிற்கு வருமானத்தை எதிர்வு கூறுவார்.

iv. குறித்த ஆயிடைக்குட்பட்ட பெறுமானங்களில் இழிவுப் பெறுமானங்களின் மொத்தத்தைக் காண்பார்.

07. தேர்ச்சி - 2

கேத்திர கணித விதகளை உபயோகித்து அமைவுகளின் தன்மை பற்றி பகுப்பாய்வு செய்வார். cm/mm அளவிடையிலுள்ள நேர்விளிம்பு, சவராயம் ஆகியவற்றை மாத்திரம் பயன்படுத்தி

i. குறித்த அளவான நேர்காட்டுத்துண்டத்தை வரைந்து அதில் குறித்த கோணத்தை அமைத்து அதன் கோண இரு கூறாக்கியை அமைப்பார்.

ii. இருபக்கங்கள் சமனாகவும் தரப்பட்ட கோணத்தை கொண்டதுமான இருபக்க முக்கோணியை அமைப்பார்.

iii. தரப்பட்ட பக்கத்திற்கு செங்குத்து இரு கூறாக்கி அமைத்து அப்பக்கத்தின் மீது புறத்தே ஒரு அரை வட்டத்தை அமைப்பார்.

iv. அரைவட்டத்தைக் குறித்த புள்ளியில் இடைவெட்டுவதும் குறித்த புள்ளியினூடாகவும் தரப்பட்ட பக்கத்திற்கு சமாந்தரமாகவும் ஒரு நேர்கோட்டினை அமைத்து தரப்பட்ட இரு புள்ளிகளை இணைப்பார்.

v. தரப்பட்ட கோணத்தின் பருமனைக் காண்பார்.

08. **தேர்ச்சி - 27**

நேர்கோட்டுத் தரவுகள் தொடர்பான கேத்திர கணித எண்ணக்கருக்களை அடிப்படையாகக் கொண்டு அன்றாட வாழ்க்கைப் பணிகளுக்குத் தேவையான முடிவுகளை எடுப்பார்.

i. தரப்பட்ட உருவை பிரதி செய்து தரவுகளை உருவில் குறித்துக்காட்டுவார்

ii. தரப்பட்ட தரவுகளைப் பயன்படுத்தி நாற்பக்கலை இணைகரம் என காரணங்களுடன் காட்டுவார்

iii. தரப்பட்ட இரு முக்கோணிகள் சமகோணமானவை எனக் காட்டுவார்.

iv. இரு நேர்கோடுகளுக்கிடையிலான தொடர்பு உண்மை எனக் காட்டுவார்.

09. **தேர்ச்சி -24**

கனவளவு தொடர்பான அறிவைக் கொண்டு வெளியின் உச்சப்பயனைப் பெறுவார்.

- செங்கூம்பகமொன்றில் சதுர அடியின் பக்கநீளமும் உயரமும் மாறிகளில் தரப்படும் போதும் அடியின் ஆரையும் உயரமும் இன்னுமொரு மாறிலி சார்பாக தரப்படும் போதும் அவற்றிற்கிடையிலான தொடர்பை தரப்பட்ட வடிவில் எடுத்துக் காட்டுவார்.

- மாறிலிகளுக்கான பெறுமானங்கள் தசம எண்களாக தரப்படும் போது எஞ்சிய மாறிகள் பெறுமானத்தை மடக்கை அட்டவணையைப் பயன்படுத்தி கிட்டிய பெறுமானத்தில் காண்பார்.

- குறித்த பக்க நீளம் கொண்ட சதுர குறுக்கு வெட்டியினை உடைய குறித்த உயரமுள்ள திண்மக் கனவுருவிலிருந்து அதே அளவீடுகளையுடைய கூம்பகம் வெட்டி அகற்றும் போது எஞ்சிய திண்மத்தின் கனவளவைக் காண்பார்.

10. **தேர்ச்சி -10**

- எண்கோலங்களில் காணப்படும் பல்வேறு தொடர்புகளை ஆராய்வதன் மூலம் முடிவுகளை மேற்கொள்வார்.

- விருத்தியின் உறுப்புக்களை காண்பதற்கு தரவுகள் முறையாகத் தரப்படுமிடத்து.
  - ய. விருத்தியின் முதல் மூன்று உறுப்புகளை ஒழுங்காக எழுதுவார்.
  - டி. விருத்தியின் n ஆம் உறுப்பைக் காண்பார்.
  - உ. விருத்தியின் n உறுப்புக்களில் கூட்டுத்தொகையைக் காண்பார்.
  - ன. மற்றுமொரு விருத்தியில் முதலுறுப்பு பொதுவித்தியாசம் தரப்படுமிடத்து குறிப்பிட்ட உறுப்புக்களின் கூட்டுத்தொகையைக் காண்பார்.
  - ந. இரு விருத்தியின் உறுப்புக்கள் சமனாகும் சந்தர்ப்பத்தில் உறுப்புக்களின் எண்ணிக்கையைக் காண்பார்.

11. **தேர்ச்சி - 24**

வட்டம் சார்பான கேத்திரகணித எண்ணக்கருவை அடிப்படையாகக் கொண்டு முடிவுகளை எடுக்க தர்க்கரீதியாக சிந்திப்பார்.

- தரப்பட்ட உருவை பிரதி செய்து தரப்பட்ட தரவுகளை குறிப்பார்.
  - i. உருவில் தரப்பட்ட நாற்பக்கல் ஒரு வட்ட நாற்பக்கல் என காரணத்துடன் காட்டி, தரப்பட்ட நேர்கோட்டினால் குறிப்பிட்ட கோணம் இருகூறிடப்படுகிறது எனக் காட்டுவார்.
  - ii. தரப்பட்ட கோணத்திற்கு சமமான இரு கோணங்களைக் காரணங்களுடன் குறிப்பிடுவார்.

12. **தேரிச்சி - 30**

அன்றாட வாழ்க்கையை இலகுவாக்கி கொள்வதற்காக தொடைகள் சார்பாக அடிப்படை கோட்பாடுகளை பயன்படுத்துவார்.

- குறித்த தேற்றத்தின் மறுதலையை எழுதிக் காட்டுவார்.
  - i. தரப்பட்ட மூன்று தொடைகளில் ஒரு வகை மாத்திரம் உள்ள உறுப்புக்களை இனங்கண்டு எண்ணிக்கையை எழுதுவார்.
  - ii. தரப்பட்ட தரவுகளில் மூன்று வகைத் தொடைப்பிரிவு இருவகை மாத்திரம் அடங்கும் தொடைப் பிரிவுக்கு சமனெனின் மூன்று வகைக்கும் பொதுவான தொடைப்பிரிவின் எண்ணிக்கையைக் காண்பார்.
  - iii. குறித்த இருவகை மாத்திரம் உள்ள தொடைப்பிரிவின் எண்ணிக்கைகள் இரண்டு தரப்படுமிடத்து அவற்றில் இரு வகைகளின் இடைவெட்டுத்தொடையின் எண்ணிக்கையை காண்பார்.
  - iv. குறித்த ஒரு தொடைவகையின் எண்ணிக்கை தரப்படுமிடத்து மற்றுமொரு தொடைவகை மாத்திரம் உள்ள எண்ணிக்கையை காண்பார்.

Part A

*Answer **all** questions **on this question paper itself.***

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

1. It is estimated that six men will take eight days to paint the walls of a house. If it is required to complete this task in three days, how many more men need to be engaged?

10 ———— ②

Amount of work = 6 × 8 man-days ———— 1

2. Find the magnitude of $B\hat{A}E$ based on the information given in the figure.

30° ———— ②

$A\hat{B}C = 40°$ ———— 1

3. Simplify: $\frac{2}{3x} + \frac{5}{6x} - \frac{7}{12x}$

$\frac{11}{12x}$ ———— ②

$\frac{8}{12x} + \frac{10}{12x} - \frac{7}{12x}$ ———— 1

4. From the shapes given below, select and underline the one that **cannot** be the shape of a face of a right prism with a triangular cross section.

(i) Square (ii) Rhombus (iii) Rectangle ———— ②

5. Based on the information in the given pie chart, if the number of students who study Drama & Theatre is 30, how many students study Dancing?

Number of students studying dancing = 105 ———— ②

Cental angle of the sector representing dancing = 70° ———— 1

6. O is the centre of the given circle. The chord AB is bisected by the straight line DOC. Find the magnitude of $C\hat{D}B$.

30° ———— ②

$A\hat{C}D = 90°$ or $B\hat{C}D = 90°$ or $A\hat{B}D = 60°$ ———— 1

7. Find the factors: $2x^2 - 18$

$2(x-3)(x+3)$ ———— ②

$2(x^2 - 9)$ ———— 1

8. Taking that $10^{0.6375} = 4.34$, find the value of lg 43.4.

1.6375 ———— ②

$43.4 = 10^{0.6375} \times 10$ ——— 1

9. In the given figure, AB is a vertical tree and there is a bird at point B. There is a child at point C. Moreover AC is horizontal. If the child observes the bird with an angle of elevation of $a°$ and the bird observes the child with an angle of depression of $b°$, represent these angles in the figure. Write the relationship between a and b. (Disregard the height of the child.)

Marking both a degrees and b degrees in the figure ———— ①

$a = b$ ———— ①

10. The height of a solid right circular cylinder is three times its base radius r. How many times of the paint required to paint only the base is needed to paint the curved surface of the cylinder completely? (The area of the curved surface of a solid right circular cylinder of base radius r and height h is $2\pi rh$.)

6 times ———— ②

Area of the curved surface $= 2\pi r\,(3r)$

or ———— 1

Area of the base $= \pi r^2$

11. Find the probability of obtaining 10 as the sum of the two digits on the face that falls downwards when an unbiased tetrahedral die with its four faces marked as 1, 3, 5, 7 is tossed up twice.

$\frac{3}{16}$ ———— ②

12. Find the value of x based on the information given in the figure. Here, ABC is a straight line.

$x = 60^o$ ———— ②

$A\hat{D}B = 40^o$ or $D\hat{C}B = 40^o$ ——— 1

13. If ε = {Integers between 0 and 7},
A = {Prime numbers between 0 and 7},
B = {Multiples of 2 between 0 and 7},

select and underline the correct statement from the statements given below.

(i) $A \cup B = \varepsilon$

(ii) $A \cap B = \{2, 4\}$

(iii) $n(A) = 3$ ———— ②

14. Simplify: $3x^2 \times 2y \div 8xy$

$\frac{3x}{4}$ ——————— ②

$3x^2 \times 2y \times \frac{1}{8xy}$ ——————— **1**

15. The second term of a geometric progression is –6 and the third term is –12. What is the fifth term of this progression?

$ar = -6$ or $ar^2 = -12$ or $r = 2$ ——————— ①

-48 ——————— ①

16. A cyclic quadrilateral $ABCD$ is shown in the figure. $A\hat{D}C$ is bisected by BD. The side AB is produced to E. Find the magnitude of $C\hat{B}E$, based on the information in the figure.

64° ——————— ②

$B\hat{D}C = 32^o$ or $A\hat{D}C = 64^o$ or $A\hat{D}C = C\hat{B}E$ ——————— **1**

17. Find the least common multiple of the following algebraic terms:
$6x^2$, $5xy$, $2y^2$

$30x^2y^2$ ——————— ②

$6x^2 = 2 \times 3 \times x \times x$
$5xy = 5 \times x \times y$
$2y^2 = 2 \times y \times y$ ——————— **1** (All three written as products of factors should be correct)

18. The area of the triangular cross section of a right prism is 616 cm^2. The volume of a right circular cylinder of the same height as the prism, and base radius r, is equal to the volume of the prism. Find the value of r in centimetres. (The volume of a right circular cylinder of base radius r and height h is $\pi r^2 h$.)

$\pi r^2 \times h = 616 \times h$ ——————— ①

$r = 14$ ——————— ①

19. The midpoints of the sides AB and AC of the given triangle ABC are D and E respectively and $A\hat{D}E = 90°$. Find the perimeter of the quadrilateral $BCED$ in centimetres.

18 cm ——————— ②

$DE = 3$ cm or $AE = 5$ cm ——————— **1**

or $AC = 10$ cm

20. Find the equation of the straight line that passes through the points (4, 6) and (6, 9) in the Cartesian plane.

$m = \frac{9-6}{6-4}$ or $6 = m \times 4 + c$ ——— ①

$y = \frac{3}{2}x$ ——— ①

21. The centre of the given circle is O. Moreover, $ABCD$ is a parallelogram and $AOBEF$ is a straight line. Find the magnitude of $D\hat{E}F$ based on the information in the figure.

160° ——— ②

$D\hat{A}B = 70^o$ or $A\hat{D}E = 90^o$ or $C\hat{B}E = 70^o$ ——— 1

22. Ramani deposited a certain amount of money for two years in a finance company that pays an annual interest rate of 10%, with the interest compounded annually. The interest that she received for the second year only is 660 rupees and the total amount she received at the end of two years is 7260 rupees. Find the amount she deposited.

Rs. 6600 or $7260 \times \frac{100}{110} \times \frac{100}{110}$ ——— ①

Rs. 6000 ——— ①

23. In the given circle, C is the centre and $AC \parallel BD$. Find the magnitude of $A\hat{E}B$.

$A\hat{E}B = 105^o$ ——— ②

$C\hat{B}D = 70^o$ or $A\hat{D}B = 35^o$ ——— 1

24. Find the **negative integral** solutions of the inequality $3x + 11 > 2$.

$3x > -9$ ——— ①

-1 and -2 ——— ①

25. ABC is an acute triangle as given in the figure. This incomplete sketch has been drawn to find the centre O of the circle that touches the side AB at the point B and also touches the side AC. Using the knowledge on loci, complete the sketch and mark O.

Drawing a perpendicular to AD at B ——— ②

Marking O on the angle bisector outside the triangle ——— 1

$\frac{50}{50}$

Part B

*Answer **all** questions **on this question paper itself**.*

1. Janaka pays income tax of 6% on the amount that he earns above 100 000 rupees, when his monthly salary is more than this amount. In a certain month, he puts aside for food, $\frac{1}{6}$ of the amount he received after paying the tax. He puts aside $\frac{3}{5}$ of the remaining amount for other expenses.

(i) What fraction of the amount Janaka received remains after he puts aside $\frac{1}{6}$ of it for food?

$1-\frac{1}{6}$

$=\frac{5}{6}$ ——— 1 (1)

(ii) What fraction of the amount he received remains with Janaka after he puts aside an amount for food and for other expenses?

$\frac{5}{6}\times\frac{3}{5}$ ——— 1

$=\frac{3}{6}=\frac{1}{2}$

Remaining fraction $=1-\left(\frac{1}{6}+\frac{1}{2}\right)$ ——— 1

$=\frac{2}{6}=\frac{1}{3}$ ——— 1 (3)

(iii) If the amount that remains now is 39 600 rupees, find separately how much he received after paying the tax and how much he put aside for food.

$\frac{1}{3}\longrightarrow$ Rs. 39600

Amount received after paying tax $=$ Rs. 39600×3
$=$ Rs. 118800 ——— 1

Amount set aside for food $=$ Rs. $118800\times\frac{1}{6}$
$=$ Rs. 19800 ——— 1 (2)

(iv) What was his salary before paying the tax?

94% of the amount on which tax is charged $=$ Rs. 18800

Amount on which tax is charged $=$ Rs. $18800\times\frac{100}{94}$ 1
$=$ Rs. 20000

$\therefore$ salary $=$ Rs. 120000 ——— 1 (2)

(v) At some stage, due to the limit over which income tax is charged being increased, if Janaka doesn't have to pay tax, and if the amount he spends on food remains the same as before, how much does he now spend on food as a percentage of his salary?

$\frac{19800}{120000}\times 100\% = 16.5\%$ 1+1 (2)

$\frac{10}{10}$

2. (*a*) Saman travels from his home to a friend's home in 30 minutes, at a uniform speed. He spends 30 minutes at his friend's home and returns to his home along the same road in 45 minutes, travelling at a uniform speed.

(i) An incomplete distance-time graph drawn to represent this information is shown here. Complete the graph based on the above information. 1 + 1 (2)

(ii) Find the speed at which Saman travels back home, in kilometres per hour.

$\frac{15}{3/4}$ ——— 1

$=20\text{km h}^{-1}$ ——— 1 (2)

(*b*) This figure consists of a semicircular part *AEB* of diameter 28 cm and a rectangular part *ABCD*, with the length of *BC* equal to 77 cm.

(i) Find the perimeter of this composite figure.

Arc length of $AB=\frac{22}{7}\times 14 = 44$ cm ——— 1

Perimeter $= 77\times 2+28+44 = 226$ cm ——— 1+1 (3)

(ii) How many times of the area of the semicircular part is the area of the rectangular part?

Area of the rectangle $= 77\times 28\text{ cm}^2$

Area of the semicircular part $=\frac{1}{2}\times\frac{22}{7}\times 14\times 14$ ——— 1

$\frac{77\times 28}{\frac{1}{2}\times\frac{22}{7}\times 14\times 14}$ ——— 1

$\therefore$ 7 times ——— 1 (3)

$\frac{10}{10}$

3. Kamal rented his house for a year at 8000 rupees per month and obtained the total amount in a single payment. The urban council to which the house belongs has assessed the annual value of the house as 12 000 rupees and charges 18% for a year as rates.

(i) How much has to be paid as rates for the house for the year? Rs. $12000 \times \frac{18}{100}$ —— 1

= Rs. 2160 —— 1 (2)

(ii) 10% of the amount obtained by renting the house is spent on house maintenance. How much money remains with Kamal after paying the rates and spending on maintenance?

Maintenance cost = Rs. $8000 \times 12 \times \frac{10}{100}$ —— 1

= Rs. 9600

Total cost = Rs. $9600 + 2160$ —— 1 (3)

= Rs. 11760

Remainder = Rs. $96000 - 11760$

= Rs. 84240 —— 1

(iii) Now Kamal adds a certain amount to the amount remaining with him, and invests it to buy 50 rupee shares of a company. The company pays annual dividends of 2.50 rupees per share. He receives 6000 rupees as the dividend income at the end of a year.

(a) How many shares did Kamal buy?

$\frac{6000}{2.5} = 2400$ —— 1 (1)

(b) Write the extra amount Kamal added to invest in the company, as a percentage of the total amount he invested in the company.

Amount invested in shares = Rs. 50×2400 = Rs. 120000

Extra amount = Rs. $120000 - 84240$ —— 1

= Rs. 35760 —— 1 (4)

Extra amount as a percentage = $\frac{35760}{120000} \times 100\%$ —— 1

= 29.8% —— 1

4. A frequency polygon and an incomplete grouped frequency table drawn based on the marks obtained by a group of students for a test are given below. In this table, the interval 10 – 20 denotes 10 or more than 10 and less than 20.

Marks	Number of students	Cumulative frequency
10 – 20	20	20
20 – 30	40	60
30 – 50	60	120
50 – 60	70	190
60 – 90	60	250

1 (for the three rows)

1 (for the last row)

1+1+1

(i) In the table, fill in the blanks in the column denoting the number of students, according to the frequency polygon. (3)

(ii) On the given frequency polygon, draw the histogram corresponding to these marks.

30 – 50 column 1

60 – 90 column 1 (3)

Remaining columns 1 (2)

(iii) Complete the cumulative frequency column in the table.

(iv) Find the probability of a student picked at random from this group of students being someone who has obtained 50 marks or more.

Number of students who got 50 or more marks = 130 —— 1

Probability of getting 50 or more marks = $\frac{130}{250}$ —— 1 (2)

5. In a school, for a certain sport, there are four boys and a girl in the grade 10 team and two boys and three girls in the grade 11 team. For the first round of a competition between the two teams, a child from grade 10 and a child from grade 11 are picked randomly.

(i) By considering that the boys are denoted by B_1, B_2, B_3, B_4, B_5, B_6 and the girls are denoted by G_1, G_2, G_3, G_4, mark the sample space relevant to randomly picking two children on this grid with the symbol 'X'. (1)

(ii) On the grid, encircle the event of exactly one boy being picked for the first round of the competition and find its probability. (3)

Encircling ——— 1

Probability $= \frac{14}{25}$ ——— 2

(iii) It is given that when the two participants in the first round of the competition are selected in the above manner, if exactly one of the two is a boy, the probability of Grade 10 winning is $\frac{4}{10}$ and if either both are boys or both are girls, the probability of Grade 10 winning is $\frac{3}{10}$. Accordingly, write the relevant probabilities on the branches of the tree diagram given below, to predict whether Grade 10 wins or not.

(3)

(iv) Calculate the probability of Grade 10 not winning in this competition round.

$$\frac{14}{25} \times \frac{6}{10} + \frac{11}{25} \times \frac{7}{10} = \frac{161}{250}$$ 1+1+1 (3)

$\frac{10}{10}$

32 – Marking Scheme
Mathematics II

1. A stock of television sets worth 84 000 rupees each is available for sale. The method used by Ruvini to buy a television set and the method used by Manel to buy another television set is given below.

Ruvini: A loan of 84 000 rupees is taken from a finance company for a year at an annual simple interest and the television set is bought. At the end of the year, the loan is settled by paying the loan amount and interest of 10 920 rupees.	**Manel**: The television set is bought on hire purchase with the amount and interest to be paid in 12 equal monthly installments. Here, the interest is calculated on the reducing balance. When the payment of the installments is completed in a year, the same total interest of 10 920 rupees that is paid by Ruvini has been paid.

Find separately the annual interest rates at which the interest is paid by the two of them and show that the annual interest rate charged in the hire purchase method is more than the annual interest rate charged by the finance company.

Question Number	Marking Scheme	Marks	Other details
1.	Interest rate paid by Ruvini for a year $= \frac{10920}{84000} \times 100\%$	1	
	$= 13\%$	1	
	Value of an installment without the interest $= \frac{84000}{12}$	1	
	$=$ Rs. 7000	1	
	Number of month units $= \frac{12}{2}\ (12+1)$	1	
	$= 78$	1	
	Interest for a month unit $= \frac{10920}{78}$	1	
	$=$ Rs. 140		
	The annual interest rate that Manel pays $= \frac{140}{7000} \times 12 \times 100\ \%$	1	
	$= 24\%$	1	
	Since $13\% < 24\%$ the interest rate charged in the higher purchase method is more than the interest rate charged by the finance company	1	10

2. An incomplete table showing the y-values corresponding to several x-values of a quadratic function of the form $y = f(x)$, within the interval $-2 \leq x \leq 4$ is given below.

x	-2	-1	0	1	2	3	4
y	-5	0	3	4	...	0	-5

(i) By considering the symmetry of the quadratic function, find the value of y when $x = 2$.

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

(iii) (*a*) Write the coordinates of the two points of intersection of the graph and the x-axis.

(*b*) By considering the coordinates of the two points mentioned in the above part, write the given quadratic function in the form $y = -(x + p)(x + q)$.

(iv) Let us take that the line $y = 1$ intersects the graph at the points A and B.

(*a*) Write the interval of values of x on which $y > 1$.

(*b*) Obtain the length of AB to the nearest first decimal place.

Question Number			Marking Scheme	Marks			Other details
2.	(i)		The value of $y = 3$	1	1		
	(ii)		Correct scale	1			
			5 correct points	1			
			Smooth curve	1	3		
	(iii)	(a)	$(-1,0)$ and $(3,0)$	1+1			
		(b)	$y = -(x+1)(x-3)$	1	3		
	(iv)	(a)	$-0.7 < x < 2.7$ (± 0.1)	1+1			If only one value and inequality is correct, 1 mark
		(b)	Length of $AB = 3.4$ (± 0.2) units	1	3	10	

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இலங்கைப் பரீட்சைத் திணைக்களம்
Department Of Examinations, Sri Lanka

විභාගය / பரீட்சை / Exam		විෂය / பாடம் / Subject	
ප්‍රශ්න අංකය / வினா இலக்கம் / Question No.		විභාග අංකය / பரீட்சை எண் / Index No.	

විභාග ශාලාවෙන් බැහැර කර ගත යුතුයි. பரீட்சை மண்டபத்திலிருந்து வெளியே எடுத்துச் செல்லக்கூடாது. Not to be removed from the Examination Hall.

3. In a competition, the competitors had to run up an inclined plane, climb up a vertical ladder and then slide down another inclined plane. The side view of the two inclined planes and the vertical ladder used for this are denoted by AC, DE and CD respectively in the figure. Here, ABE is a horizontal plane, $AC = BE = 50$ m, $C\hat{A}B = 26° 10'$, BCD is perpendicular to ABE, and $DC = BC$.

Copy the given figure in your answer script and include the given information in it.

Using trigonometric ratios, show that the difference between the incline of DE (that is $D\hat{E}B$) and the incline of AC (that is $C\hat{A}B$) is more than 15°.

Question Number	Marking Scheme	Marks	Other details
3.		1+1+1	For correctly marking $26°10'$ —1 50 m —— 1 (Indicating 50m in both place places or indicating equality of the two lengths with 50 m indicated in one place) DC = CB and $90°$ —— 1
	In $\triangle ABC$,		
	$\sin 26°10' = \frac{BC}{AC}$	1	
	$50 \times 0.4410 = BC$	1	
	$\therefore BC = 22.05$ m	1	
	In $\triangle DEB$,		
	$\tan D\hat{E}B = \frac{DB}{BE}$		
	$= \frac{2 \times 22.05}{50}$	1	
	$= 0.8820$	1	
	$D\hat{E}B = 41° 25'$	1	
	Difference between $D\hat{E}B$ and $C\hat{A}B$ $= 41° 25' - 26°10'$		
	$= 15° 15'$		
	Since $15° < 15° 15'$		
	the difference between the incline of DE and the incline of AC is more than $15°$.	1	10

4. The top of a birthday cake is in the shape of a right angled isosceles triangle. Its two equal sides are of length $2x$ cm each. As shown in the figure, the words 'HAPPY BIRTHDAY' are written on a rectangular piece of white icing of length $(x+2)$ cm and breadth $(x-4)$ cm. The remaining portion is decorated in pink and is of area 132 cm^2.

(i) Show that x satisfies the equation $x^2 + 2x - 124 = 0$ and find the value of x to the nearest centimetre. (Take the value of $\sqrt{5}$ to be 2.24)

(ii) Show that the length of the longest side of the top of the cake is given by $2\sqrt{2}x$ and show that this length is greater than 28 cm. (Take the value of $\sqrt{2}$ to be 1.41)

Question Number			Marking Scheme	Marks			Other details
4.	(i)		Area of the right angled triangle $= \frac{1}{2} \times 2x \times 2x$ $= 2x^2$	1			
			Area of the rectangle $= (x+2)(x-4)$ $= x^2 - 2x - 8$	1			
			$\therefore 2x^2 - (x^2 - 2x - 8) = 132$ $x^2 + 2x - 124 = 0$	1			
			$(x+1)^2 = 124 + 1$	1			
			$x + 1 = \pm\sqrt{125}$				
			$x + 1 = \pm 5\sqrt{5}$	1			
			$x = -1 + 5\sqrt{5} \quad (\because x > 0)$	1			
			$x = -1 + 5\,(2.24)$				
			$x = 10.2$ cm				
			$\therefore x \doteq 10$ cm	1	7		
	(ii)		Length of longest side of the top $= \sqrt{(2x)^2 + (2x)^2}$ $= 2\sqrt{2}x$ cm	1			
			Length $= 2(1.41)(10)$cm	1			
			$= 28.2$ cm				
			Since $28.2 > 28$ the length of the longest side is greater than 28 cm.	1	3	10	

5. Packs of 10 small plates each and packs of 5 large plates each were bought to serve sweetmeats to the adults and children who attended a party. The price of a pack of small plates was 150 rupees and the price of a pack of large plates was 120 rupees. The total number of plates that were bought was 200 and the total cost of these plates was 3720 rupees.

(i) By taking the number of packs of small plates bought as x and the number of packs of large plates bought as y, construct a pair of simultaneous equations and by solving them, find separately the number of packs of small plates and the number of packs of large plates that were bought.

(ii) Each small plate had the same number of sweetmeats and each large plate had two sweetmeats more than a small plate. If the total number of sweetmeats that were served was 1160, find the number of sweetmeats that a small plate had.

Question Number			Marking Scheme	Marks			Other details
5.	(i)		$10x + 5y = 200$ ——— (1)	1			
			$150x + 120y = 3720$ ——— (2)	1			
			(1) $\times 15$ $150x + 75y = 3000$ ——— (3)				
			(2) - (3) $45y = 720$	1			
			$y = 16$	1			
			Substituting $y = 16$ in (1)				
			$10x + 5 \times 16 = 200$	1			
			$10x = 120$				
			$x = 12$	1			
			Number of packs of small plates $= 12$ Number of packs of large plates $= 16$	1	(7)		
	(ii)		Let us take the number of sweetmeats on a small plate as n				For $120n$ —1 For $(n+2)80$ –1
			$120n + (n+2)80 = 1160$	1+1			
			$n = 5$ Number of sweetmeats on a small plate is 5.	1	(3)	10	

6. The frequency table given below provides information related to the number of hires a certain three-wheeler engaged in each week.

Number of hires	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39
Number of weeks	1	3	4	6	5	7	4

(i) Find the mean number of times the three-wheeler was hired a week.

(ii) How many hires can the three-wheeler driver expect in total in 52 weeks?

(iii) Let us take that the average distance of a hire is 5 km. If the three-wheeler driver charged a fee of 100 rupees per kilometre, what can he expect as his income for four weeks?

(iv) What is the minimum number of times the three-wheeler may have been hired in total in the weeks in which the number of times it was hired was less than 20?

Question Number	Marking Scheme	Marks			Other details
6.					

Number of hires	Number of weeks (f)	Mid value (x)	fx
5-9	1	7	7
10-14	3	12	36
15-19	4	17	68
20-24	6	22	132
25-29	5	27	135
30-34	7	32	224
35-39	4	37	148
	$\sum f = 30$		$\sum fx = 750$

x column —1

fx column —2

(disregard one error)

$\sum fx = 750$ — 1

(i) Mean number of hires per week $= \frac{750}{30}$ — 1 — Dividing by 30

$= 25$ — 1 — 6

(ii) Number of hires in 52 weeks $= 25 \times 52$

$= 1300$ — 1 — 1

(iii) Expected income for 4 weeks $= 4 \times 25 \times 100 \times 5$ — 1

$=$ Rs. 50000 — 1 — 2

(iv) Minimum number of hires $= 1 \times 5 + 3 \times 10 + 4 \times 15$

$= 95$ — 1 — 1 — 10

7. Use only a straight edge with a cm/mm scale and a pair of compasses for the following geometric constructions. The construction lines should be clearly drawn.

(i) Construct a straight line segment AB of length 6 cm. Construct an angle of 60° at B on AB and bisect it.

(ii) Construct the isosceles triangle ABC such that $AB = AC$ and $A\hat{B}C = 30^\circ$.

(iii) Construct the perpendicular bisector of AC. Construct a semicircle on the side AC, outside the triangle ABC, such that AC is its diameter.

(iv) Construct a straight line through A parallel to BC such that it intersects the semicircle at D, and join CD.

(v) What is the magnitude of $A\hat{C}D$?

Question Number			Marking Scheme	Marks			Other details
7.		(i)	Constructing AB	1			
			Constructing 60°	1			
			Constructing the angle bisector	2	4		
		(ii)	Completing the correct triangle ABC	1	1		
		(iii)	Contructing the perpendicular bisector of AC	2			No marks for the perpendicular bisector of another side
			Contructing the correct semicircle corresponding to the correct AC	1	3		
		(iv)	Contructing the straight line through A parallel to BC	1	1		
		(v)	$A\hat{C}D = 60^o$	1	1	10	

C
D
6cm
60°
A
6cm
B

8.

In the figure, $ABCD$ is a parallelogram. E is the midpoint of BC and F is a point on DC such that $DF = \frac{1}{3}DC$. Here, the line AB produced meets the line FE produced at G and the line AD produced meets the line EF produced at H.

Copy the given figure in your answer script.

(i) Show that $\triangle BGE \equiv \triangle CFE$.

(ii) Join BF and GC and give reasons why $BGCF$ is a parallelogram.

(iii) Show that $\triangle DFH$ and $\triangle BGE$ are equiangular.

(iv) Show that $DH = \frac{1}{4}AD$.

Question Number			Marking Scheme	Marks			Other details
8.							
		(i)	In the $\triangle s$ BGE and CFE				
			$BE = EC$ (Datum)				Give marks even if one reason is wrong
			$B\hat{E}G = F\hat{E}C$ (Vertically opposite ∢s)	1			
			$B\hat{G}E = C\hat{F}E$ (Alternate ∢s)	1			
			$\therefore \triangle BGE \equiv \triangle CFE$ (A.A.S.)	1	3		Reason ——1
		(ii)	In the quadrilateral $BGCF$,				
			$BG \parallel FC$ ($\because AB \parallel DC$)				
			$BG = FC$ ($\because$Congruent△s)	1			
			Therefore $BGCF$ is a parallelogram				
			(Pair of opposite sides is parallel and equal)	1	2		
		(iii)	In $\triangle$ DFH and $\triangle$ BGE				
			$D\hat{H}F = B\hat{E}G$ (Corresponding ∢s)	1			Reduce 1 mark if the correct reason is not given in at least one place
			$H\hat{F}D = E\hat{G}B$ (Corresponding ∢s)	1			
			$H\hat{D}F = E\hat{B}G$ (Remaining ∢s)	1	3		
			$\therefore \triangle$ DFH and $\triangle$ BGE are equiangular				
		(iv)	$\frac{DH}{BE} = \frac{DF}{BG}$	1			
			$\frac{DH}{\frac{1}{2}BC} = \frac{\frac{1}{3}DC}{\frac{2}{3}DC}$	1	2	10	
			$DH = \frac{1}{4}AD$ ($\because BC = AD$)				

9. Nine small solid metal right pyramids, each with a square base of side length a, and height $2a$, are melted and a solid right circular cylinder of base radius r and height $3r$ is made without any wastage of metal.

Show that $a^3 = \frac{\pi}{2}r^3$.

If $r = 1.725$ cm, by taking $\pi = 3.14$, find the value of a^3 using the logarithms table and obtain the side length a of the base of a pyramid to the nearest centimetre.

From a solid cuboid with a square cross section of side length a, and height $2a$, if one small pyramid with the above mentioned measurements is cut and removed, find the volume of metal that is remaining. (Use the above obtained value of a.)

Question Number	Marking Scheme	Marks			Other details
9.	Volume of a pyramid $= \frac{1}{3} \times a \times a \times 2a$				
	$= \frac{2a^3}{3}$	1			
	Volume of the cylinder $= \pi r^2 \times 3r$				
	$= 3\pi r^3$	1			
	$\therefore 9\left(\frac{2a^3}{3}\right) = 3\pi r^3$				
	$a^3 = \frac{\pi r^3}{2}$	1			
	$a^3 = \frac{3.14 \times (1.725)^3}{2}$				
	$\lg a^3 = \lg(1.57) + 3\lg 1.725$	1			For two correct logarithms——1
	$= 0.1959 + 3(0.2367)$	1			
	$= 0.1959 + 0.7101$				
	$= 0.9060$	1			
	$\therefore a^3 = \text{antilog}\,(0.9060)$				
	$= 8.053$ or 8.054	1			
	$a^3 \simeq 8$				
	$\therefore a = 2$	1			
	Volume of the cuboid $= 2a^3$				
	Remaining volume of metal $= 2a^3 - \frac{1}{3}(2a^3)$	1			
	$= \frac{4a^3}{3}$				
	$= \frac{4}{3} \times (2^3)$				
	$= 10.67\ \text{cm}^3$ or $10\frac{2}{3}\ \text{cm}^3$	1		10	

10. Amala and Sumana decide to read a certain novel during the holidays. Amala reads 20 pages on the first day and on each day thereafter she reads three pages more than the previous day.
   (i) Write the number of pages that Amala reads on the 1st, 2nd and 3rd days respectively.
   (ii) How many pages does Amala read on the 16th day?
   (iii) If she completes the novel on the 16th day, how many pages does the novel consist of?
   (iv) How many pages does Sumana read on the first day if she takes 17 days to complete the novel and if on each day after the first, she reads 4 pages more than the previous day?
   (v) If the two of them started reading the novel on the same day, on which day do they both read the same number of pages?

Question Number			Marking Scheme	Marks			Other details
10.	(i)		20, 23, 26	1	(1)		
	(ii)		$T_n = a + (n - 1)\,d$ $T_{16} = 20 + (16 - 1)\,3$ $= 65$	1 1	(2)		For the formula or for substituting—
	(iii)		$S_n = \frac{n}{2}(a + l)$ $S_{16} = \frac{16}{2}(20 + 65)$ $= 8 \times 85$ $= 680$	 1 1	(2)		
	(iv)		$S_n = \frac{n}{2}\{2a + (n-1)d\}$ $680 = \frac{17}{2}\{2a + (17-1)4\}$ $a = 8$	 1 1	(2)		For the formula or for substituting —
	(v)		Suppose they both read the same number of pages on the n th day. $20 + (n - 1)\,3 = 8 + (n - 1)\,4$ $20 + 3n - 3 = 8 + 4n - 4$ $n = 13$ The two read the same number of pages on the 13 th day	 1+1 1	(3)	(10)	

11. In the given figure, AB is a diameter of the circle with centre O and CD is a chord which is bisected at X by AB. Moreover, CP is perpendicular to PAR, the tangent to the circle at A.

Copy the given figure in your answer script and join OC.

(i) Show that $PAXC$ is a cyclic quadrilateral and that the chord AC bisects $P\hat{C}O$.

(ii) State with reasons two angles which are equal to $D\hat{A}R$.

Question Number			Marking Scheme	Marks			Other details
11.				1			Figure with OC joined —— 1
	(i)		$A\hat{X}C = 90^o$ (Line joining the midpoint of the chord CD to the centre is perpendicular to the chord)	1+1			For $A\hat{X}C = 90^o$—1 Reason ——1
			$C\hat{P}A = 90^o$ (Given)				
			$\therefore O\hat{X}C + C\hat{P}A = 180^o$ $\therefore PAXC$ is a cyclic quadrilateral (Opposite angles are supplementary)	1			
			$O\hat{A}P = 90^o$ (Angle between the radius and tangent)	1			
			$O\hat{A}C = O\hat{C}A$ $(\because OA = OC)$	1			
			$\because O\hat{A}P + A\hat{P}C = 180^o, AB // PC$	1			
			$\therefore O\hat{A}C = A\hat{C}P$ (Alternate ∢s) $\therefore A\hat{C}O = A\hat{C}P$ (Axiom) $\therefore P\hat{C}O$ is bisected by CA	1	8		Reduce one mark if the reason is not given in one place even
	(ii)		$D\hat{A}R = A\hat{D}C$ ($PR // CD$, Alternate ∢s) $D\hat{A}R = A\hat{C}D$ (Angle in the alternate segment) $D\hat{A}R = C\hat{A}P$ ($\because A\hat{C}D = C\hat{A}P$)	1+1	2	10	For any two equal angles with reason 1+1

12. An incomplete Venn diagram with information on 100 customers who came to a certain store is shown here.

* 14 customers did not buy fish, lentils or eggs. 60 customers bought lentils.

Copy the given figure in your answer script and enter the given information in it.

(i) How many customers bought exactly one of the three items fish, eggs and lentils?

(ii) If the number of customers who bought all these three items is equal to the number of customers who bought exactly two of these items, how many customers bought all three items?

(iii) If the number of customers who bought only eggs and lentils is twice the number of customers who bought only fish and lentils, how many customers bought eggs and lentils?

(iv) If the number of customers who bought fish is 52, how many customers bought only eggs?

Question Number			Marking Scheme	Marks			Other details
12.							
			Copying the figure Marking 100, 60, 14 correctly	1+1+1	3		
		(i)	$100 - (60 + 14)$ $= 26$	1 1	2		2 marks even if only 26 written
		(ii)	30	1	1		
		(iii)	$20 + 30$ $= 50$	1 1	2		
		(iv)	Number that bought only fish $= 52 - (30 + 10)$ $= 12$	1			20, 30 should at least be marked in the figure
			Number that bought only eggs $= 26 - 12$ $= 14$	1	2	10	