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வலயக் கல்வி காரியாலயம் கொழும்பு - ஸ்ரீ ஜயவர்தனபுரம்  
Zonal Education Office Colombo - Sri Jayawardhanapura

දෙවන වාර පරීක්ෂණය - 2025  
இரண்டாம் தவணைப் பரீட்சை - 2025  
Second Term Test - 2025

Grade 11

Mathematics II

3 hours

Additional Reading Time - 10 minutes.

**Important:**

- Answer 10 questions by selecting 5 questions from part A and 5 questions from part B.
- Write relevant steps and correct units when answering the questions.
- Each question carries 10 marks.
- The volume of a right circular cylinder of base radius  $r$  and height  $h$  is  $\pi r^2 h$
- The volume of a sphere of radius  $r$  is  $\frac{4}{3} \pi r^3$

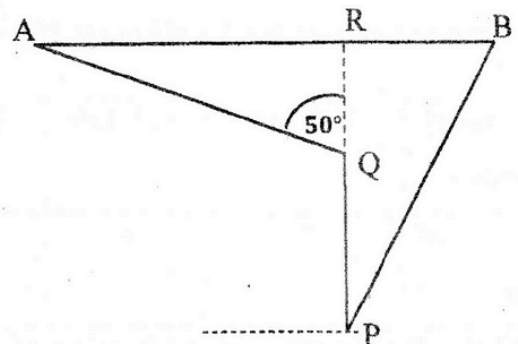
**Part A****Answer 05 questions only.**

01.(a) Ms. Sudhira took a loan of Rs. 144 000 from a financial institution at an annual interest rate of 33% for 2 years, to be repaid at the end of the term. The interest is charged on the reducing balance. Show that the total interest she paid at the end of 2 years does not exceed Rs. 50,000.

(b) Ms. Sudhira used one-third of the loan amount to purchase a mobile phone. The selling price of the mobile phone, including the expected profit, was Rs. 37,500. When purchasing the mobile phone, she paid Value Added Tax (VAT) to the government. Calculate the VAT percentage charged.

02. A and B are two targets located at the same horizontal level. PQ is a vertical tower 240 meters high and PR=360 meters. The angle of elevation from P to B is  $55^\circ$ .

- Copy the diagram and include the given information in it.
- What is the angle of elevation from Q to A?
- Draw a scale diagram where 1 cm represents 60 meters and find the length of AB.

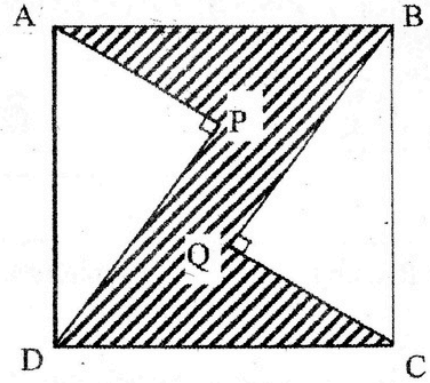


03.(a) Length of a rectangle is 1 cm less than twice of its breadth, which the perimeter is 19 cm.

- By taking the length as  $x$  and breadth as  $y$  of the rectangle and construct a pair of simultaneous equation.
- By solving them, find the area of the rectangle.

(b) Simplify:  $\frac{x(x-5)}{x^2-4x-5} + \frac{2x}{x^2-1}$

04. In a square-shaped lamina ABCD, two identical right-angled triangular parts APD and BQC are removed and obtained the shaded region shown in the figure.  $AP = QC = (x - 3)$  cm and  $DP = BQ = (x - 1)$  cm. The area of the shaded region is  $23\text{cm}^2$ . Show that the value of  $x$  satisfies the equation  $x^2 - 4x - 16 = 0$  and find the value of  $x$  to one decimal place. (Use  $\sqrt{5} = 2.23$ )



05. An incomplete table of values is given below showing the values of  $y$  corresponding to some values of  $x$  within the interval  $0 \leq x \leq 5$  for a quadratic function of the form  $y = f(x)$ .

$x$	0	1	2	3	4	5
$y$	5	8	9	8	—	0

- By using the symmetry find the value of  $y$ , when  $x = 4$ .
  - Using the standard coordinate system and a suitable scale, draw the graph of the quadratic function on graph paper based on the above table of values  
By using the graph,
  - Write the coordinates of the turning point.
  - Write the interval of values of values of  $x$  where  $0 < f(x) < 9$ , where the function is decreasing.
  - If the function moves 5 units downwards along the  $y$ -axis, express the equation of the function in the form  $f(x) = b - (x - a)^2$ , where  $a$  and  $b$  are constant.
06. A frequency distribution based on the monthly salaries of 100 employees working at a certain organization has been prepared below. 100 - 114 means 100 000 - 114 000 and rest also the same.

monthly salary (in thousands)	100-114	115-129	130-144	145-159	160-174	175-189	190-204
Number of employees	2	8	26	45	8	6	5

- What is the minimum monthly salary of an employee?
- Write down the mid value of the modal class.
- Taking the mid value of the modal class as the assumed mean, calculate the average monthly salary of an employee.
- Accordingly, estimate the amount of money that this organization should allocate for employee salaries for the next 4 months.

07(a) Savidu and Kamidu decided to start saving money separately in two tills. Accordingly, during the first week, Savidu saves 1500 rupees and Kamidu saves 1000 rupees. From then onward, each following week, Savidu adds 25 rupees and Kamidu adds 50 rupees to their tills without fail.

- i. What is the total amount saved in Savidu's till at the end of the 8th week?
- ii. Show that the total amounts of money saved by Sumudu and Kamidu are equal after the 20th week passes from the start of saving money.

(b) a, 4, -8, ... are the first three terms of a geometric progression, find the sum of the first 5 terms.

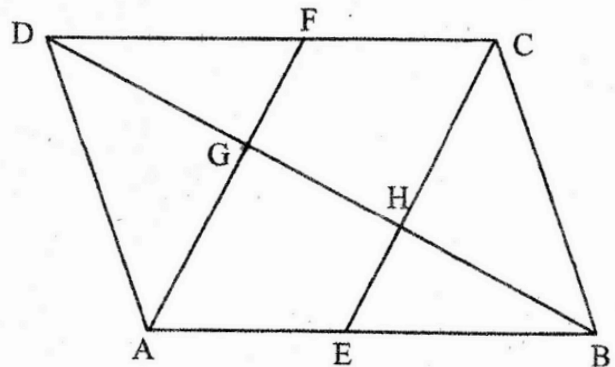
08. Use only a straight edge with a cm/mm scale and a pair of compasses for the following constructions. Show the construction lines clearly.

- i. Draw a straight-line segment AB of length 8 cm, and construct its perpendicular bisector.
- ii. With aid of it, construct a circle with center O and diameter AB.
- iii. At point A, construct a  $60^\circ$  angle and draw its angle bisector.
- iv. Name the point where the bisectors from (i) and (iii) intersect as C. From point B, draw a perpendicular to produced AC and name the point where it meets produced AC as D.
- v. Find the value of the angles  $\hat{D}C\hat{O} + \hat{D}B\hat{O}$ .

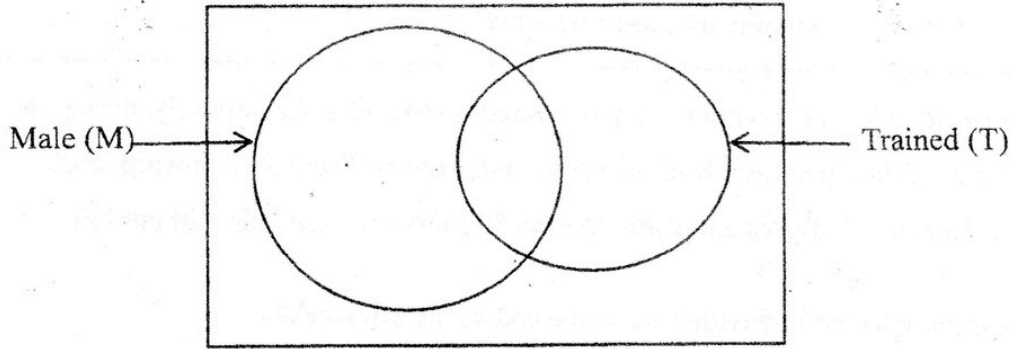
09. Base radius of a right circular cylindrical tank is  $r$  units and height is  $3r$  units. When water is filled up to a height of  $2r$  units, a solid metal sphere of radius 2 units is placed in it, the water level rises to  $2\frac{1}{2}r$  units. Show that the radius  $r$ , of the cylinder is given by  $r = \frac{4}{\sqrt[3]{3}}$ . Using logarithm tables, find the value of  $r$  to the first decimal place.

10. In parallelogram ABCD, AF and EC lines intersect the line DB at points G and H respectively. Also,  $DG = GH = HB$ . Copy the given figure and then prove the following:

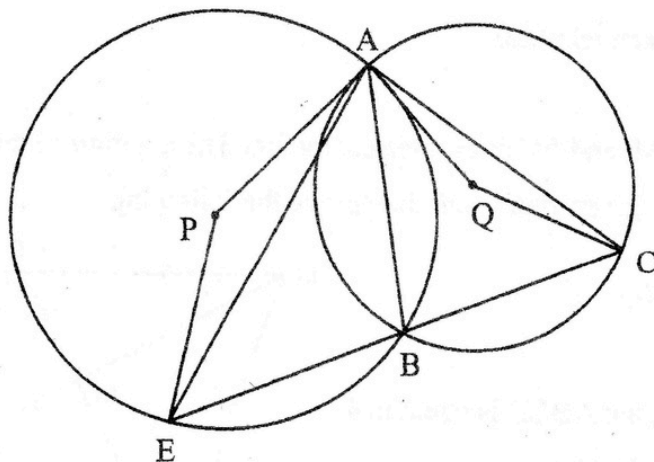
- i. AECF is a parallelogram.
- ii.  $\triangle DFG \cong \triangle EBH$ .
- iii. The area of parallelogram ABCD is equal to 4 times the area of triangle ADF



11. There are 138 workers in a certain company. Among them 88 are trained workers. There are 38 trainee female workers.



- i. Copy the given Venn diagram on to your answer script and insert the relevant information.
  - ii. How many trainee male workers are there?
  - iii. If male workers and trained workers are equal, find the number of trained male workers.
  - iv. Describe that region  $(M \cap T') \cup (M \cup T)'$  in words and find its number of elements.  
All the trainee male workers of that company were promoted as trained workers, and 9 female trained workers were newly recruited.
  - v. Draw a new Venn diagram by considering the above changed information and complete the Venn diagram by filling each region.
- 12.(a) Two circles with centers P and Q are intersect at the points A and B respectively. Points E and C lie on the circles such that EBC is a straight line. Point D lies on the circle which center is P such that  $\widehat{ABC} = \widehat{ADE}$ . Copy this diagram to your answer sheet, include the given information, and show that  $\widehat{AQC} = \widehat{EPA}$  and  $\widehat{PAQ} = \widehat{EAC}$ .
- (b) The radius of the circle which center P is twice the radius of the circle which center Q. Find the ratio of  $AC:AE$ .



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