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 ஆண்டிறுதி மதிப்பீடு - 2021  
 Year End Evaluation

ශ්‍රේණිය } 11  
 தரம் }  
 Grade }

විෂය }  
 பாடம் } Mathematics  
 Subject }

පත්‍ර } II  
 வினாத்தாள் }  
 Paper }

කාලය } 03 hours  
 காலம் }  
 Time }

Name :-.....

**Important :**

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

**Part A**

Answer **five** questions only.

**01.** Shown below are two ways in which a price of the same item has been marked to sell in a showroom.

Price of an item Rs. <b>30 000/=</b> Discount <b>5%</b> of the price on outright purchase is given	Price of an item Rs. <b>30 000/=</b> An item can be bought by making a down payment of Rs. 6000 and paying the rest in 10 equal monthly installments of Rs. 2664.
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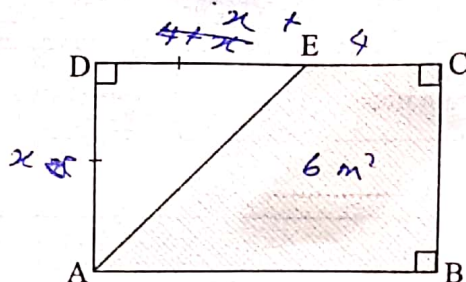
- (i) How much need to be paid when buying the above item on outright purchase?
- (ii) Find the extra amount that should be paid when buying it to pay in monthly instalments.
- (iii) Find the interest should be paid for a monthly instalment under the reducing loan balance?

**02.** An incomplete table of values prepared to draw the graph of the function  $y = x(x - 2) - 3$  is given.

<b>x</b>	-2	-1	0	1	2	3	4
<b>y</b>	5	0	-3	-4	-3...	0	5

- (i) Find the value of **y** when  $x = 2$ .
- (ii) Using the standard system of axes and a suitable scale, draw the graph of the given function on graph paper.
- (iii) Write the coordinates of the turning point of the graph.
- (iv) Using the graph, find the roots of  $x^2 - 2x - 3 = 0$ .
- (v) Describe the behaviour of **y** when  $-1 \leq x \leq 1$ .

03. The figure shows a rectangular-shaped sheet ABCD. The width of it is  $x$  metres and the length of it is 4m more than the width. An isosceles triangular-shaped portion ADE is cut off from it and the area of the portion which is remaining is  $6 \text{ m}^2$ . Show that  $x$  satisfies the quadratic equation  $x^2 + 8x - 12 = 0$ . By solving it find the width of the sheet. (Take the value of  $\sqrt{7} = 2.65$ .)



04. (a) In a certain private company, the number of male workers is five less than twice of female workers. In addition to the daily salary, the company pays an incentive of Rs. 60 per day for a male worker and Rs. 50 per day for a female worker. The company spent Rs. 2250 as an incentive on the day that all the workers came.

- Construct a pair of simultaneous equations by taking the number of male workers in the company as  $x$  and the number of female workers in the company as  $y$ .
- Solve the pair of simultaneous equations and find the number of male workers and the number of female workers.

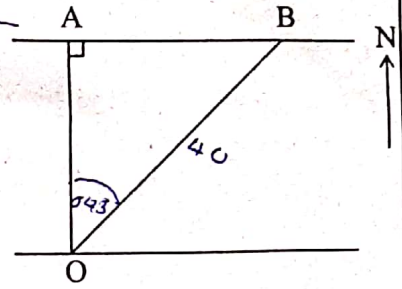
- (b) If  $5 - 2x \geq 7$ , find the maximum value that  $x$  can take?

05. The information on the time spent by 50 students on online education during a month is given in the following frequency distribution.

Time (hours)	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80
Number of students	3	7	8	12	10	6	4

- Taking the mid-value of the modal class as the assumed mean, find the mean time spent by a student during a month on online education to the nearest first decimal place.
- If the cost for online education per hour is about Rs. 40, how much would be spent on online education during a month for two children in a family.

06. From a point O on the bank of a river flowing from East to West, a point A on the opposite bank is seen north and a point B is seen on bearing of  $043^\circ$ .



- Copy the given figure onto your answer script and include the above information in it. Find the magnitude of  $\hat{A}BO$ .
- If the distance between O and B is 40 m, find the breadth of the river to the nearest metre using trigonometric ratios.
- If point C is located 60m to the east from A, find the bearing of C from O.

## Part B

Answer only five questions.

07. A wall decoration consists of 20 rows with different colour marbles. The first row consists of 5 marbles and each row thereafter consist of 3 marbles more than the previous row.

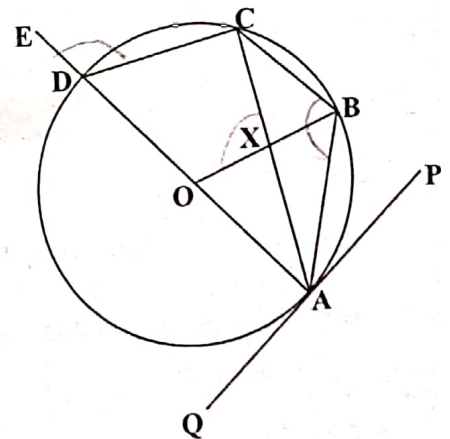
- Write the number of marbles in the first four rows respectively.
- How many marbles are in the last row?
- Find the total number of marbles needed to complete the wall decoration.
- There are two white marbles at both ends of each row. Find the number of colour marbles other than white used in the decoration.

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

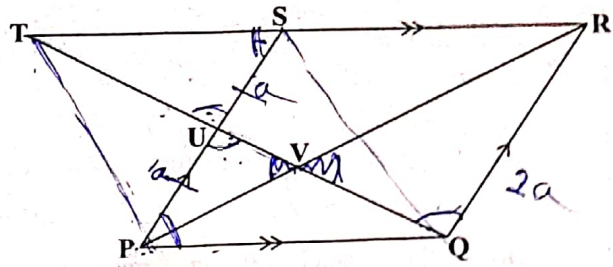
- Construct the triangle ABC such that  $AB = 6$  cm,  $\hat{A}BC = 90^\circ$  and  $BC = 4$  cm.
- Construct the circumcircle of the triangle ABC and label its centre as O.
- The perpendicular bisector of AB meets the major arc of the circle at D. Mark the point D and then construct the cyclic quadrilateral ABCD.
- Construct the tangent to the circle at D.

09. The diameter AD is produced to E in the given circle with centre O. PQ is a tangent drawn to the circle at A. The chord AB bisects the angle  $\hat{OAP}$ . Point C is located on the circle so that the lines AC and OB intersect at X.

- Show that OXCD is a cyclic quadrilateral.
- Show that  $\hat{ABC} = \hat{OXC}$ .



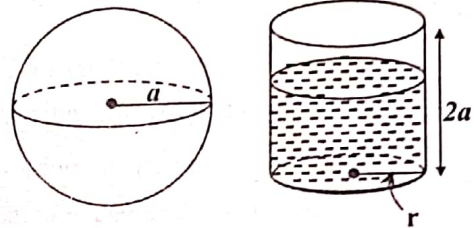
10. PQRS is a parallelogram and U is the midpoint of the side PS. The line QU is produced and the line RS is produced to meet at T. QU and PR intersect at V.



- (i) Show that  $PQU \Delta \cong TSU \Delta$ .
- (ii) Show that PQST is a parallelogram.
- (iii) Show that  $PUV \Delta$  and  $QRV \Delta$  are equiangular.

(iv) Show that  $\frac{PV}{VR} = \frac{1}{2}$ .

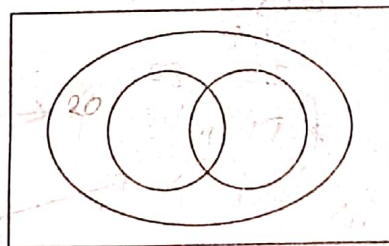
11. A solid sphere of radius  $a$  and a cylinder of base radius  $r$  and height  $2a$  are shown in the figure.  $\frac{2}{3}$  of the cylinder was filled with water.



- (i) When a solid sphere was put into the cylinder the water level came exactly to the brim of the cylinder. Show that  $r = \sqrt{2} a$ .
- (ii) If  $a = 0.095$  m, find the value of  $r$  using logarithmic tables.

12. There were 100 patients in the medical clinic, 90 of these patients had high blood pressure. Out of the patients who had high blood pressure, 53 had diabetes and 35 had heart diseases. 20 patients had high blood pressure only.

(i) Complete the following Venn diagram by using the given information.



- (ii) How many patients had all three diseases?
- (iii) Shade the region that shows the patients had only two diseases and find the number of patients is in that region.
- (iv) If there were no patients who had these three diseases, draw how the Venn diagram should change. (It does not need to write the numbers in the Venn diagram.)