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Department of Education, Southern Province

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Year End Term Test - 2019

10 ශ්‍රේණිය
Grade 10

Mathematics - II

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Three hours

- **Answer 5 questions from part A and 5 questions from Part B.**
- **The volume of a right circular cylinder of base radius r and height h is $\pi r^2 h$ and curved surface area is $2\pi rh$. (Here $\pi = \frac{22}{7}$)**

Part A

(01) A person imported a vehicle. As the customs duty he has to pay 30% of the imported value and 15% as the value added tax (VAT). After paying all the above taxes he has to pay Rs. 18 000 as the loaded, unloaded and transportation costs. For the vehicle in total he paid Rs 5 400 000. When he imported the vehicle he paid for the vehicle in American Dollars and at that day an American Dollars worth Rs. 180. Show that the imported value of the vehicle is 20 000 American Dollars. (10 marks)

(02) An incomplete table to draw the graph of the function $y = a - x^2$ is given below.

x	-3	-2	-1	0	1	2	3
y	-6	-1	2	3	2	.....	-6

(i) By considering the symmetry of the given table obtain the value of y when $x = 2$ (01 mark)

(ii) Draw the graph of the above function by taking 10 small divisions along both x and y axes as one unit. (03 marks)

(iii) Using the graph find the value of a. (02 marks)

(iv) Write the range of values of x for which the function is positive. (02 marks)

(v) Find the value of $\sqrt{3}$ using the graph. (02 marks)

(03) The below frequency distribution shows the information collected from 30 houses about the water units consumed during a month under the Sath Piyum water distribution project.

Water units	16- 18	18 - 20	20 - 22	22 - 24	24 - 26	26 - 28
Number of houses (frequency f)	2	4	10	8	5	1

(i) Which class interval contains the highest number of houses. (01 ma

(ii) Taking the mid value of the modal class as the assumed mean or any other metho find the mean number of water units consumed by a house during a month, for the nearest whole number. (06 marks)

(iii) The manager of this project stated that they earned Rs. 12 for a water unit from each house. But really they have to pay Rs. 17 for a water unit. Find the extra amount they have to bare for the water units per month from a project with 50 houses.

(03 marks)

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(04) (a) Solve the inequality $5 - 2x < 1$ and represent the solutions on a number line.

(03 marks)

(b) Simplify $\frac{2}{x-1} + \frac{1}{1-x}$ (02 marks)

(c) Solve $3x + 2y = 0$

$x - y = 5$ (05 marks)

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(05) There are two pumps which provides water to a certain tank in a uniform speed. One pump takes 5 minutes more than the other pump to fill the empty tank completely. Using the both pumps the tank completely filled within 6 minutes. By taking the time taken by the pump with high speed to fill the tank completely as x minutes, show that the value of x is given by $x^2 - 7x - 30 = 0$ and by solving it find the value of x. (10 marks)

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(06) (a) The distance between two towns in a map draw to the scale 1:50 000 is 20 cm.

(i) Find the actual distance represented by 1 cm in the to map. (01 mark)

(ii) Find the actual distance between 2 towns in kilometres. (02 marks)

(b) The angle of elevation of the top of a flag post observed from the bottom of a building is 60°. Angle of depression of the top of the same flag post observed from a window which is 10 m away from the bottom of that building is 45°.

(i) Draw a scale diagram by representing 2 m of actual length by 1 cm in the scale diagram. (04 marks)

(ii) Using it find the height of the flag post in meters. (03 marks)

Part B

(07) 1st term is 5 and the 25th term is 25 in an arithmetic progression.

(i) Find the common difference. (03 marks)

(ii) Find the 17th term. (02 marks)

(iii) Find the sum of the first 20 terms. (03 marks)

(iv) Write the common difference of the arithmetic progression which is formed by adding 3 to every term of the above arithmetic progression. (02 marks)

(08) (i) Constructs the triangle PQR such that PQ = 6cm, QR = 9cm and $\hat{QPR} = 90^0$ (04 marks)

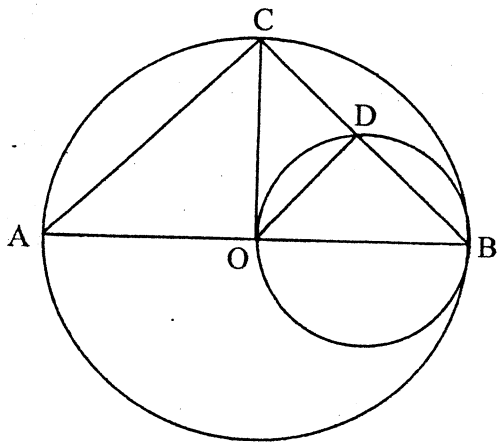
(ii) Construct the bisector of $\hat{PRQ}$. Name the intersection point of that bisector and PQ side as S. (02 marks)

(iii) Name the point which is on SR and moving equidistance from the points S and R as O.

(02 marks)

(iv) Construct the circle by taking O as the centre and OP as the radius and write down the radius of that circle. (02 marks)

(09) The centre of a circle is O and the diameter of the other circle is OB. If $\hat{ABC} = 45°$, prove that,



(i) AC // OD (03 marks)

(ii) $\hat{BOC} = 90^0$ (02 marks)

(iii) D is the centre of the circle which is passes through the points B, O, C. (05 marks)

(10) ABCD is a quadrilateral such that AB = AD. The base of the perpendicular drawn from A to CD is X. AX and BD are intersect at Y and YC = YD.

(i) Represent the above information in a figure and prove that $CXY\Delta \equiv XYD\Delta$ (05 marks)

(ii) Prove that ABC triangle is an isosceles triangle. (05 marks)

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(11) (a) Base radius of a cylindrical container is r and its height is seven times as its base radius. A cube shaped container of side length r is used to fill water to this cylindrical container. How many times it is needed to pour water from the cube shaped container to fill the cylindrical container completely. (04 marks)

(b) The carved surface area of the above cylinder is $2150cm^2$. Find the value of r^2 to the nearest whole number using logarithms table by taking $14\pi = 43.96$ and then find the value of r. (06 marks)

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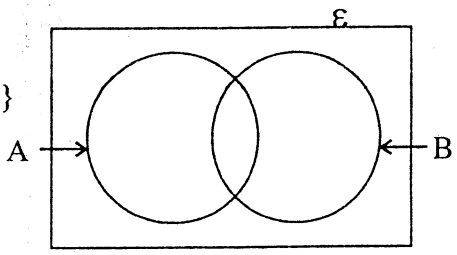
(12) The below information is about 30 students who participated to a Daham Pasal speaking competition.



ε = {students who participated in the competition}

A = {Boys who participated in the competition}

B = {Students who won the competition}

15 boys participated in the above competition and 7 of them won the competition.

13 students lost the competition.

copy the given Venn diagram in your answer sheet,

(i) Include the above data in the Venn diagram (04 marks)

(ii) How many girls won the competition. (02 marks)

(iii) Write down in set notation the region which represent the boys who lost the competition. (02 marks)

(iv) If all the boys who participated in the competition won the competition draw a new Venn diagram to represent it. (02 marks)
