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சபரகமுவ மாகாண கல்வித் திணைக்களம்
Sabaragamuwa Provincial Department of Education

පළමු වාර පරීක්ෂණය 2018
முதலாம் தவணைப் பரீட்சை 2018
First Term Test 2018

11 ශ්‍රේණිය
தரம் 11
Grade 11

ගණිතය I
கணிதம் I
Mathematics I

පැය දෙකයි
இரண்டு மணித்தியாலம்
Two hours

Name / Index No. Class :

- ★ Answer all the questions on this paper itself.
- ★ Each question in part A carries 2 marks each.
- ★ Each question in part B carries 10 marks each.

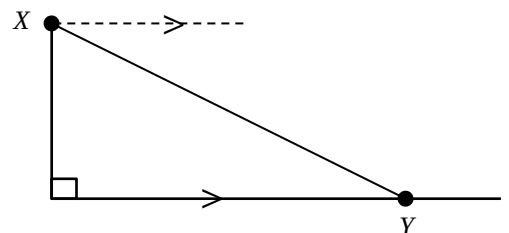
Part - A

(01) Find the least common multiple of the two algebraic expressions $4a^2b$, $3ab$

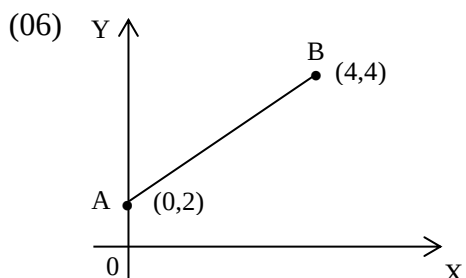
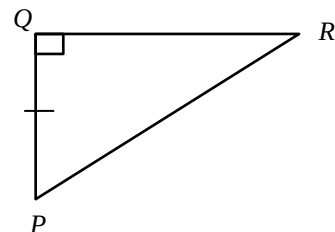
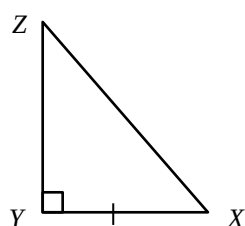
(02) If $4.4 \times 4.4 = 19.36$
 $4.5 \times 4.5 = 20.25$
find the first approximation of $\sqrt{20}$

(03) Write down $5^x = 625$ in logarithmic form

(04) The angle of depression of a car Y parked by the road as seen from a window X in the upstairs of a house is 42° .
Mark the angle in the given figure.



- (05) Write down the other pair of elements that should be equal for the pair of triangles given below to be congruent under the case SAS.



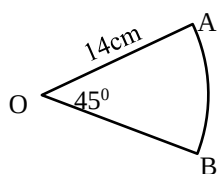
Write down the equation of the straight line AB in the form $y = mx + c$

(07) Solve : $\frac{12}{x} - 1 = 11$

(08) Simplify : $\frac{1}{3x^2} \div \frac{5}{6xy}$

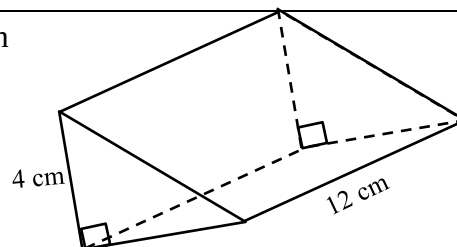
(09) Write down all the positive integers that satisfy the inequality $x - \frac{1}{2} \leq 1\frac{1}{2}$

(10)



Find the length of the arc AB of the sector AOB .

- (11) The area of the triangular cross - section of the prism shown in the figure is 6cm^2 . Find the volume of the prism.



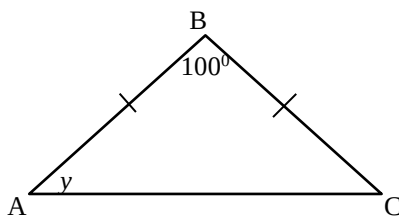
- (12) Find the volume of water collected in 10 seconds from a pipe through which water flows at a rate of $20\text{ cm}^3\text{ s}^{-1}$.

(13) A man deposits Rs. 1000 in a bank which pays an annual simple interest rate of 12%. How much interest will he receive at the end of 6 months?

(14) Write down the roots of $x(x - 3) = 0$

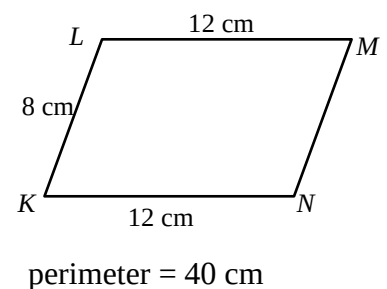
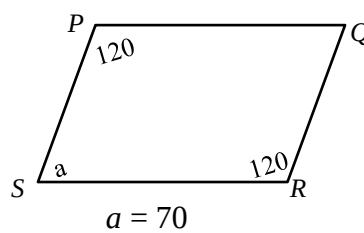
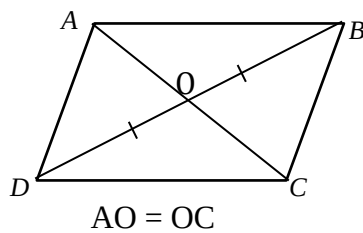
(15) Nimal, Toss a unbiased coin twice, find the probability of getting a head at least one attempt?

(16)



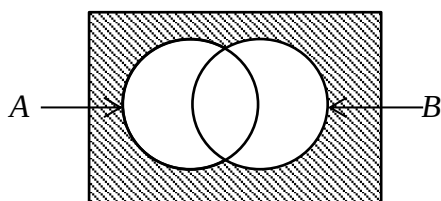
In triangle ABC , $AB = BC$. Find the value of y using the given information.

(17) Using the information shown in the quadrilaterals given below, name the quadrilateral which is not a parallelogram.



(18) It takes 6 days to cut the grass in a playground using a machine. How many days will it take to do the same task using 2 such machines?

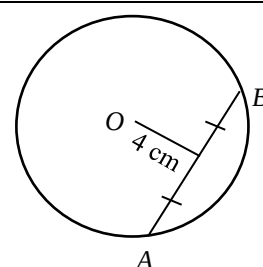
(19)



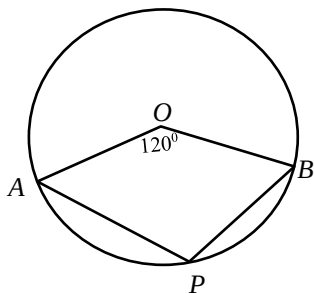
Write down the shaded region in the Venn diagram using the set notation.

(20)

In the circle with the center O, the length of the chord AB is 6 cm. Using the given information, find the radius of the circle.



(21)



According to the information shown in the figure, find the magnitude of $\widehat{APB}$

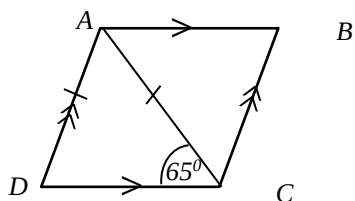
(22) The table given below shows a frequency distribution on the marks scored by a group of grade 11 students for Mathematics I paper.

Class interval	Frequency
0 - 10	4
11 - 20	7
21 - 30	17
31 - 40	8
41 - 50	5

i) Find the mid value of the class interval 11-20.

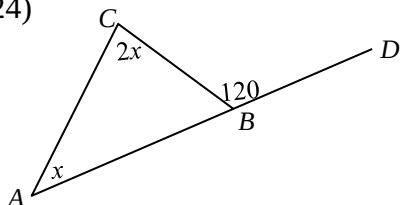
ii) What is the modal class?

(23)



In the parallelogram $ABCD$, $AC = AD$. Using the given information, find the magnitude of $\widehat{ABC}$

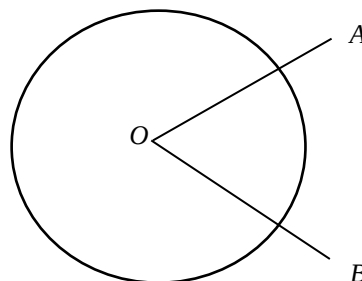
(24)



The side AB of the triangle ABC has been produced to D . Find the value of x .

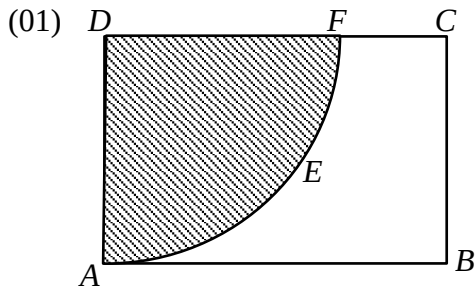
(25)

In the figure, draw a sketch of construction lines required to find the point on the circle with centre O which is equidistant from the lines OA and OB , and indicate this point by naming as P .



Part - B

(Answer all questions on this question paper itself)



The given figure is a sketch of a rectangular land. The breadth of the land is 14m and the length is twice the breadth.

Vegetable has been cultivated in the sector $AEFD$ and banana has been cultivated in the remaining part of the land.

- i) Find the area of the land.
- ii) Find the area of the region in which vegetable has been cultivated.
- iii) Find the perimeter of the region in which vegetable has been cultivated.
- iv) A right-angled triangular part ABG is added to the above rectangular land such that the total extent of land for the cultivation of banana is 406 m^2 .
Draw, with measurements, a sketch of the triangular part to be added, in the above diagram.

- 02) $\frac{3}{5}$ of the population of a certain city are school students, $\frac{3}{20}$ of the population are employees.

The remaining number of people is 4608.

- i) Find what fraction of the whole population is the school students and employees.
- ii) What fraction of the whole population are the remaining people?
- iii) Find the total population in the city.
- iv) Find the number of school students in the city.

- 03) a) 80% duty is charged when a motor bike worth Rs. 50000 is imported.
- Find the duty charged for the motor bike.
 - If Rs. 12500 is spent as other expenses, find the new value of the motor bike.
 - A businessman sells the above motor bike such that he earns a profit of Rs. 17500. When buying it, a buyer has to pay a 15% VAT. What is the total amount that should be paid to buy the motor bike?
- b) In a certain factory, the number of goods scheduled to be produced for a day is produced by operating 10 similar machines for 6 hours. How many more machines should be operated to produce the same number of goods in 5 hours?

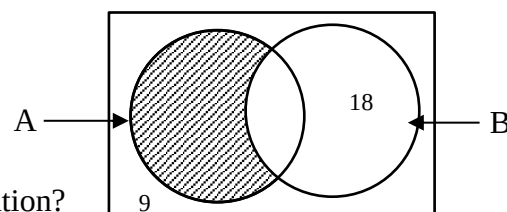
- 04) a) Information on a group of students who sat for an examination is shown below.

ε = {students who sat for the examination}

A = {Girls who sat for the examination}

B = {Students who passed the examination}

$n(A) = 60, n(B) = 40$



- What is the number of girls who passed the examination?

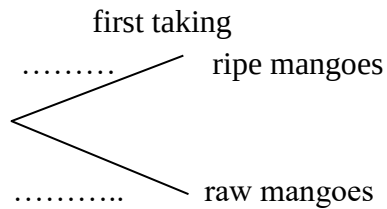
- Describe the students who belong to the shaded region shown in the above Venn diagram and indicate it in set notation.

- Find the total number of students who sat for the examination.

- b) A box contains 5 mangoes in a box. Out of them, 3 mangoes are ripe and the remaining mangoes are raw. All mangoes are of the same size. One mango is taken randomly out of the box.

- What is the probability of obtaining a ripe mango?

- An incomplete tree diagram relevant to the above event is shown below. Mark the relevant probabilities on the branches.

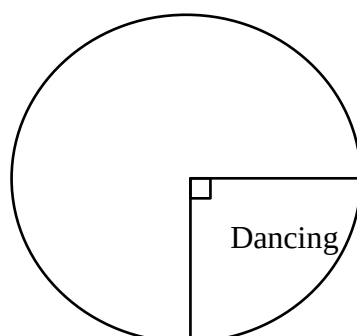


iii) The mango taken out first is put back into the box and another mango is taken randomly from the box. Extend the tree diagram relevant to the second taking and find the probability that the two mangoes obtained in both takings are ripe.

- 05) Each student in grade 11 of a certain school had to select exactly one of the four subject Art, Dancing, Music and Drama as the aesthetic subject. How the students selected these subjects is given in the incomplete table given below. There are 40 students in grade 11 of this school. The table includes another column of angles at the centres of the sectors required to draw a pie chart.

Subject	No. of students	Angle at the centre
Art	18	162°
Dancing	10	90°
Music	—	—
Drama	4	—

- i) What is the number of students who learn music?
- ii) Find the angle at the centre of the sector that represents the students who learn music.
- iii) Find the angle at the centre of the sector that represents the students who learn drama.
- iv) Using the above information, complete the incomplete pie chart shown below.



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පළමු වාර පරීක්ෂණය 2018
முதலாம் தவணைப் பரீட்சை 2018
First Term Test 2018

11 ශ්‍රේණිය
தரம் 11
Grade 11

ගණිතය II
கணிதம் II
Mathematics II

පැය 3.00
இரண்டு 3.00
3.00 hrs

- ★ Answer ten questions selecting five questions from Part A and five questions from Part B.
- ★ Write down the relevant steps and the accurate units when answering the questions.
- ★ Each question carries 10 marks.
- ★ The volume of a right circular cone of radius r and height h is $\frac{1}{3}\pi r^2 h$ and the volume of a sphere of radius r is $\frac{4}{3}\pi r^3$

Part - A

Answer only 5 questions.

- (01) An incomplete table of values of x and y prepared to draw the graph of the function $y = 6 - 2x^2$ is shown below.

x	-3	-2	-1	0	1	2	3
y	-12	-2	4		4	-2	-12

- i) Find the value of y when $x = 0$
 - ii) Using the scale of 10 small divisions as one unit along the x - axis and 10 small divisions as two units along the y -axis, draw the graph of the above function.
 - iii) Write down the interval of values of x for which the value of y decreases positively.
 - iv) Write down the coordinates of the turning point of the function $y = x^2 - 3$
 - v) Write down the equation of the graph whose minimum value is -6 and which intersects the X - axis at the same points as that of the graph $y = 6 - 2x^2$
- 02) a) The annual rates percentage charged by a certain urban council for a house of assesses annual value of Rs. 50 000 is 7%. The owner of the house rents out his house for a year and he collects the rent monthly. From the annual income the rent monthly. From the annual income he receives, he spends 10% on the annual house maintenance. After paying the annual rates too, Rs. 109900 is left with him. Find the monthly rent of the house.

- b) A train which is travelling at uniform speed of 72 kmh^{-1} takes 12 seconds to pass a platform of length 100 m. If this train travels at a uniform speed of 54 kmh^{-1} , how long will it take for the train to pass the same platform?
- 03) a) A trader who bought 25 coconuts separates them to two heaps as small coconuts and big coconuts. He sells a small coconut for Rs. 75 each and a big coconut for Rs. 100 each. The total amount received by selling the coconuts is Rs. 2375. Taking the number of small coconuts as x and the number of big coconuts as y , construct a pair of simultaneous equations and find the number of small coconuts and the number of big coconuts separately by solving the equations.
- b) When twice a certain number is multiplied by the number obtained by subtracting 1 from the original number, the answer is 40. Construct a quadratic equation and find the two numbers by solving the quadratic equation.
- 04) i) Factorise : $x^2 - 5x + 6$
- ii) Make 'b' the subject of the formula $a = \frac{1-2x}{bx-y}$
- iii) Solve : $\frac{1}{x-1} - \frac{3}{x+3} = 0$
- iv) Using the knowledge of factors, find the value of $79^2 - 3 \times 79 - 4$
- 05) The slant height of a right circular solid cone is $7\sqrt{10}$ cm. The ratio of its perpendicular height to the base radius is 3 : 1.
- i) Find the base radius and the perpendicular height of the cone.
- ii) Calculate the volume of the cone.
- iii) A solid sphere is made out of the metal obtained by melting the above cone, without any wastage of metal. Show that the radius of the sphere is $7 \times 3\sqrt{\frac{3}{4}}$
- 06) The frequency distribution given below shows information about the number of one day matches that the cricket team of a certain sports club played and the scores collected.

Score	51-75	76-100	101-125	126-150	151-175	176-200
No. of matches	1	3	6	12	10	8

- i) What is the modal class?
- ii) Express the number of matches in which more than 150 scores were collected as a percentage of the total number of matches.

- iii) Calculate the mean score collected in a one day match taking the mid-value of the modal class as the assumed mean.
- iv) Find the total score that would be expected to be collected in 6 such one day matches they are scheduled to play in the coming days.

Part - B

(Answer five questions only)

- 07) The carpenter who constructs the roof of a certain house states that 70 tiles are required to tile the top row of one side of the roof and 13 tiles are required to tile the bottom row of the same side of the roof and the number of tiles in any row is 3 less than the number of tiles in the row below it. If it costs Rs. 35 for one tile, using the relevant formulae, find the total number of tiles required to tile one side of the roof and show that the total cost for the tiles required to tile one side of the roof is more than Rs. 29000.
- 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) Construct the triangle ABC such that $AB = 7$ cm, $\hat{BAC} = 60^\circ$ and $AC = 6$ cm.
 - ii) Construct the trapezium $ABCD$ such that $CD = 3$ cm
 - iii) Construct the bisector of BAC
 - iv) Construct the circle which passes through points A and B , and whose centre lies on the bisector of the angle BAC .

- 09) The points A, B, C and D lie on the circle shown in the figure.

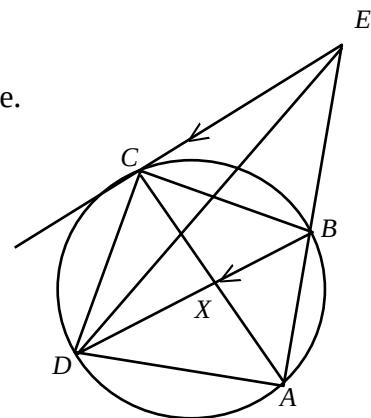
The side AB has been produced to E .

$$BD \parallel EC, \quad \hat{BAD} = \hat{ABC},$$

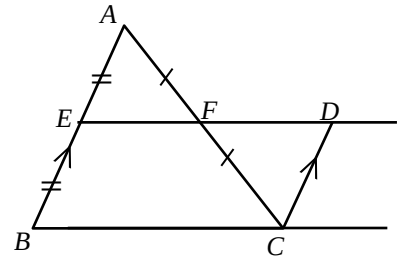
$$\hat{BAC} = 40^\circ, \quad \hat{ADB} = 70^\circ$$

The straight lines AC and BD intersect at X .

- i) Find the magnitude of CAD
- ii) Prove that $\triangle ABC \equiv \triangle ABD$
- iii) Prove that the area of $\triangle AXD =$ the area of $\triangle BXE$
- iv) Prove that the area of the $\triangle ADE =$ the area of the quadrilateral $ABCD$



- 10) In triangle ABC shown in the figure,
 $AB \parallel DC$, $AF = CF$, $AE = BE$.
 Show that BCDE is a parallelogram
 and $EF = \frac{1}{2} BC$



- 11) i) Simplify : $\sqrt[4]{\frac{81}{16}} \times \sqrt{0.01} \times \left(\frac{2}{3}\right)^{-1}$
 ii) Find the value of x
 $2 \log_5 x + 4 \log_5 2 + \log_5 5 = \log_5 15 + \log_5 12$
 iii) Simplify $\frac{\sqrt{0.4562} \times 154.3}{(5.473)^2}$ using logarithms table.

- 12) The points P, Q, R and S lies on the circle with centre O. PQ is the diameter of the circle.
 $\angle PSO = 50^\circ$ and $\angle PQR = 65^\circ$. Giving reasons, find the magnitude of each angle given below.

- i) $\angle PSO$
 ii) $\angle SPO$
 iii) $\angle PQS$
 iv) Show that RSQ is an isosceles triangle.

