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சபரகமுவ மாகாண கல்வித் திணைக்களம்
Sabaragamuwa Provincial Department of Education

තෙවන වාර පරීක්ෂණය 2018
மூன்றாம் தவணைப் பரீட்சை 2018
Third Term Test 2018

11 ශ්‍රේණිය
தரம் 11
Grade 11

මූලිකය I
கணிதம் I
Mathematics I

භාග දෙකයි
இரண்டு மணித்தியாலம்
Two hours

Name / Index No. : Class:

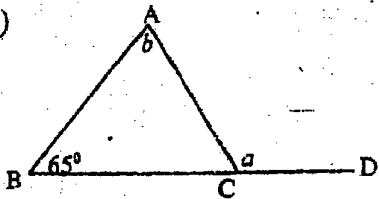
Part - A

* Answer all questions on this paper itself.

(01) Find the first approximation of $\sqrt{7}$ ($2.5 \times 2.5 = 6.25$)

(02) Simplify $\therefore \frac{5}{2x^2} \times \frac{x}{5}$

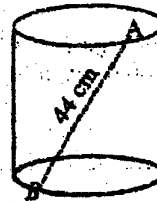
(03)



In the figure, BD is a straight line. Find the value of x and y according to the given data.

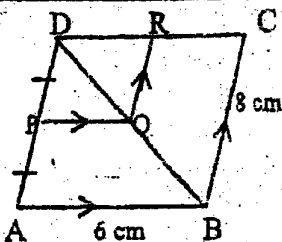
(04) The Diagram shows a hollow cylinder of height 20 cm, which is formed using a thin sheet. The circumference of its base is equal to the length of AB

i) Write the name of the geometrical shape of the sheet obtained when the cylinder is cut along the line AB?



ii) What is the area of the curved surface of the cylinder.

(05)

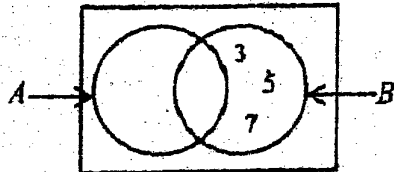


ABCD is parallelogram. $AB = 6\text{cm}$ and $BC = 8\text{cm}$. The mid-point of AD is P. $PQ \parallel AB$ and $QR \parallel BC$. Find the perimeter of quadrilateral PQRD.

(06) Find the least common multiple of $6x$ and $4x^2$

(07) Write $\lg 100 = x$ in index form

(08) A and B are two sets where,

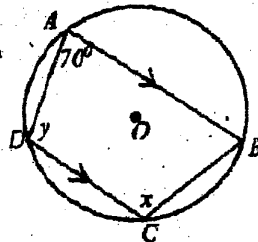


$A = \{\text{even numbers between 0 and 10}\}$

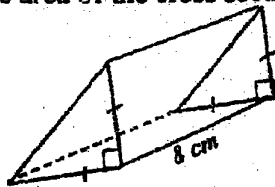
$B = \{2, 3, 5, 7\}$

Write the set $A \cup B$

(09) A, B, C and D are four points on the circle with center is O . According to the given data in the figure, find the value of x and y .



(10) If the area of the cross section of the given right prism is 18cm^2 , find the volume of the prism.

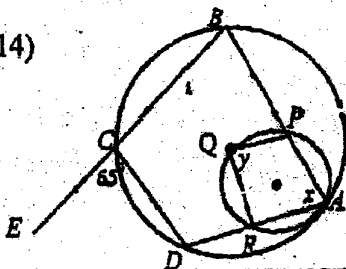


(11) Solve : $\frac{3}{2x} = \frac{1}{2}$

(12) When x is a positive whole number,
What is the maximum value x can take where $3x + 16 \leq 100$?

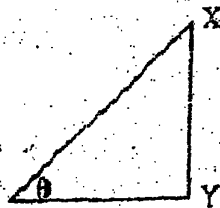
(13) Water continues to flow into a cuboid shaped tank of length 2m, breadth 1m and height 0.8 m cm at the rate of 40 litres per minute. How long will it take to fill the tank completely?

(14)

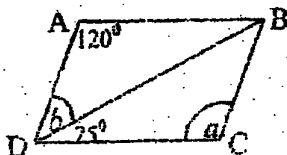


The radius of the large circle is twice the radius of the small circle. The two circles touches each other at A . A, B, C, D are four points on the large circle. A, P, Q, R are four points on small circle. The side BC has been produced to E . According to the data given in the figure find the value of x and y .

- (15) According to the given write down the ratio $\sin \theta$.

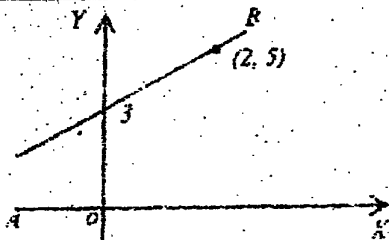


- (16) $ABCD$ is a parallelogram, find the value of a, b .



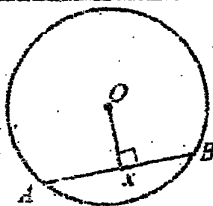
- (17) The probability that seed germinates is $\frac{3}{4}$ and the probability that a plant bears fruits is $\frac{4}{5}$.
What is the probability of such germinated plant bearing fruits.

- (18)



Write the equation of the line AB .

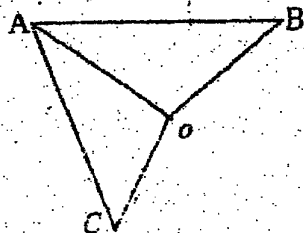
- (19)



AB is a chord of a circle with center O . The perpendicular drawn from O to the chord AB is 5 cm. long. If the radius of the circle is 13 cm, find the length of the chord AB .

- (20) A duty of 80% is charged when importing a bicycle worth Rs. 45000. Find the value of the bicycle after paying duty.

- (21)



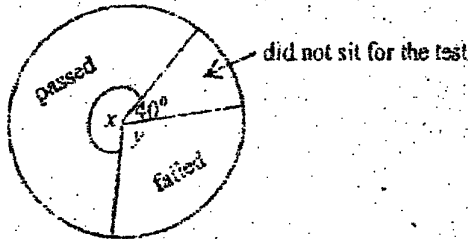
In the figure, $\angle AOC = \angle AOB$. Write down two pairs of elements that should be equal in the triangles AOC and AOB for the triangles to be congruent under the case AAS .

(22) $2, 4x, 8x^2, \dots$

When x is a positive whole number, indicate the 11^{th} term of the given geometric progression in index form.

Write down the 4^{th} term.

(23) $\frac{1}{9}$ of the candidates who applied for a test did not sit for it. 60% of the candidates who sat for the test passed the test and the rest failed in the test. The pie chart given below shows the above information

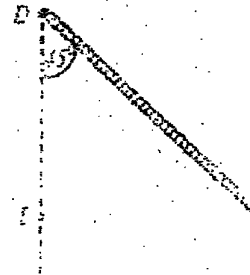


Find the value of the angles x and y

(24) a and b are positive whole numbers.

If $(x+a)^2 = x^2 + \frac{1}{2}bx + 4$, what is the value of b ?

(25) A history book refers to that a certain artefact has been buried at the location P which is on the straight road leading in the south-east direction from the guard house D such that P is equidistant from D and the stone pillar Z . Using your knowledge of loci, sketch the location of P in the given diagram



Part - B

Answer all questions on this paper itself.

(01) a) A wire of length 20 m is cut into pieces of length $\frac{5}{9}$ m each. How many pieces of wire can it be cut into?

b) The travelling details about a certain journey are given below.

- $\frac{4}{5}$ of the total distance of the journey was travelled by bus.
- $\frac{3}{4}$ of the remaining distance was travelled by the jeep.
- Finally a distance of 2 km was travelled on foot.

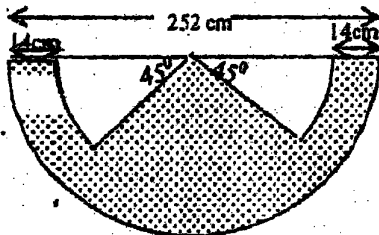
i) After travelling by bus, what fraction of the total distance remained?

ii) What fraction of the total distance was the distance travelled by the jeep?

iii) What portion of the total distance was the distance travelled on foot?

iv) Find the total distance of the journey.

(02)



Flowers have been grown in the two sectors contained in the semi-circular part shown in the figure. Wooden sticks have been erected every 8 cm along the edges of the sectors as a protective fence and sand has been spread in the remaining portion.

i) What is the radius of a sector in centimetres?

ii) Find the perimeter of a sector.

iii) How many wooden sticks are required to erect along the edges of the three sectors?

iv) Find the area of the part where flowers have been grown.

(03) a) A certain urban council charges 6% annual rates for a shop of assessed annual value Rs. 40000. The owner of the shop rents out the shop for Rs. 7500 per month. From the income he receives, he spends 5% on the shop maintenance.

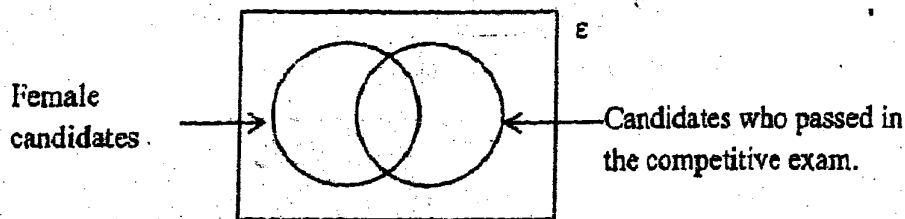
i) What is the total amount received as rent in a year?

ii) What is the amount that should be allocated for the maintenance and the rates for a year?

iii) After allocating money for the maintenance and the rates, he deposits the remaining amount in a financial institute which pays an annual simple interest rate of 8%. Find the interest he receives at the end of one year.

b) 15 men take 6 days to dig a drainage. After 10 men work for 4 days, how many more men should be employed to complete the task within the scheduled number of days.

(04) a) The candidates who applied for a certain job have to sit for a competitive examination before being selected to the job. The number of candidates who applied for the job was 130. Of them, 65 were female candidates and the number of candidates who failed the competitive examination was 75.

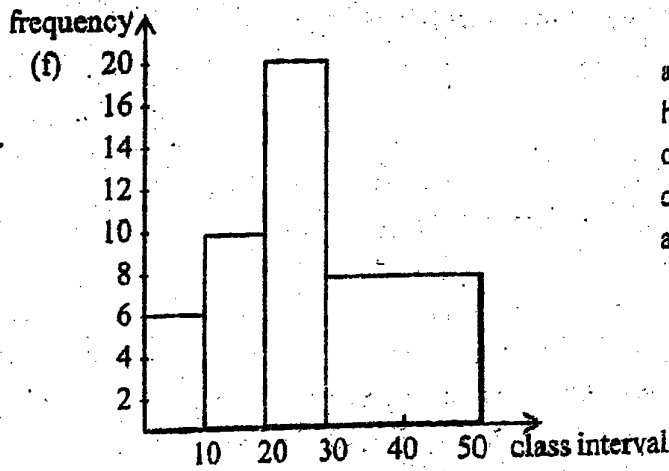


i) If the number of female candidates who passed the competitive examination was 40, include this information in the given Venn diagram. Find the number of male candidates who passed the competitive exam.

ii) In the given Venn diagram, shade the region representing the male candidates who passed the competitive exam and write down that number.

iii) There are 4 blue balls and 3 red balls in the container B. All these balls are of the same size and same shape. A ball is taken randomly out of the container A and put into the container B and then a ball is taken randomly out of the container B. Depict the relevant sample space in a Venn diagram.

iv) Find the probability of the two balls taken out being blue.



a) The diagram given below shows a histogram which represents the marks obtained by a group of students for a question paper for which marks are awarded out of 50.

- i) Draw the frequency polygon on the histogram
- ii) Using the above histogram, complete the frequency table given below.

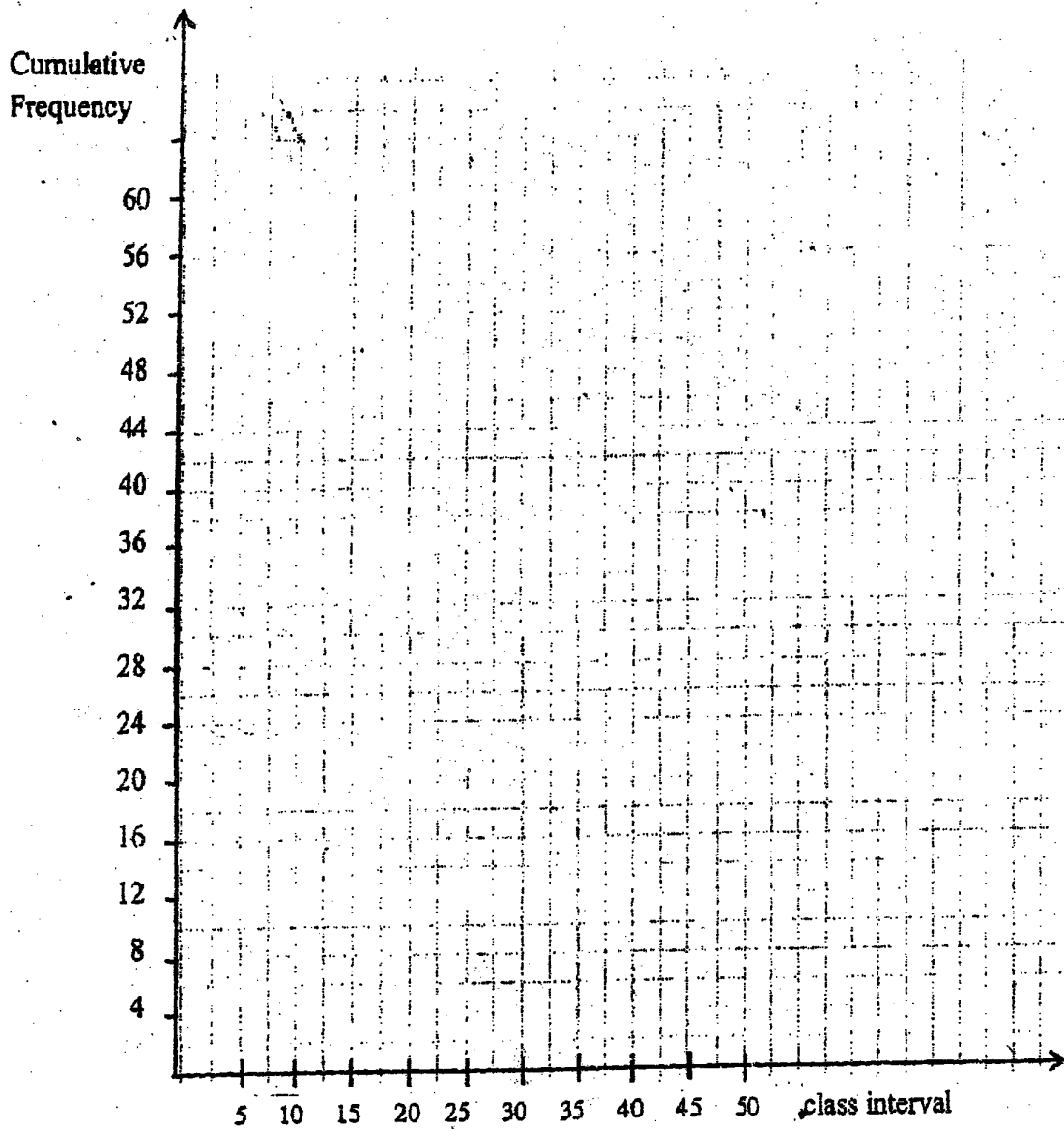
Class interval	Frequency
0 - 10	6
10 - 20
20 - 30	20
30 - 50

iii)

Class interval	Frequency	Cumulative frequency
10 - 15	5	5
15 - 20	7	12
20 - 25	12
25 - 30	37
30 - 35	10	47
35 - 40	6	53
40 - 45	5	58
45 - 50	2	60

A frequency table containing the marks obtained by another group of students for the same paper is given here. Fill in the blanks in the frequency column and the cumulative frequency column.

iv) Using the table, draw a cumulative frequency curve on the given coordinate plane.



v) It is required to select from these 60 students the 25% students with the highest marks. For that, what should be the minimum mark that a student should take?

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11 ශ්‍රේණිය
 தரம் 11
Grade 11

ශ්‍රේණිය II
 கணிதம் II
Mathematics II

වැය 3.00
 இரண்டு 3.00
3.00 hrs

- * Answer 10 questions selecting five questions from Part A and five questions from Part B.
- * Each question carries 10 marks
- * The volume of a right circular cone with base radius r and height h is $\frac{1}{3}\pi r^2 h$

Part - A

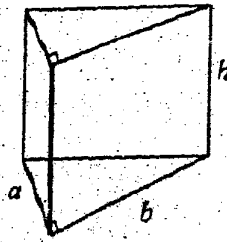
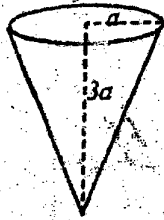
- (01) a) A company which pays annual dividends of 2.40 per share issues 200,000 shares of value Rs. 20 to the public. Chathura who purchases shares from this company has 1% ownership of this company. After receiving dividends for a year, he sells his shares at Rs. 24 per share. Find the total income he gains.
- b) A person who deposits a certain amount of money in a financial institute which pays 12% annual interest compounded, yearly receives a total amount of Rs. 25088 at the end of 2 years. If the compound interest he receives for the second year is Rs. 2688, find the amount of money he deposits.

- 02) a) An incomplete table prepared to draw the graph of the function $y = 5 - (x - 1)^2$ is given below.

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

- i) Find the value of y when $x = 1$
- ii) Taking a scale of 10 small divisions as one unit along x and y axes, draw the graph of the above function.
- b) Using the graph,
- i) Write down the coordinates of the turning point.
- ii) Write the maximum and the minimum value of the function such that $1 \leq x \leq 3$
- iii) Deduce the coordinates of the turning point of the graph of the function $y = 5 - (x - 1)^2$

- (03) The diagram given below shows an inverted conical shaped vessel of base radius r and height three times its radius and another prism shaped vessel with a right angled triangular base and height h . The lengths of the sides of the base containing the right angle are a and b .



The diagram given below shows a conical shaped vessel of base radius a and the height three times its radius and a prism shaped vessel with a right angled triangular base and height h . The lengths of the sides of the base containing the right angle are a and b .

- Find the volume of the conical shaped vessel in terms of π and a .
- Find the volume of the prism shaped vessel in terms of a , b and h .
- When the conical shaped vessel is completely filled with water and that volume of water is poured into the prism shaped vessel, if $\frac{1}{2}$ of the height of the prism shaped vessel is filled with water. Show that $h = \frac{4\pi a^2}{b}$.
- If $4\pi = 12.56$, $a = 5.5$ and $b = 12.8$, find the value of h to the nearest whole number using logarithmic tables.

(04) a) If $A = \begin{pmatrix} 2 & 1 \\ -1 & 3 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & 1 \\ 1 & -2 \end{pmatrix}$ find $A \times B$

b) Solve : $\frac{7}{2(x-1)} - \frac{1}{(x-1)} = \frac{5}{6}$

- c) The table given below shows information on the food items Ravi and Nimali bought for their breakfast from a canteen.

	Hoppers	Bananas
Ravi	3	1
Nimali	2	2

For the breakfast, Ravi spent Rs. 55 while Nimali spent Rs. 50.

- Taking the price of a hopper as Rs. x and the price of a banana as Rs. y construct a pair of simultaneous equations.
- Solve the equations and find the price of a banana and the price of a hopper separately.

- (05) The length of a side of the square base of a right pyramid is x and the perpendicular height of a triangular face is 2.5 m. If the total surface area of the pyramid is 25 m^2 , show that the area of the square base is $\frac{25}{2} (3 - \sqrt{5}) \text{ m}^2$

- (06) The frequency distribution given below shows information on the quantity of tea leaves that is wasted from a certain tea estate in a month while plucking tea leaves and due to other reasons.

Wastage in grams	0 - 1	1 - 2	2 - 3	3 - 4	4 - 5	5 - 6	6 - 7
No. of days	1	2	3	9	8	4	3

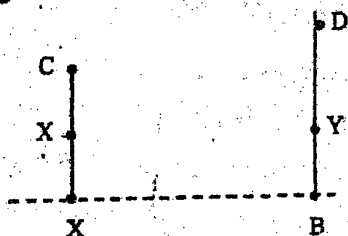
- What is the modal class of this distribution?
- Taking the mid value of the class interval 3 - 4 as the assumed mean, find the mean quantity of tea leaves wasted in a day in kilograms.
- If the quantity of tea leaves wasted every month is as above, find the quantity of tea leaves wasted in a year in kilograms.
- If the price of 1 kg of tea leaves is Rs. 70, giving reasons show that the annual income that the owner of the tea estate loses is Rs. 100,000

Part - B

(Answer five questions only)

- (07) a) 40 students participated in the musical chair game held in a children's sports festival in a certain school. After every round, 3 chairs were removed from the circle such that 3 children could be eliminated from the game. Using the formulae of the relevant progression, find the number of rounds of the game held. If each round lasted for 5 minutes, giving reasons, show that it took more than one hour to finish the game.
- b) Find the common ratio of a geometric progression with the second term $-\frac{2}{3}$ and the seventh term 162.
- (08) a) A distance of 12 km has been represented by 24 cm in a map.
- Write the above scale as a ratio.
 - In the above map, the distance between two cities has been represented by 7.5 cm. Find the actual distance between the two cities.

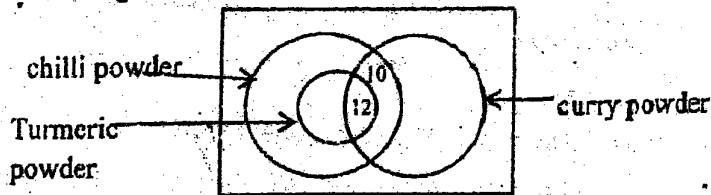
- b) The figure shows a vertical building AC and a vertical tower BD located in a level ground.



The point B, the foot of the tower, is observed with an angle of depression of $24^{\circ}15'$ from a window of the building. The window is 10m above the ground level.

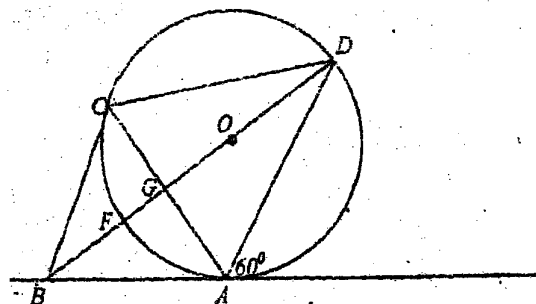
- Copy the above diagram onto your answer sheet and include the above information in it.
- Using the trigonometric ratios, find the shortest distance from the building to the tower.
- If the height of the tower is 48 m, find the angle of elevation of D from X. ($D\hat{X}Y$)

- (09) a) An incomplete Venn diagram containing the information about how customers bought chilli powder, curry powder and turmeric powder from a grinding mill on a day is shown in the figure.



- i) 40 customers bought curry powder. Find the number of customers who bought curry powder only.
 - ii) 25 customers bought turmeric powder, 10 bought only chilli powder. The number of customers who came to the grinding mill on that day was 70. Copy the Venn diagram onto your answer sheet and include the data in it and find the number of customers who bought at least one of the above commodities.
- b) A box contains 3 blue pens and 2 black pens. All these pens are of the same size and same shape. Nimali and Himali take two pens at random from the box.
- i) Represent the sample space showing all possible outcomes in a grid.
 - ii) Find the probability that both of them obtained two pens of the same colour.
 - iii) Find the probability that Himali obtains a black pen and Nimali obtains a blue pen.
- (10) Using only a pair of compass, straight edge with cm/mm scale and showing the construction lines clearly,
- i) Construct the triangle ABC with $BC = 6.5$ cm, $\hat{ABC} = 45^\circ$ and $\hat{BCA} = 60^\circ$
 - ii) Construct a line parallel to BC through A
 - iii) Mark the point D on the above constructed line where $BC = AD$ such that the points C and D are on the same side of AB
 - iv) Write the name of the geometrical shape $ABCD$ state theorem based on which this name is proposed.
 - v) Construct the circle which passes through the point A and touches BC at B .

- (11) In the circle with centre O , BE is a tangent drawn to the circle at A . AC and AD are two chords. The line BD intersects the circle at F and the line AC at G . The centre O lies on the line BD and $\hat{DAE} = 60^\circ$



- i) Find the magnitude \hat{ACD}
 - ii) Find the magnitude \hat{ADB}
 - iii) If $BE \parallel CD$ show that $\triangle CDG \cong \triangle ADG$
 - iv) Show that the quadrilateral $ABCD$ is a rhombus
- (12) In parallelogram $ABCD$, the point E lies on the side DC such that $DE : EC = 2 : 1$. The side AC and the side BE intersect at X . Mark these data in a figure and show that $CX = \frac{1}{4} AC$.