Department of Education – North Central Province

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மாகாண கல்வி திணைக்களம் - மத்திய மாகாணம்

32	S	I

Third Term Test - 2023

Mathematics - I

Index No.:- .....

Important:

* This question paper consists of **8** pages.
* Write your **Index Number** correctly in the appropriate places on **this page** and **page three**.
* Answer **all** questions **on this question paper itself**.
* Use the space provided under each question for working and writing the answer.
* Indicate the **relevant steps** and the **correct units** when answering the questions.
* Marks are awarded as follows:

  In part A

  2 marks for each question

  In part B

  10 marks for each question
* Blank papers can be obtained for scratch work

For Marking Examiners' Use Only		
Paper I		
Part	**Question Number**	**Marks**
A	**1 - 25**	
B	**1**	
	2	
	3	
	4	
	5	
Total		
Paper II		
Part	**Question Number**	**Marks**
A	**1**	
	2	
	3	
	4	
	5	
	6	
B	**7**	
	8	
	9	
	10	
	11	
	12	
Total		

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மாகாணக் கல்வித் திணைக்களம் - வட மத்திய மாகாணம்
DEPARTMENT OF EDUCATION – NORTH CENTRAL PROVINCE

Third Term Test - 2023

Grade
11

Subject :- **Mathematics - I**

School Name : .....

Index Number : .....

Time : 2 Hours

Part A

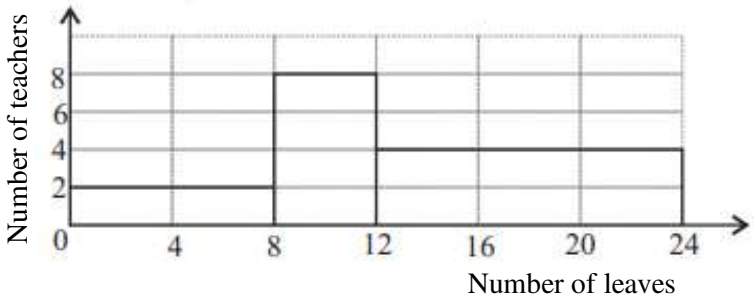
* Answer **all** questions **on this question paper itself**.

1. If **Rs. 500** is charged as the quarterly rate for a building, find the annual rate.

2. Simplify $\frac{2}{3a} + \frac{1}{6a}$

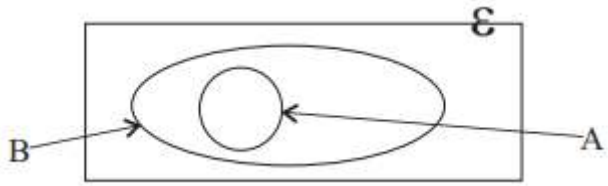
3. The surface area of the curved surface of a cylinder with radius **7 cm** is **220 cm^2**. Find the height of the cylinder.

4. The histogram that shows how teachers in a school took leaves is given below. Fill the incomplete frequency distribution using that.

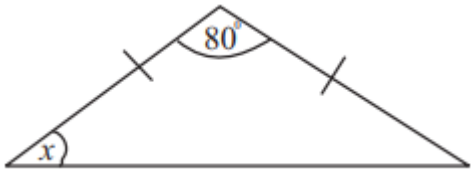


Class intervals (Number of leaves)	Number of teachers
0-8	4
8-12	.....
12-24	.....

5. Shade **A∩B** in given Venn diagram.



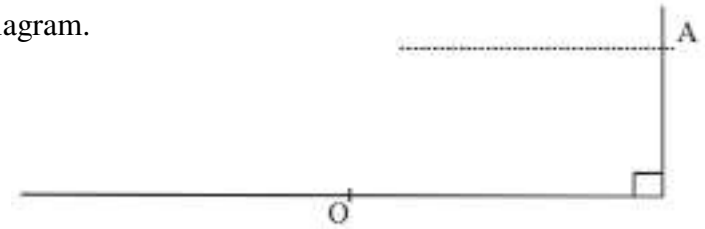
6. Find the value of x using the given information.



7. Express $\log_5 625 = 4$ in **index form**.

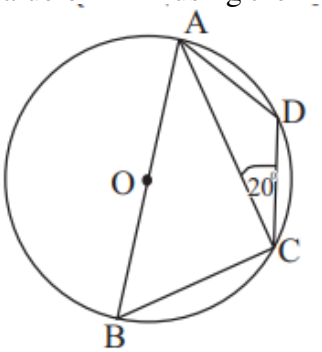
8. Find the LCM of $6a^2b, 3ab^2$

9. Piyal who is looking through the window **A** which is located **6 m** above in a building can see a ball **O** falling on the ground with an angle of depletion of 30^0. Mark the relevant information in following diagram.



10. If the probability of taking a red ball from a container containing identical red balls and yellow bales is $\frac{2}{5}$ and if there are only **4** red balls in the container, find the number of yellow balls in the container.

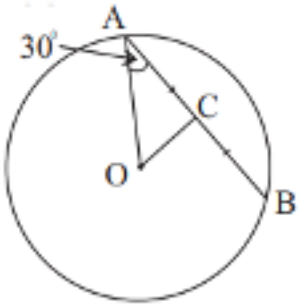
11. **C** and **D** are located on the circle with center **O** and diameter **AB**. Find the value of $B\hat{A}D$ using the information given in the diagram.



12. **4** water pumps take **6** hours to fill a tank. Find the time taken to fill the **half of** the tank by **3** such machines.

13. Express $a^2 - 1$ as a product of two factors.

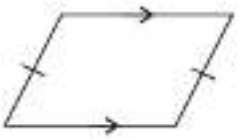
14. The mid-point of the chord **AB** of the circle with center **O** is **C**. Find $A\hat{O}C$.

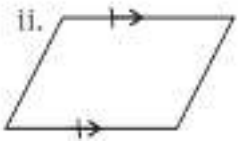


15. Between which two whole numbers does the value of $\sqrt{57}$ lie?

16. Solve $x(x-2) = 0$.

17. Select and underline the quadrilateral/ quadrilaterals that can be definitely identified as a parallelogram from the following quadrilaterals.

i. 

ii. 

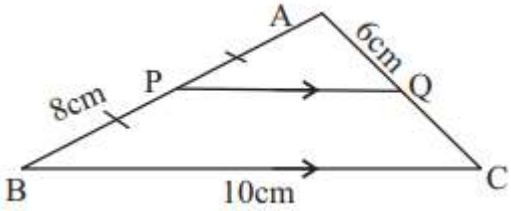
iii. 

iv. 

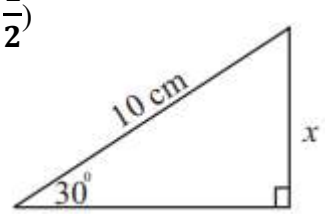
18. $3a + 2b = 7;\ 2a + 3b = 3$, find the value of $a+b$ without solving the equations.

19. The cross-sectional area and the height of a right prism with a triangular cross section are **5 cm^2** and **10 cm**. Find its volume.

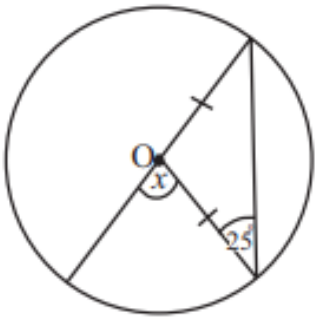
20. In triangle **ABC**, **BC // PQ**. Find the lengths of **PQ** and **QC** using the given data.



21. Calculate the length of the side denoted by $\boldsymbol{x}$ in following triangle.($\mathbf{\sin 30^0 = \frac{1}{2}}$)

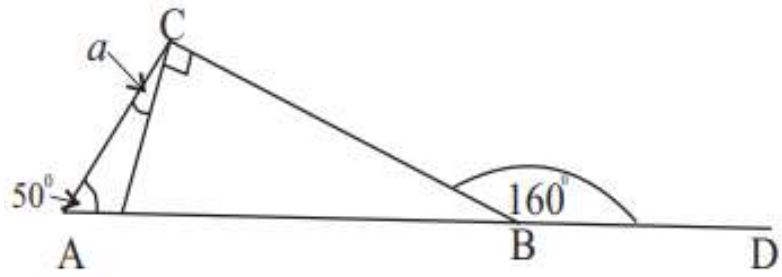


22. Find the value of $\boldsymbol{x}$ using the data given in the circle with center **O**.

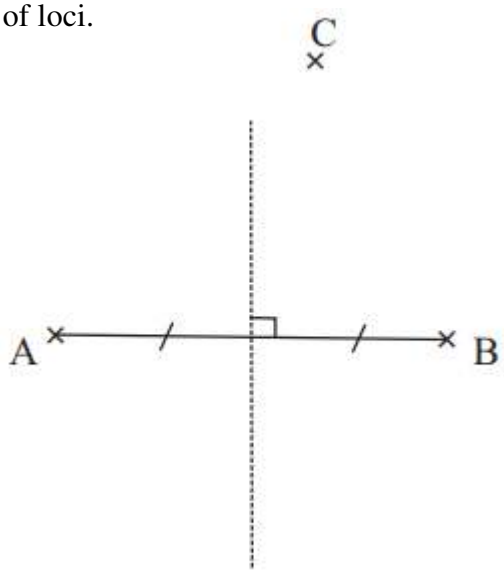


23. Find the intercept of the line which is passing through the point **(5,7)** and having the gradient **2**.

24. The side **AB** of triangle **ABC** is produces up to **D**. find the value of the angle $\boldsymbol{a}$.



25. **A**, **B** and **C** are three houses of three friends. The lamp post **X** should be fixed equidistance from all these three houses. Indicate by a sketch on this incomplete figure, how the location of **X** is found according to the knowledge of loci.



Part B

* Answer **all** questions **on this question paper itself**.

1. Neela, who made the welithlapa, reserved $\frac{3}{8}$ of it for alms in the temple and reserved $\frac{4}{5}$ of remaining to go to her relative's house. The remaining amount is divided equally among her three children.

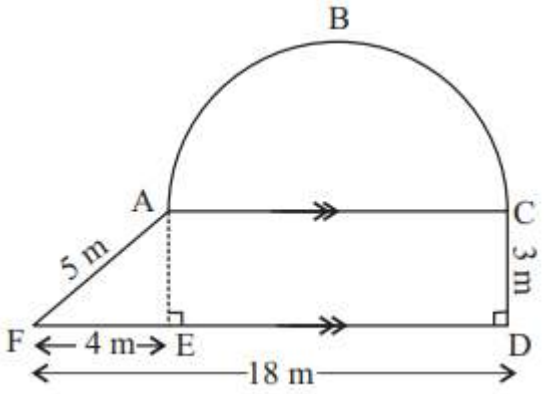
I. What fraction of total amount of welithalapa is remained after reserving for temple?

II. What fraction of total amount of welithalapa is reserved to go to relative's house?

III. What fraction of total amount of welithalpa is received by a child?

IV. Neela said that, she spent Rs. 3600 to make welithalapa. If the number of welithalapa received by a child is 5, find the cost of one welithalapa by finding the total amount of welithalapa which were made by Neela.

2. The figure shows a flower bed in the shape of a semicircle and a trapezium connected to it. There are blue flowers in the semi-circular part and yellow flowers in the other part.



I. Find the radius of the semi-circle.

II. Find the length of ABC arc.

III. It is necessary to make a fence around this flower bed. Find the length of that fence.

IV. Find the area of the part containing blue flowers.

V. Find the area of the whole flower bed.

3. Nimal has 200 shares of a company which pays annual dividends of Rs. 20 per share.

I. Find the dividends income received by him at the end of the year.

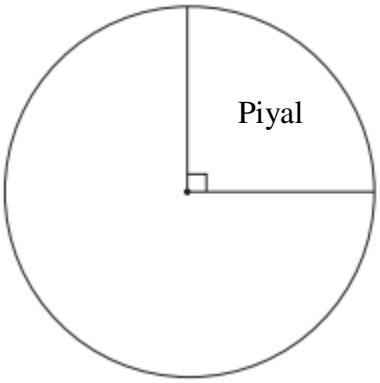
At the end of first year he earned Rs. 18 000 by selling 150 shares. Nimal said that he received a capital gain of Rs. 3000 by that. And also he said that he got the dividends income by the remaining shares.

II. Find the purchase price of a share.

III. Find the amount that he invested to buy all the shares.

IV. What percentage of the amount invested is the total profit that he gained at the end of two years.

4. The four students Piyal, Kamal, Nimal and Saman participated for the election of selecting head prefect in a school. Piyal got 240 votes out of that.



I. If there are no rejected votes among the votes casted, find the total number of students who voted?

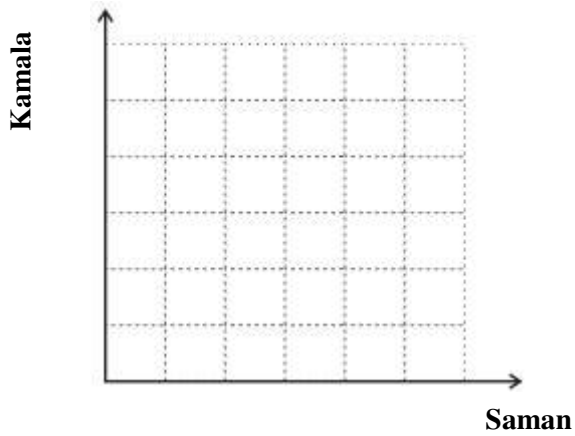
II. Kamal got 160 votes. Find the magnitude of the angle at the center of the sector denoting Kamal's votes.

III. Nimal and Saman got equal number of votes. Find the magnitude of the angle at the center of the sector denoting Nimal's and Saman's votes. Complete above pie chart.

IV. In the above counting, the 16 votes obtained by Saman were erroneously recorded as the votes received by Piyal. Find the magnitude of the angle at the center of the sector denoting Piyal's votes when it is corrected.

5. **(a)** 3 private buses and two public buses were ready to go on a trip of Wewa Langa School. Saman and Kamala are two students who came to go on this trip. Boys and girls are not allowed to travel on the same bus in the trip. Students were asked to climb on the bus randomly according to this rule.

I. Show the sample space of receiving a bus by Saman and Kamala in following grid. (Denote private buses as $\mathbf{P_1}$, $\mathbf{P_2}$, $\mathbf{P_3}$ and public buses as $\mathbf{L_1}$, $\mathbf{L_2}$)



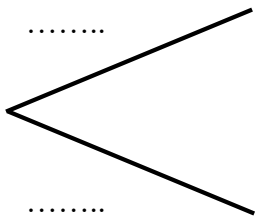
II. In the grid, encircle the event that both Kamla and Saman get a public bus and find its probability.

(b) On the way, the buses were stopped near a sweets shop to buy sweets for all the students. There, Saman and Kamala shared money and bought a toffee packet. All the toffees in the toffee packet differ only in taste. Here, 7 toffees are orange flavored and 3 toffees are tamarind flavored. (The taste of toffee is mentioned on the wrapper.)

- Saman first takes a toffee randomly from the toffee packet, eats it if it is an orange flavored toffee and gives the remaining toffees to Kamala. If the taken toffee is tamarind flavored, it is put back in the packet and given to Kamala.
- Kamala also takes a toffee randomly from the packet of toffees given by Saman and eats only if it is tamarind flavored toffee.

I. Complete following incomplete tree diagram which shows the event of taking a toffee by Saman randomly.

Saman



II. Extend above tree diagram to show the event of taking toffee by Kamala. Find the probability of tasting a toffee each by Saman and Kamala.

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மாகாணக் கல்வித் திணைக்களம் - வட மத்திய மாகாணம்
DEPARTMENT OF EDUCATION – NORTH CENTRAL PROVINCE

Third Term Test - 2023

Grade: 11

Subject :- **Mathematics - II**

School Name : .....

Index Number : .....

Time : **3 Hours and 10 Minutes**

Use additional reading time to go through the question paper, select the questions and decide on the questions that you give priority in answering.

Important:

* Answer **ten** questions selecting **five** questions from **Part A** and five questions from **Part B**.
* Write the **relevant steps** and **correct units** in answering the questions.
* Each question carries **10** marks.
* The volume of a 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.*

1. A product worth Rs. 120 000 can be brought by payment of equal monthly installments for one year at an annual interest rate of 24% where the interest is calculated on the reducing loan balance. But, Piyal bought it by borrowing a loan of Rs. 120 000 from a company at annual simple interest rate of 24%. He repaid it within one year. Find the profit or loss stating whether Piyal incurred a profit or a loss by taking a loan for simple interest rate without taking this product under the interest rate of reducing balance method.

2. An incomplete table prepared to draw graph of the function $y = -x^2 + 2x + 3$ is given below.

x	-2	-1	0	1	2	3	4
y	-5	....	3	4	3	0	-5

   I. Find the value of y when $x = -1$.
   II. Using the scale of 10 small divisions representing one unit along x-axis and along the y-axis, draw the graph of the above function on a graph paper.
   III. Find the roots of $x^2 - 2x - 3 = 0$.
   IV. Find the interval of values of x for which function is increasing positively.
   V. Express the given function in the form $y = -(x-a)^2 + b$, where a and b are two numbers.

3. **(*a*)** The price of two school bags and a pair of shoes is Rs. 11 000. The price of a school bag is Rs. 3000 less than the price of two pairs of shoes.
   I. Construct a pair of simultaneous equations by taking the price of a school bag as Rs. a and price of a pair of shoes is Rs. b.
   II. Solve above pair of simultaneous equations and find the price of a school bag and price of a pair of shoes.

(b) Piyal bought above school bags and pairs of shoes in equal amounts by spending Rs. 36 000. Construct a linear equation by taking number of bags as x. Find the number of bags that nimal bought by solving that equation.

4. There are two types of medicines as A and B. The amounts of these two medicines bought by Neeroga pharmacy are shown in following table. If amounts of money spent to by the two medicines are equal, verify the quadratic equation $2x^2 - 11x - 15 = 0$ and find the cost of 1 g of the medicine A by taking the value of x. (Use 15.52 for the value of $\sqrt{241}$)

Type of medicine	Cost per gram (Rs.)	Amount bought (g)
A	$2x$	$2x$
B	$(2x + 5)$	$(x + 3)$

5. A, B, C and D are four places which are located on a plain ground. Following information are given about the locations of those places.
   - B is located north of A.
   - C is located east of A.
   - C is located with a bearing of $321^0\ 20'$ from B. The minimum distance between A and C is 4 m.

   I. Draw a sketch to show above information.
   II. Find the distance between B and C to the nearest whole number using trigonometric tables.
   III. The point D is located on the produced AC line. The minimum distance between B and D is 7 m. Find the magnitude of $B\widehat{D}A$.

6. The table below shows the information about extra classes done by 70 teachers teaching in a particular school during the last year. Each class is held for two hours.

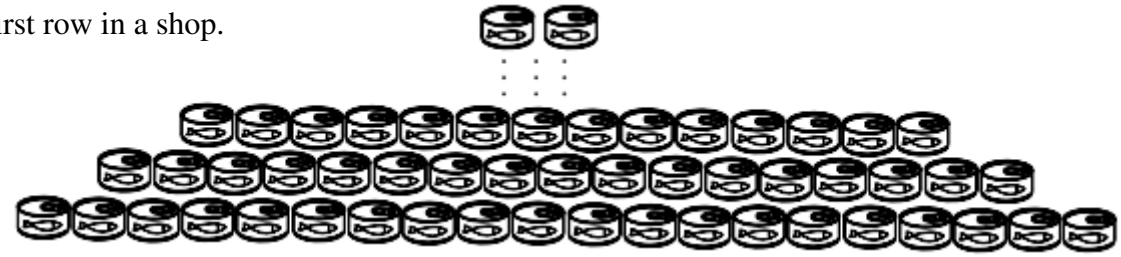
Number of times that the classes were held	0 – 6	7 – 11	11 – 15	16 – 20	21 – 27	28 – 32	33 – 41
Number of teachers	3	5	11	16	19	9	7

   I. Find the model class of the distribution.
   II. Using the mean of the modal class as assumed mean or otherwise, find the mean of the number of extra classes held by a teacher during last year.
   III. If a teacher is paid Rs. 800 per hour, find the amount of total money received by above teachers.
   IV. According to above data distribution, the principal said that the minimum number of times that the extra classes held by all the teachers is greater than 1290 in that year. State with reasons whether this statement is true or fault.

Part B

*Answer **five** questions only.*

7. **(a)** Following diagram shows how salmon tins are arranged in three rows at the bottom and in the first row in a shop.



   I. How many rows of salmon tins are there in this arrangement?
   II. Find the total number of salmon tins in this arrangement.

(b) The common ration of geometric progression is **3** and **5th** term $T_5 = 62$.

I. Find the first term of this progression.
II. Show that the **10th** term of this progression is $T_5 \times 3^5$.

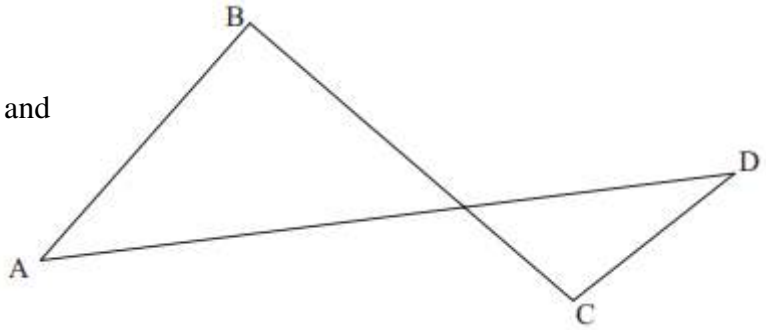
8. Use only straight edge with a cm/mm scale and pair of compasses for the following constructions. Show the construction line clearly.

I. Construct the parallelogram **ABCD** such that **AB=6 cm**; $D\hat{A}B = 60^0$; **AD = 4 cm**.
II. Construct the line which travels equidistance from the points B and C. Construct the perpendicular to the line **AB** at **B**. Name the point of intersection of these two lines as **O**.
III. Construct a circle by taking **O** as the center and **OB** as the radius.
IV. Construct a tangent to the circle at **C** and produce **AB** so that it meets the tangent. Name that meeting point as **E**.
V. State with reasons, the relationship between **CE** and **EB**.

9. A cylindrical shaped container with thin walls is completely filled with water. The radius of it is x and the height is **six** times of radius. The water in that container is enough to fill **6** semicircular containers with radius $3a$. When thus filled, the cylindrical tank is completely empty. Show that, $a = \frac{x}{\sqrt[3]{18}}$. If $x = 0.5241$,find a using logarithm tables.

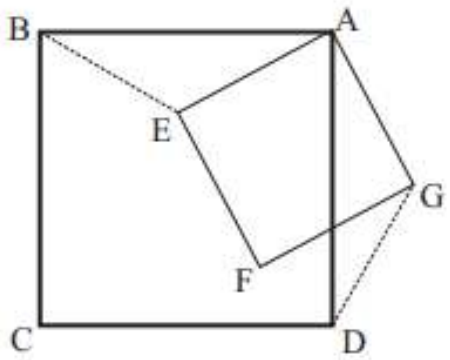
10. **(a)** The mid points of following straight line segments **AB**, **BC**, **AD** and **DC** are **P**, **Q**, **R** and **S** respectively.

I. Copy this figure in your answer script and mark given information.
II. Prove that PQ = RS

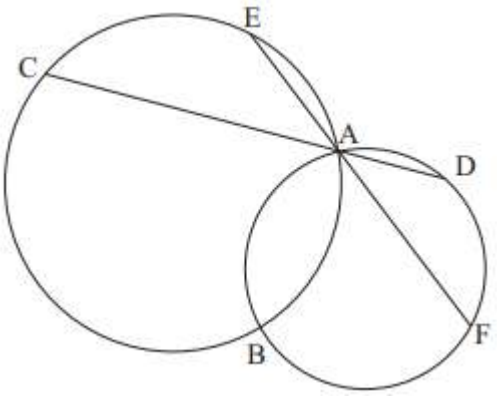


(b) **ABCD** and **AGFE** shown in following figure are squares.

I. Show that $B\hat{A}E = G\hat{A}D$
II. Show that BE = GD



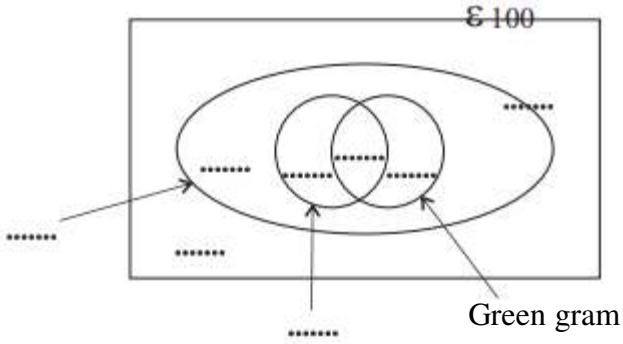
11. As shown in the figure, the two circles intersect at the points A and B. The straight line segments CD and EF intersect at A. X is any point located on the circle between CE, Y is any point located on the circle between DF. Copy this incomplete figure in your answer script and mark the given information in that figure.
Show that,
$C\hat{B}D = E\hat{B}F$ and $C\hat{X}E + D\hat{B}F = 180^0$.



12. There are 100 members in a Farmers' society. The information about cultivating paddy, green gram and black gram (undu) by these farmers is given below.
    - All the farmers who cultivate green gram and black gram cultivate paddy.
    - 90 farmers cultivate paddy.
    - 30 farmers cultivate only paddy.
    - The ratio of the farmers who cultivate only black gram and paddy to farmers who cultivate only green gram and paddy to farmers who cultivate black gram, green gram and paddy is 1:3:2.

    (Hint: take the number of farmers who cultivate only black gram and paddy as x.)

I. Copy following incomplete Venn diagram in your answer script and mark relevant information.



II. How many farmers cultivate all the three crops?

None of the farmers hope to cultivate all the three crops for next season. Farmers those who cultivated all the three crops in this season, hope to cultivate next season in following ratio.

Farmers who cultivate only black gram and paddy to farmers who cultivate only green gram and paddy is 3:2.

III. Draw a new Venn diagram by changing above Venn diagram to show cultivation of crops of farmers for next season and include relevant information.