



# Provincial Department of Education

## Northern Province

### Year End Exam – 2020



### Mathematics

Grade -11

32 T1

Time : 2 hours

Index No : .....

Supervisor Signature

:.....

#### Instructions

- ❖ Write your index number correctly.
- ❖ To use the under space part IA, IB questions get answer method
- ❖ Answer all questions must be done part IA, &IB
- ❖ Not allowed to get out the answer sheet form the exam hall after the examination.

#### Important :

- Part IA has 25 questions each has 2 marks totally 50 marks given.
- PartIB has 5 questions each has 10 marks totally 50 marks.

Marking examiner

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Cross examiner

#### Examiner use only

Part	Question	Marks
IA	1 - 25	
IB	1	
	2	
	3	
	4	
	5	
Total		

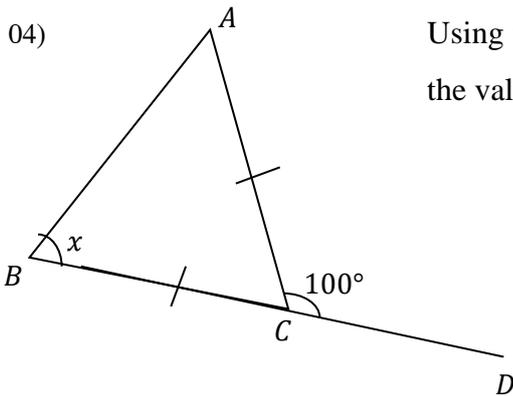
**Part - I A**

01) If the customs duty that has to be paid is 7% of the value of the items, when a mobile phone worth Rs 5000 is imported, find the amount that has to be paid as duty,

02) Find the 25<sup>th</sup> term of the progression 5,7,9, ...

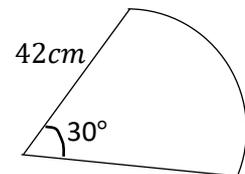
03) Find the gradient of the straight line which passes through the points (4,0)&(2,2)

04)



Using the data given in the diagram,  $BCD$  is a straight line find the value of  $x$ .

05) Find the arc length of the given circular portion.



06) Simplify

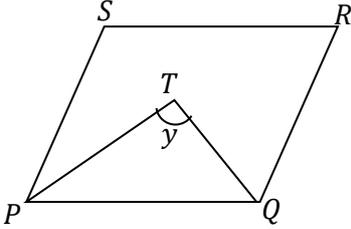
$$\frac{a^2}{3} \times \frac{12}{2a}$$

07) Factorize.  $3x^2 - 7x - 6$

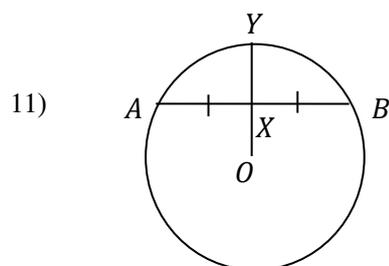
08)  $A = \{x: x \text{ - Prime Number, } x < 10\}$

i. List out the elements of set A

ii. Describe set A in any other way

09)   $PQRS$  is a parallelogram. The bisectors of angles  $\hat{P}$ , and  $\hat{Q}$  meet at the point T. Find the value of y

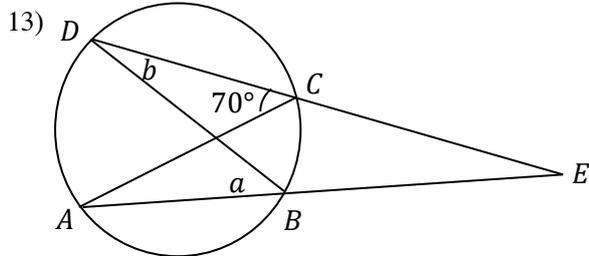
10) Solve.  $3x^2 - 48 = 0$



In a circle with centre  $O$ ,  $OX = 6\text{cm}$ , and  $XY = 4\text{cm}$ . If the following statements are correct mark a 'v' and if they are incorrect mark a 'x' in front of it.

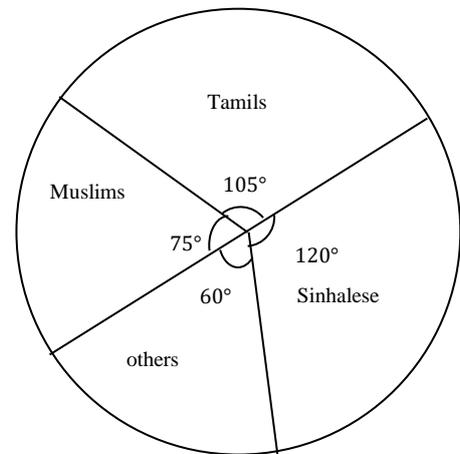
$OB = 8\text{cm}$	
$AB = 16\text{cm}$	

- 12) 8 men take 6 days to plough a farming land. If 4 men plough a portion of farming land in 3 days. How many days will be taken for a man to plough the remaining portion of land?



The points  $A, B, C$  and  $D$  lie on the circle. The produced sides  $AB$  and  $DC$  meet at  $E$ . If  $BD = BE$  and  $\hat{A}CD = 70^\circ$ , find the values of  $a$  and  $b$

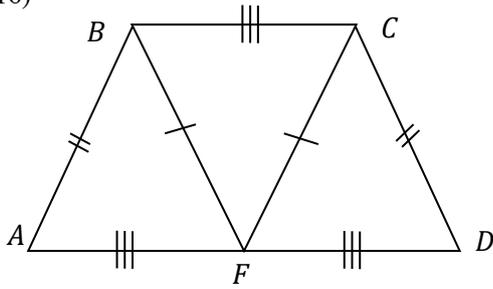
- 14) The pie-chart shows the details of Sinhalese, Tamils, Muslims and others who lived in a building. If the number of Muslims is 150 using the pie-chart, write down the number of Tamils who lived in the building.



- 15) If the radius of a solid cylinder is  $14\text{ cm}$  and its height is  $5\text{ cm}$ , find its curved surface area.  
(Area of the curved surface of a solid cylinder of radius  $r$  and height  $h$  is

$$2\pi rh \text{ take } \pi = \frac{22}{7})$$

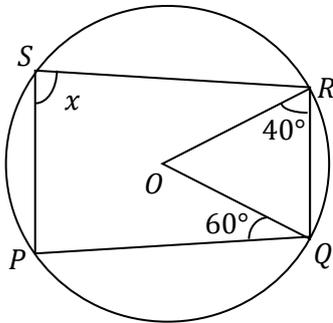
16)



According to the data given in the figure, Name a pair of congruent triangles and write in which conditions that they are congruent.

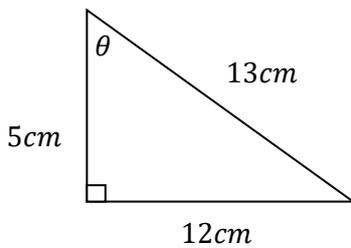
17) If  $\begin{pmatrix} -2 & 1 \\ 3 & 0 \end{pmatrix} \begin{pmatrix} -3 & 1 \\ 0 & 2 \end{pmatrix} = \begin{pmatrix} 6 & x \\ y & 3 \end{pmatrix}$ , Find the values of  $x$  and  $y$ ?

18)



The points  $P, Q, R$  and  $S$  lie on the circle with center  $O$ . According to the given information, find the value of  $x$ .

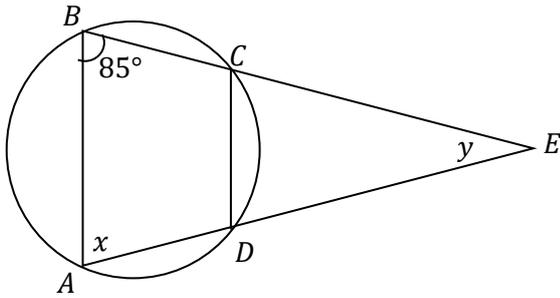
19)



Using the given information in the figure, find the value of  $\sin \theta$ .

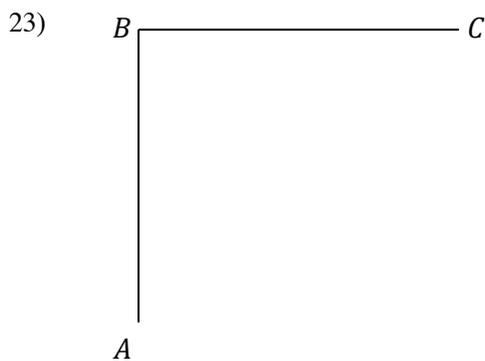
20) Find the least common multiple of the following three algebraic terms  $3x^2$ ,  $4xy^2$  and  $9y$

21)



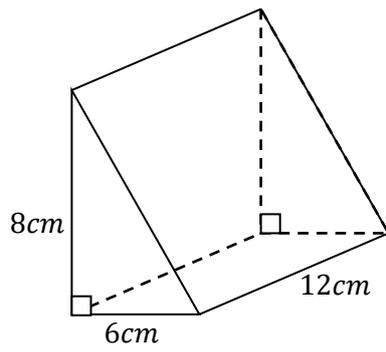
$AB \parallel DC$  in a cyclic quadrilateral  $ABCD$ . The produced sides  $BC$  and  $AD$  meet at the point  $E$ . Using the given data, find the values of  $x$  and  $y$

22) A man travels a certain distance at a speed of  $40 \text{ kmh}^{-1}$  in 30 minutes. Find the time it will take to travel the same distance at the speed of  $60 \text{ kmh}^{-1}$ ?



$AB$  and  $BC$  are two boundaries of the playground. An electricity post has to be placed in the playground which is  $8\text{m}$  from  $B$  and  $5\text{m}$  from  $AB$ . Draw a rough sketch to show the post needs to be located in a ground using the knowledge of loci.

24)



Find the volume of the triangular prism, using the given data in the figure.

25)  $X$  and  $Y$  are two events. If  $P(X) = \frac{1}{3}$ ,  $P(Y) = \frac{1}{4}$ , and  $P(X \cap Y) = \frac{1}{6}$ , find  $P(X \cup Y)$ .

**Part - I B**

**Answer the all Questions**

01) From the teachers who work in a certain schools,  $\frac{2}{5}$  of the teachers come to schools from outside district. Out of them  $\frac{1}{4}$  of the teachers come to school by motorbike. Others come to schools by bus.  $\frac{2}{3}$  of the teachers who belong to this district use motorbike.

(a) What fraction of the teachers, come to school by motorbike from outside district.

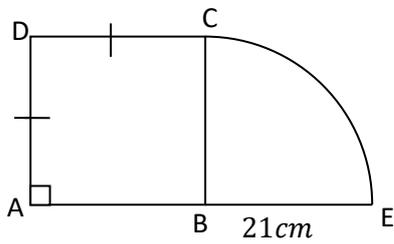
(b) What fraction of the teachers, come to school by motorbike from inside district.

(c) If the number of teachers come to school by motorbike is 30. How many teachers are there working in that school.

(d) How many teachers come to school by bus from outside district

02) A sketch of land consisting of a square shaped portion  $ABCD$  and a quarter circular portion with angle at the center  $90^\circ BCE$  is shown in the diagram.

(Take  $\pi = \frac{22}{7}$  )



(i) Find the area of the portion  $BCE$ .

(ii) Find the area of figure  $ABECD$

(iii) Find the arc length of  $CE$ .

(iv) If a person travels three times around the land, find the travelling distance?

03) Kannan invested a certain amount to buy shares in a company at the market price of Rs. 20 per share. At the end of the year, he received the annual dividends of Rs. 14,000. The company pays annual dividends of Rs. 4 per share.

(a) Find the number of shares that Kannan bought

(b) Find the amount that he invested in a company to buy shares?

(c) If he sells his shares to receive the capital gain as Rs.7000, what will be the selling price of a share?

(d) If he deposits the amount that he received as dividend income and the amount he got by selling shares at a compound interest rate of 10% in two years in a bank.

I. Find the amount that he deposited in a bank?

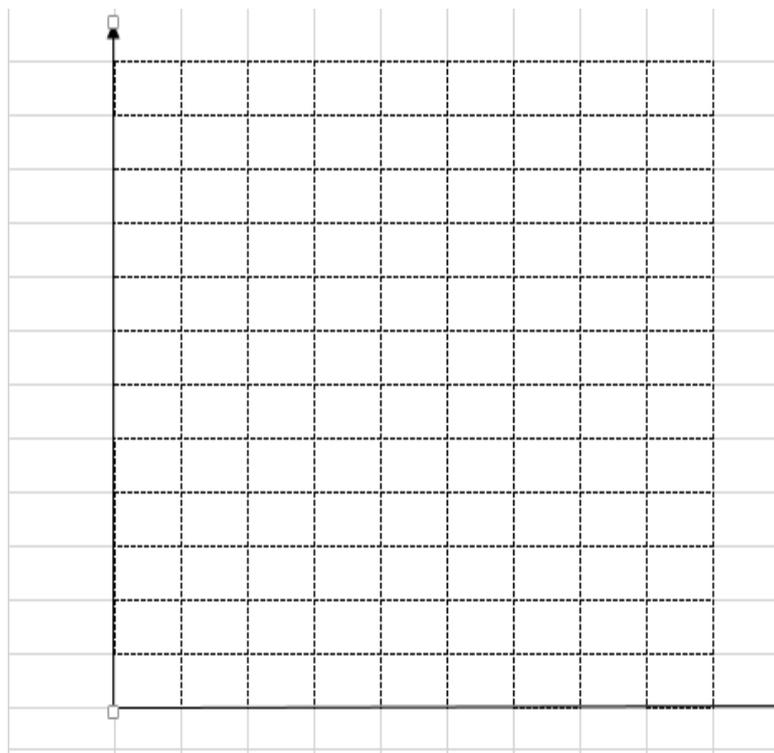
II. Find the interest he received at the end of the period?

04) The information related to the number of masks are received by 40 students during the term in a certain class of a school is shown below

No of masks	No of students who received the masks	Cumulative frequency
20 – 30	3	3
30 – 40	5	.....
40 – 50	.....	15
50 – 60	10	.....
60 – 70	.....	34
70 – 80	6	40

- (i) Complete the above table
- (ii) Using the table, Draw the cumulative frequency curve on the given coordinate plane
- (iii) Using the cumulative frequency curve,

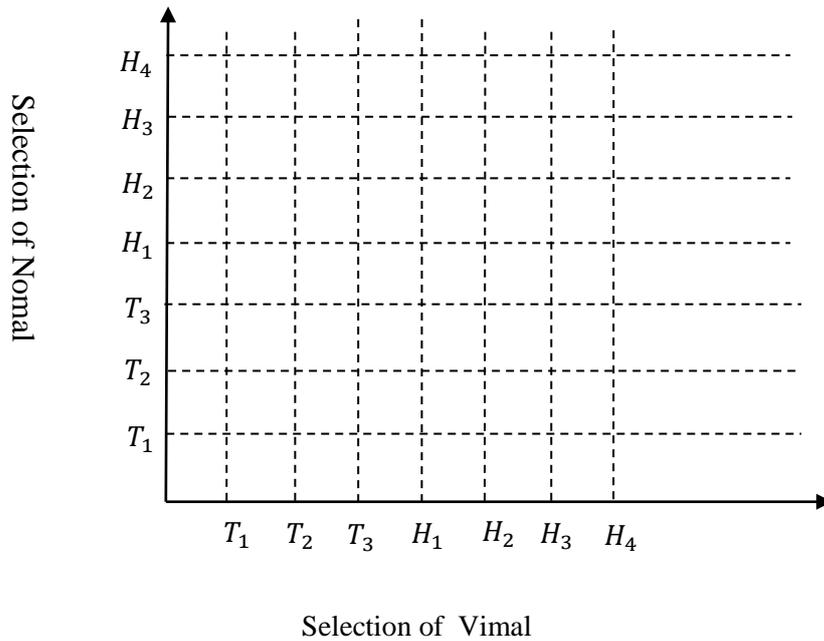
1. Among those students, 50% of the students who received the lowest number of masks have to be choosed. Below what number of masks that received the students should this selection be made?



2. Find the inter quartile range

05) (a) There are 3 TVS motorbikes and 4 Hero Honda motorbikes in a motorbike show room.

Nimal and Vimal who went to the shop and select a motorbikes for themselves.

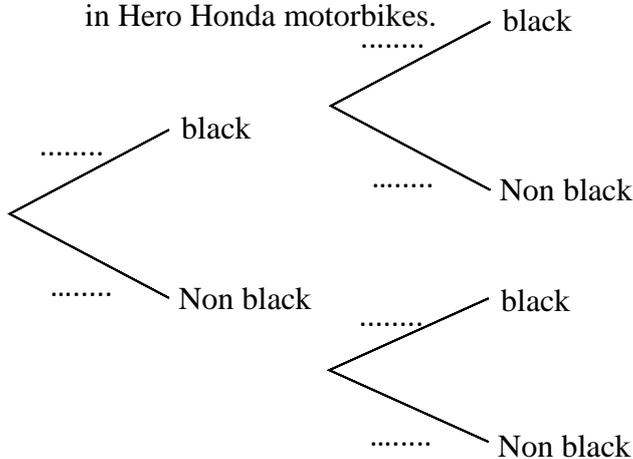


- (i) Represent the sample space of possible outcomes that Nimal and Vimal selected in the given grid.
- (ii) Indicate the event of both of them selecting different types of motorbike on the grid and find probabilities.

(b) Among the motorbikes in the shop, there are 2 black TVS motorbikes and 3 black Hero Honda motorbikes

i. First draw the tree diagram to show the event of black color and non black color in TVS motorbikes

ii. Then draw the tree diagram to show the event of the black color and non black color in Hero Honda motorbikes.



iii. Find the probability of selecting both of the motorbikes being black color.



**PROVINCIAL DEPARTMENT OF EDUCATION**  
**NORTHERN PROVINCE**  
**Year End Examination-2020**  
**Mathematics**



**Grade-11**

*32T II*

**Time: 3.10 Hours**

- ❖ Select any five questions from part IIA and any five questions from part IIB and answer for totally 10 questions
- ❖ The volume of a right circular cylinder with a base of radius  $r$  and height  $h$  are  $V = \pi r^2 h$
- ❖ The volume of a right circular cone with radius  $r$  and height  $h$  are  $V = \frac{1}{3} \pi r^2 h$
- ❖ The volume of sphere with radius  $r$  is  $V = \frac{4}{3} \pi r^3$

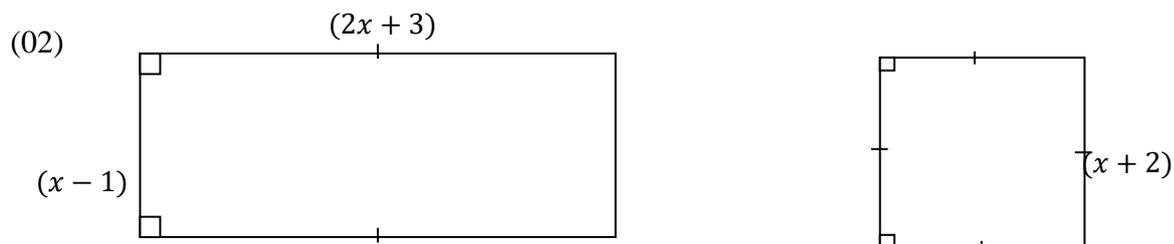
**Part IIA**

(01) The following notices have been published by a bank and a company.

<b>Bank</b>	<b>Company</b>
<ul style="list-style-type: none"><li>• Simple interest of 9% per annum is paid for fixed deposits</li></ul>	<ul style="list-style-type: none"><li>• Price of a share is Rs.30</li><li>• Dividends of Rs.2 per share is paid annually</li></ul>

One person has Rs.300000. He deposited in the above bank exactly half of the amount of this and he invested the remaining amount in the above company.

- (a) Find the total interest he received at the end of one year.
- (b) (i) Find the no of shares he bought.  
(ii) Find the annual dividend obtained by him.  
(iii) At the end of one year he sold all shares. He got one rupee for one share as the capital gain. Find the total capital gain.
- (c) Show giving reasons from which investment he received a greater income at the end of one year.



The two plane figures shown above.

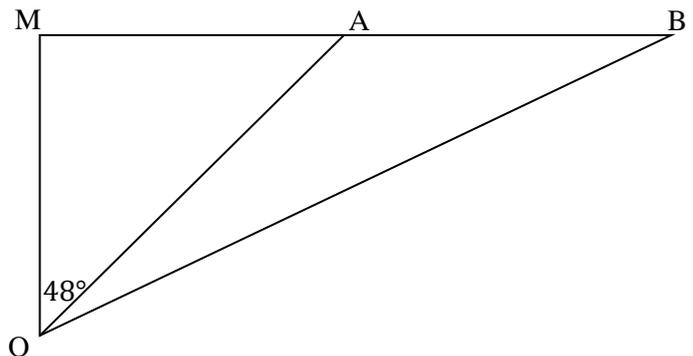
- (a) If the areas of them are equal, show that  $x$  satisfies the quadratic equation  $x^2 - 3x - 7 = 0$  and show with reasons that  $x$  can take exactly one value.
- (b) By using 6.08 for the value of  $\sqrt{37}$ , find an approximate value for a length of the square to the first decimal place.

- (03) An incomplete table showing the  $y$  values corresponding to several  $x$  values of the quadratic function  $y = x^2 - 4x - 3$ , with in the interval  $-1 \leq x \leq 5$ , is given below.

$x$	-1	0	1	2	3	4	5
$y$	2	-3	-6	.....	-6	-3	2

- (a) Find the value of  $y$  when  $x = 2$
- (b) Using the standard system of axes and a suitable scale, draw the graph of the given quadratic function on a graph paper; according to the above table of values.
- (c) Answer the following questions using the graph.
- Write the equation of the axis of symmetry.
  - Write the interval of values of  $x$  on which the function increases within the interval  $-7 < y \leq -3$
  - Find the positive root of the equation  $x^2 - 4x - 3 = 0$  to the first decimal place and thereby find an approximate value for  $\sqrt{7}$
- (d) Express the given function in the form  $y = (x - a)^2 + b$  where  $a, b$  are two whole numbers.
- (04) (a) A person who withdraw the amount of Rs.1000 from a bank request 10 rupees and 20 rupees notes totally from counter. Take the number of 10 rupees notes as ' $x$ ' and the number of 20 rupees notes as ' $y$ '
- Construct a pair of simultaneous equations using this information.
  - Find the number of 10 rupees notes and 20 rupees notes.
- (b). Simplify  $\frac{8}{x(x-2)} + \frac{4}{(2-x)}$

- (05) (a) A man observe the angle of elevation of the top of a mountain to be  $30^\circ$ , after walking  $150m$  towards the mountain he observes the angle of elevation of the top of the mountain to be  $60^\circ$  neglecting the height of the man.
- Draw the scale diagram to the Scale 1:5000
  - Find the height of the mountain. (OA=48km and AB=50km)



- (06) The following table represents the Maths marks of 120 students who sat an examination of which the obtainable total mark is 100.

Class interval (Marks)	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80
Number of students (frequency)	7	18	10	8	45	20	3	9

- Find the modal class of this distribution.
- Find the median class of this distribution.
- By taking the mid value of the class interval 41-50 as the assumed mean, find the mean mark obtained by a student.
- If 41 and above is counted as pass marks which percentage of students will be failed?

### Part IIB

- (07) (a) Ravi with the aim of saving money saves rupees 50 on the first day, rupees 65 on the second day and rupees 80 on the third day
- (i) In this arithmetic progression, how much money did Ravi put in the till box on the eleventh day
  - (ii) He wants to purchase a radio of rupees 8500, show with reason that is impossible buy that radio using the money, he saved at the end of the month from what he saved on the first day (one month = 30days )
- (b) In a geometric progression second term is 6. The sum at the second and fourth term is 60.
- (i) Find the Common ratio in positive
  - (ii) Find the seventh term.

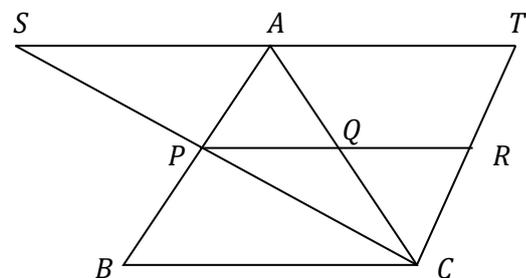
- (08) Use only a straight edge with a cm| mm scale and pair of compasses show the following construction lines clearly.
- (i) Construct the triangle  $ABC$  Such that  $AB = 5cm, BC = 12cm$  and  $\hat{A} = 90^\circ$ .
  - (ii) Construct A circle which touches the line  $AB$  at  $B$  and the line  $AC$ . The Centre of the circle is on the line  $BC$  name its Centre as  $O$ .
  - (iii) Construct the tangent of the circle from  $C$  (Expect  $AC$ )
  - (iv) If the circle touches  $AC$  at  $D$  show the reasons for  $CB = 8cm$
  - (v) Find the area of the triangle  $COD$

- (09) In the given figure  $ABC$  is a triangle mid points of  $AB, AC$ , are  $P$  and  $Q$  respectively.

The line drawn parallel to  $BA$  through  $C$  meets extended  $PQ$  at  $R$ . The line drawn parallel to  $BC$  through  $A$  meets extended  $CR$  and extended  $CP$  at  $T, S$  respectively.

Copy the given figure on to your answer script and answer the following questions show that

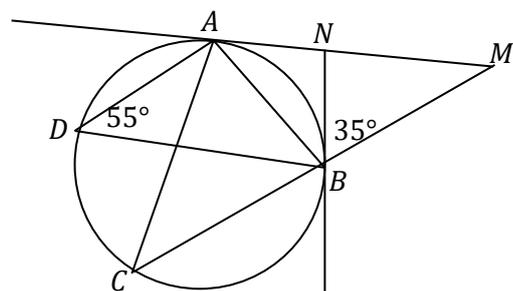
- (i)  $A$  is the midpoint of  $ST$
- (ii)  $ARCP$  is a parallelogram
- (iii) Area of triangle  $CST$  is twice the area of triangle  $ABC$



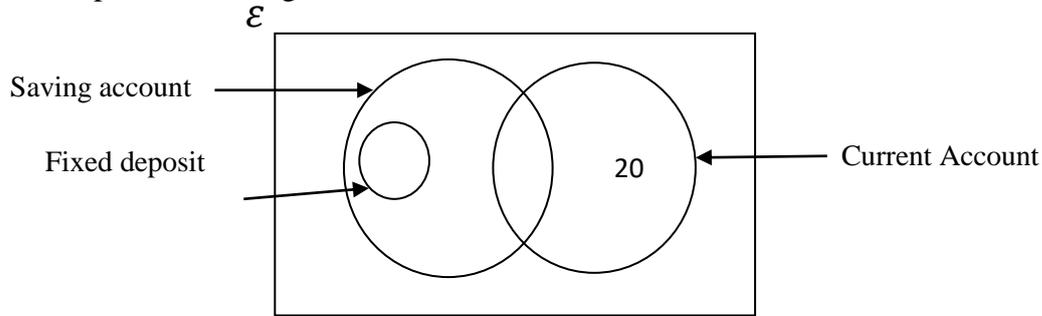
- (10)

As shown in the figure  $A, B, C, D$  are the points on the circumference of the circle with radius  $6cm$ . Tangents drawn at  $A$  and  $B$  meet at  $N$

- (i) Find the magnitude of  $\hat{ANB}$
- (ii) Find the length of  $AC$
- (iii) Show that  $BN = MN$

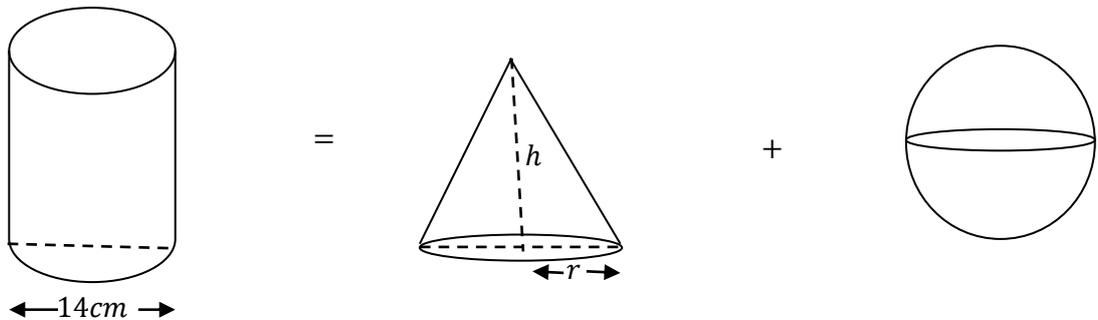


- (11) Details of an individual bank account containing 90 pensioners is shown in the following incomplete Venn diagram



Answer the following Questions using the Venn diagram

- (i) Write the set which demotes the number 20 in words form
  - (ii) If the number of pensioners who maintains current account, saving account is 30 and 65 respectively. Find the number of pensioners who do not maintain any of the above accounts.
  - (iii) If the number of pensioners who maintain two types of account is less than 5 of the pensioners who maintain only one type of account. Find the number of pensioners who maintain saving account only.
- (12) A cylinder of diameter  $14\text{cm}$  and height  $12\text{cm}$  is melted and a solid sphere and a solid cone is made from that without any wastage.



- (i) Find the volume of cylinder
- (ii) If the ratio between volume of the cylinder and the volume of the sphere is 9:7 so that the radius of the sphere is  $7\text{cm}$
- (iii) If the height of the cone is  $\frac{2}{3}$  of the height of the cylinder, write the volume of the cone in terms of  $r$ .
- (iv) Find the value of  $r$