



**PROVINCIAL DEPARTMENT OF EDUCATION  
NORTHERN PROVINCE**



**Second Term Examination – 2023**

**Grade - 11**

**Time :- Three Hours**

**Mathematics II**

**Additional Reading Time : 10  
Minutes**

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

**Important:**

- ❖ Answer **ten** questions selecting **five** questions from **part A** and **five** questions from **part B**
- ❖ Indicate the **relevant steps** and the **correct units** when answering the questions.
- ❖ Each questions carries **10** marks

**Part A**

**Answer five Questions only**

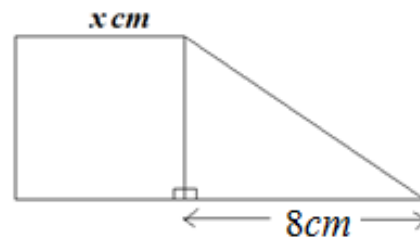
1. A LED TV price at 32400 rupees for outright purchase can be bought by making a down payment of 10000 rupees and paying the rest in 14 equal monthly installments of 1900 rupees. If the interest on the loan is calculated on the reducing loan balance, find the annual interest rate.
  
2. An incomplete table of  $x$  and  $y$  values prepared to draw the graph of the function  $y = x^2 + 2x - 5$  is given below.

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

- (i) Find the value of  $y$  when  $x = 1$ .
- (ii) Draw the graph of the function by taking 10 small divisions along the  $x$ -axis and  $y$ -axis to be one unit as scale.  
By considering the graph.
- (iii) Write the equation of symmetric axis.
- (iv) Write the range of values of  $x$  for which  $y < 2$ .
- (v) Express the above function in the form  $y = (x + k)^2 - h$ . ( Here  $k$  and  $h$  are two constants.)
- (vi) Find the roots of the quadratic equation  $x^2 + 2x - 6 = 0$ .

3. (a) Solve.  $\frac{x+3}{x-2} + \frac{x+1}{x-2} = 5$

(b) A plate of area  $33 \text{ cm}^2$  is made by joining a square plate and a right angled triangular plate as shown in the figure.



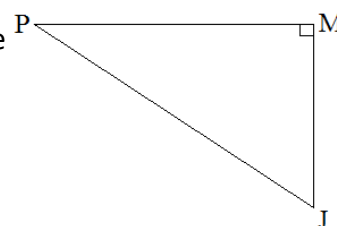
- (i) Construct a quadratic equation in terms of  $x$  using the above information.
- (ii) By solving the equation find the side length of the square plate to the nearest whole number. (Take  $\sqrt{37} = 6.08$ )

4. Rs. 650 is spent to buy 3 guavas and an orange. 4 guavas can be bought for the money required to buy 3 oranges.

- (i) By taking the price of an orange as Rs.  $x$  and the price of a guava as Rs.  $y$ , construct a pair of simultaneous equations
- (ii) By solving the above equations, find separately the price of an orange and a guava.
- (iii) Find the number of orange and the number of guava that can be bought for Rs.500 without remaining money.

5. a) A coconut tree  $P$ , a mango tree  $M$  and a jackfruit tree  $J$  are on a level ground as shown in the figure.

- (i) If  $40 \text{ m}$  actual distance between  $P$  and  $M$  is represented by  $8 \text{ cm}$  in the scale diagram, find the scale ratio used to draw the scale diagram.
- (ii) Find the actual distance between  $M$  and  $J$ , if the length of  $MJ$  in the scale diagram is  $7 \text{ cm}$ .



b) A ship leaves from harbor  $A$  travels  $15 \text{ km}$  on a bearing of  $040^\circ$  and reaches harbour  $B$ . Then leaves from harbour  $B$  travels  $8 \text{ km}$  on a bearing of  $130^\circ$  and reaches harbour  $C$ .

- (i) Draw a rough sketch to show the traveling path of the ship.
- (ii) Find the shortest distance between the harbours  $A$  and  $C$ .

6. Information on the number of capsicums in 1 kilogram of capsicum packets is given in the following frequency distribution table.

Class interval (Number of capsicums in 1kg)	50 – 52	53 – 55	56 – 58	59 – 61	62 – 64	65 – 67
Frequency (Number of packets)	8	13	29	34	10	6

- (i) What is the model class?
- (ii) By taking the mid-value of the model class as the assumed mean, find the mean number of capsicums in 1 kilogram packet to the nearest whole number.
- (iii) If the price of 1 kg capsicum packet is Rs. 354, find the mean price of a capsicum.

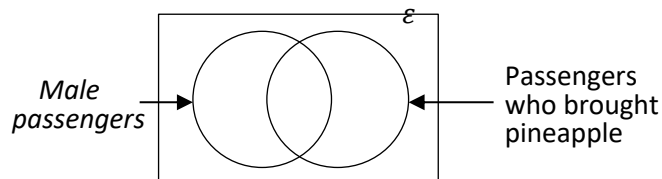
### PART II B

**Answer five questions only.**

7. Vithuran starts saving money by putting Rs.20 into his saving box in the first month from his pocket money given by his father to buy a book worth Rs. 750. After that he puts money into his saving box once a month Rs.12 more than the previous month.
- (i) Write the amounts of money he puts into the box in the first three months.
  - (ii) Write the amount of money he puts in the  $n^{\text{th}}$  month in term of  $n$ .
  - (iii) How much money he puts in the 8<sup>th</sup> month?
  - (iv) Show that he can't buy the book using the money which he saves in first 10 months.
8. Use only a straight edge with a cm/mm scale and a pair of compasses for the following geometric constructions. The construction lines should be drawn clearly.
- (i) Construct a straight line segment  $AB$  of length 8 cm.
  - (ii) Construct a circle with diameter  $AB$ . Mark a point  $C$  on the circle such that  $\hat{BAC} = 60^\circ$  and complete the triangle  $ABC$ .
  - (iii) Construct a straight line through  $C$  parallel to  $AB$  and name the point at which it intersects the circle as  $D$ . Join  $BD$ .
  - (iv) Name the point of intersection of  $BC$  and the straight line joining  $A$  and  $D$  as  $E$ .
  - (v) Write the name of a triangle which is equal in the area of  $\triangle ACD$ .
  - (vi) Which type of triangle is  $\triangle ABE$  according to the sides. Give reasons.
9. A solid metal cylinder of radius  $R$  cm and height  $h$  cm is made by melting a solid metal sphere of radius  $r$  cm without wastage. If the ratio between the radius and height of the cylinder is  $2 : 3$ , Show that  $r = \frac{h}{(3)^{\frac{1}{3}}}$ . By taking the height of the cylinder as 5.78 cm, find the value of  $r$  to the nearest whole number using the logarithms table.

10. One day 61 passengers travelled in a bus came from Colombo. 31 of them brought pineapple. 15 of them who brought pineapple are men. 25 women travelled in the bus.

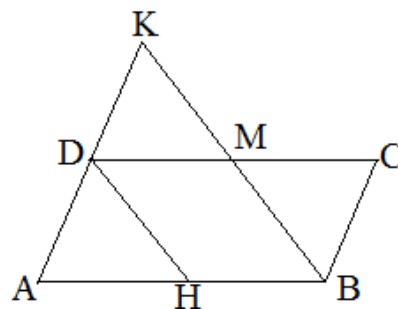
- (i) Copy the given Venn diagram onto your answer script and include the above information.



- (ii) How many men travelled in the bus?  
 (iii) How many women brought pineapple?  
 (iv) How many passengers did not bring pineapple?  
 (v) Find the probability of a passenger who selected randomly from the bus being a woman did not bring pineapple. .

11. In the figure,  $ABCD$  is a parallelogram.  $H$  is the midpoint of  $AB$  and  $HD \parallel BK$ . Straight lines  $BK$  and  $DC$  intersect at  $M$ . Show that,

- (i)  $DK = BC$   
 (ii)  $BMDH$  is a parallelogram.  
 (iii)  $HB = MC$



12. In the figure,  $RT$  is diameter of the circle with centre  $O$ .  $OPQR$  is a parallelogram.  $QRS$  is a straight line. If  $\hat{PQR} = x^\circ$ , Find the value of the following angles in terms of  $x$ .

- (i)  $\hat{ORS}$   
 (ii)  $\hat{PSR}$   
 (iii)  $\hat{STR}$   
 (iv)  $\hat{QPR}$

