

vii. Write x as a function of y in $5x + 2y = 15$

A. $f(x) = \frac{15-2y}{5}$

C. $f(y) = \frac{15-5x}{2}$

B. $f(x) = \frac{2y-15}{5}$

D. $f(y) = \frac{15-2y}{5}$

viii. Intersection point of $y = 3x - 6$ and $y = 2x - 5$ is

A. (1, -3)

C. (1, 3)

B. (-1, -3)

D. (-3, 1)

ix. Simplified form of $\sqrt{325}$

A. $15\sqrt{3}$

C. $5\sqrt{13}$

B. $13\sqrt{5}$

D. $\sqrt{325}$

x. The marked price of shechu gho was Nu. 55,000. 25% discount was offered in Thimphu tshechu. Find the selling price of the shechu gho?

A. Nu. 41250

C. Nu. 45500

B. Nu. 40000

D. Nu. 41200

Section B (32 marks)

Answer ALL the questions

Question 2

Calculate each:

i) $3 \begin{bmatrix} 2 & 4 & 0 \\ 7 & -5 & 2 \end{bmatrix} + 2 \begin{bmatrix} -2 & -4 & 2 \\ 1 & 3 & 0 \end{bmatrix} - \frac{1}{2} \begin{bmatrix} 6 & 4 & 12 \\ 10 & 30 & -8 \end{bmatrix}$ [3]

ii) $\begin{bmatrix} 4 & 3 \\ 0 & 1 \end{bmatrix} \times \begin{bmatrix} 1 & 5 & 1 \\ -2 & 0 & 3 \end{bmatrix}$ [2]

Question 3

Solve: $(\sqrt{x} + \sqrt{15})(\sqrt{x} - \sqrt{15}) = 5$ [2]

Question 4

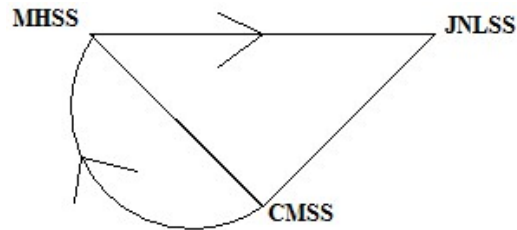
Shopkeeper bought a Nokia phone at Nu.5500 and sold it at a profit of 15%. Find the profit and selling price of the Nokia phone. [3]

Question 5

Namkha buys scientific calculators in bulk for Nu.160 each. She sells them for Nu.200 each. Calculate the percent markup. [2]

Question 6

The digraph given below represents the route between three different schools in Thimphu. Create an adjacency matrix for the given network [2]

**Question 7**

Yangzom won a lottery of Nu.100, 000 and wants to invest in a BNB for 5 years. Bank offers her an interest rate of 5% p.a. compounded semi-annually. Calculate the amount. [2]

Question 8

Namgay bought 150 shares from T-Bank at a face value of Nu.200. After ten years company declared a 25% dividend rate. Calculate dividend amount. [2]

Question 9

Simplify each: [3]

- i) $\sqrt{20} + \sqrt{125}$
- ii) $(10 - \sqrt{8})(10 + \sqrt{8})$

Question 10

Transform the linear equation $5x + 2y = 10$ to slope and y-intercept form. Sketch the graph. [3]

Question 11

Solve: $y = 5x + 2$ and $2x - y = 2$ [3]

Question 12

Round each number as indicated: [3]

- i) 0.0567 to two significant figures.
- ii) 32327 to four significant figures.
- iii) 52.7 to one significant figures.

Question 13

Find the slope from the given coordinates (5, -10) and (-6, -8). [2]

SECTION C [48 marks]

Under this section, there are 8 questions (question 14 – 21).

Each question has two parts, I and II. Attempt either I or II from each question.

Question 14 (I)

$$A = \begin{bmatrix} 5 & -2 \\ 3 & 5 \end{bmatrix} \quad B = \begin{bmatrix} 2 & 6 \\ -1 & 3 \end{bmatrix}$$

a) Calculate each: [3]

i) $2A + B$

ii) $A^2 - 3B$

b) Create a digraph of following adjacency matrix. [3]

i) $\begin{bmatrix} 1 & 1 & 2 \\ 0 & 1 & 0 \\ 2 & 0 & 0 \end{bmatrix}$

ii) $\begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 1 & 1 & 0 \\ 1 & 0 & 0 & 1 \\ 2 & 1 & 1 & 0 \end{bmatrix}$

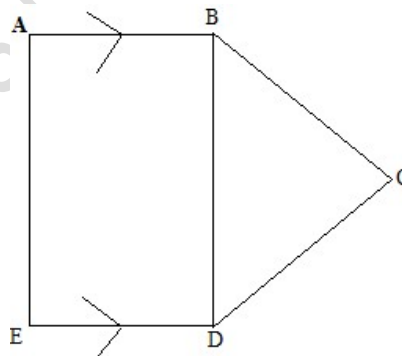
OR

Question 14 (II)

a) Multiply the following matrices to find the values of x, y and z [3]

$$\begin{bmatrix} 1 & 3 & 5 \\ 0 & 1 & y \\ -2 & 0 & 4 \end{bmatrix} \times \begin{bmatrix} 2 \\ -5 \\ z \end{bmatrix} = \begin{bmatrix} x \\ 5 \\ 4 \end{bmatrix}$$

b) This digraph represents a network of flights. [3]



i) How many one-stopover trips are there from A to C?

ii) How many two-stopover trips are there from A to C?

Question 15 (I)

- a) Which of the following options is better for the buyer? Explain. [3]

Option 1

30% markup on an item with a cost price of Nu.500

Option 2

25% discount on the same item that has a marked price of Nu. 800

- b) Lhamo borrowed Nu.35, 000. She repaid the loan at the end of 5 years with a single payment of Nu. 55,000. What interest rate was charged, if the compounding was monthly?

[3]

OR

Question 15 (II)

Stocks were sold at 25% discount which has a face value of Nu. 100. Tshering bought 175 shares of stock. A dividend rate of 20% was paid at the end of one year. He then sold the stock at a 15% premium.

- i) How much profit did he make? [4]

- ii) How much was his profit as a percentage of his investment? [2]

Question 16 (I)

- a) Simplify each: [3]

i)
$$\frac{3\sqrt{14} - 12\sqrt{63}}{3\sqrt{7}}$$

ii)
$$\frac{\sqrt[3]{2x} + \sqrt[3]{54x}}{\sqrt[3]{2}}$$

- b) With a help of diagram show that $\sqrt{18} = 3\sqrt{2}$ [3]

OR

Question 16 (II)

Find the missing value: [6]

i) $\sqrt{8} + \sqrt{32} = 2\sqrt{y}$

ii)
$$\frac{\sqrt{20} \times \sqrt{x^a} \times \sqrt{2}}{\sqrt{x}} = 2\sqrt{10x}$$

iii) $p^3 \div \sqrt{8} = 8\sqrt{2}$

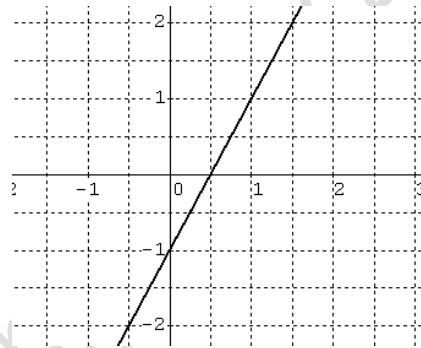
Question 17 (I)

- a)
- i) Create a table of values to represent the function $f(x) = 5x + 2$ [3]
 - ii) Explain why the table suggests that this is a function.
 - iii) How can you be sure it is a function?
- b) You bought 20kg of chilies and 50kg of potatoes from a vegetable market and altogether you paid Nu. 1500. [3]
- i) Write an equation to model this situation.
 - ii) Write a function that tells the amount of chilies to pay if you know the amount of potatoes you paid.

OR

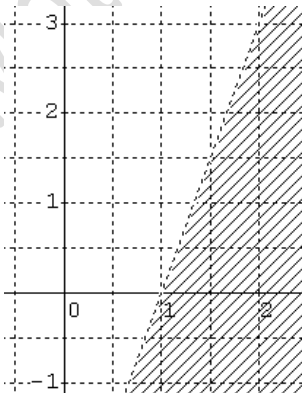
Question 17 (II)

- i) Create an equation of the given graph. [3]
- ii) Write x as the function of y . [2]
- iii) Use the function in part ii) to predict the value of x , if $y = 19$. [1]



Question 18 (I)

- a) Sketch the graph of $10x - 5y \geq 20$ [3]
- b) Write the inequality of graph given below: [3]



OR

Question 18 (II)

- a)
- i) Write a number that has four zeros and five significant figures. [3]
 - ii) Write a number that has eight digits but only one significant figure.
 - iii) What is the greatest and least number you could write for part ii)?
- b) Sketch the graph of $18 < 6x - 3y$ [3]

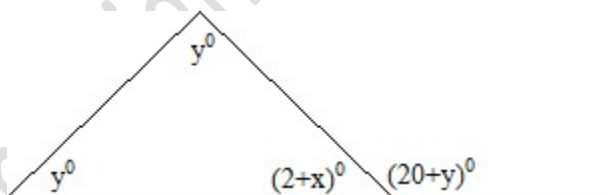
Question 19 (I)

- a) Class X E earned total amount of Nu. 1000 from selling 75kg of wastes. From paper wastes they earned Nu.15 and plastics wastes they earned Nu. 5. Solve the system of equations to determine how many kilograms of paper and plastics wastes they sold. [3]
- b) Solve the system of linear equation: $\frac{1}{2}x + \frac{1}{3}y = 9$ and $\frac{2}{5}x - \frac{3}{4}y = -5$ [3]

OR

Question 19 (II)

- a) A father is 20 years older than his son. Sum of their ages is 35 years. Solve the system of equations to determine each person's age. [3]
- b) Determine the unknown values in the diagram below. Show your work. [3]



Question 20 (I)

- a) Matrix G below describes the coordinates of the vertices of a shape.
- $$G = \begin{bmatrix} 2 & 4 & 5 & 1 & 2 & 4 \\ 1 & 1 & 3 & 3 & 5 & 5 \end{bmatrix}$$
- i) Draw the shape on grid paper. [1.5]
 - ii) Create a matrix for a new shape by multiplying Matrix G by 2. [1]
 - iii) Plot the new coordinates. How has the shape changed? [1.5]
- b) Create the following: [2]
- i) 2×3 matrix
 - ii) 3×4 matrix

OR

Question 20 (II)

- a) Listed below are the numbers of buses traveling between 4 dzongkhags. Create a digraph for this information. [2]
- 5 from Thimphu to Paro
 - 8 from Punakha to Wangdue
 - 15 from Paro to Wangdue
 - 16 from Thimphu to Punakha
 - 7 from Wangdue to Paro
 - 4 from Wangdue to Thimphu
- b) Write down the significant figure of following numbers: [1]
- i) 0.00090007 ii) 8.98×10^3
- c) What interest rate compounded annually is equivalent to 16% p.a. compounded quarterly? [3]

Question 21 (I)

- a) Ugyen buys stock at a premium of 15%. Each share has a face value of Nu. 100. [3]
- i) How many shares can she buy with Nu.75, 000?
- ii) What will be the dividend rate if he was awarded Nu.5000 as a dividend amount?
- b) Kamal is given Nu. 5000 as her monthly salary and additional of 5% of commission for every sales. Her goal is to earn Nu.70000 each month. What is the minimum amount of monthly sales required to earn his level of income? [3]

OR

Question 21 (II)

- a) A manager pays his salesperson a commission of 15% on total sales. The manager wants to make a profit of Nu. 50000 on each mobile. The cost price of a mobile is Nu. 40,000. What must the selling price of the mobile be for the manager to make profit and pay commission? [3]
- b) Order the following expressions from least to greatest by expressing them as entire radicals: [2]

$$4\sqrt{8} \qquad 2\sqrt{18} \qquad 3\sqrt{12} \qquad 7\sqrt{2} \qquad 15$$

- c) Write the dimension of given matrices. [1]

i) $\begin{bmatrix} 2 & 0 & 2 & 6 \\ 3 & 5 & 2 & 5 \\ 7 & 3 & 7 & 4 \end{bmatrix}$

ii) $\begin{bmatrix} 2 & 0 & 2 & 6 & 4 \\ 3 & 5 & 2 & 5 & 3 \\ 5 & 3 & 2 & 1 & 2 \\ 4 & 3 & 7 & 4 & 4 \end{bmatrix}$