Mock-7 for CSS 2024
General Science And Ability

PART-II
SECTION-I

Question no. 4:

(a)

Answer: (i) Pesticides:

Definition: Pesticides may be defined as chemical substances that are meant to kill pests.

Examples: A few examples of pesticides are given below:

(i) Insecticides,
(ii) Herbicides,
(iii) Chlorpyrifos,
(iv) Fungicides.

(ii) Herbicides:

Definition: Herbicides may be defined as the substances used to control undesired growth of plants, also known as weeds.

Example:

(i) Atrazine
(ii) Dicamba

Good for theory portion
Keep length equal for all answers
Improve paper presentation
Write complete logic and steps in math portion

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(iii) Trifluralin.

(iii) Insecticides:

Definition: Insecticides may be defined as the chemicals used to control insects by killing them or preventing them from engaging in undesirable or destructive behaviors.

Examples:

(i) Chlorpyrifos,
(ii) Organophosphates
(iii) Carbaryl,
(iv) Cypermethrin.

(iv) Ceramics:

Definition: Ceramics may be defined as inorganic, non-metallic solids xmadex made up of either metal or non-metal compounds that have been shaped and then hardened by heating to high temperatures (figure A).

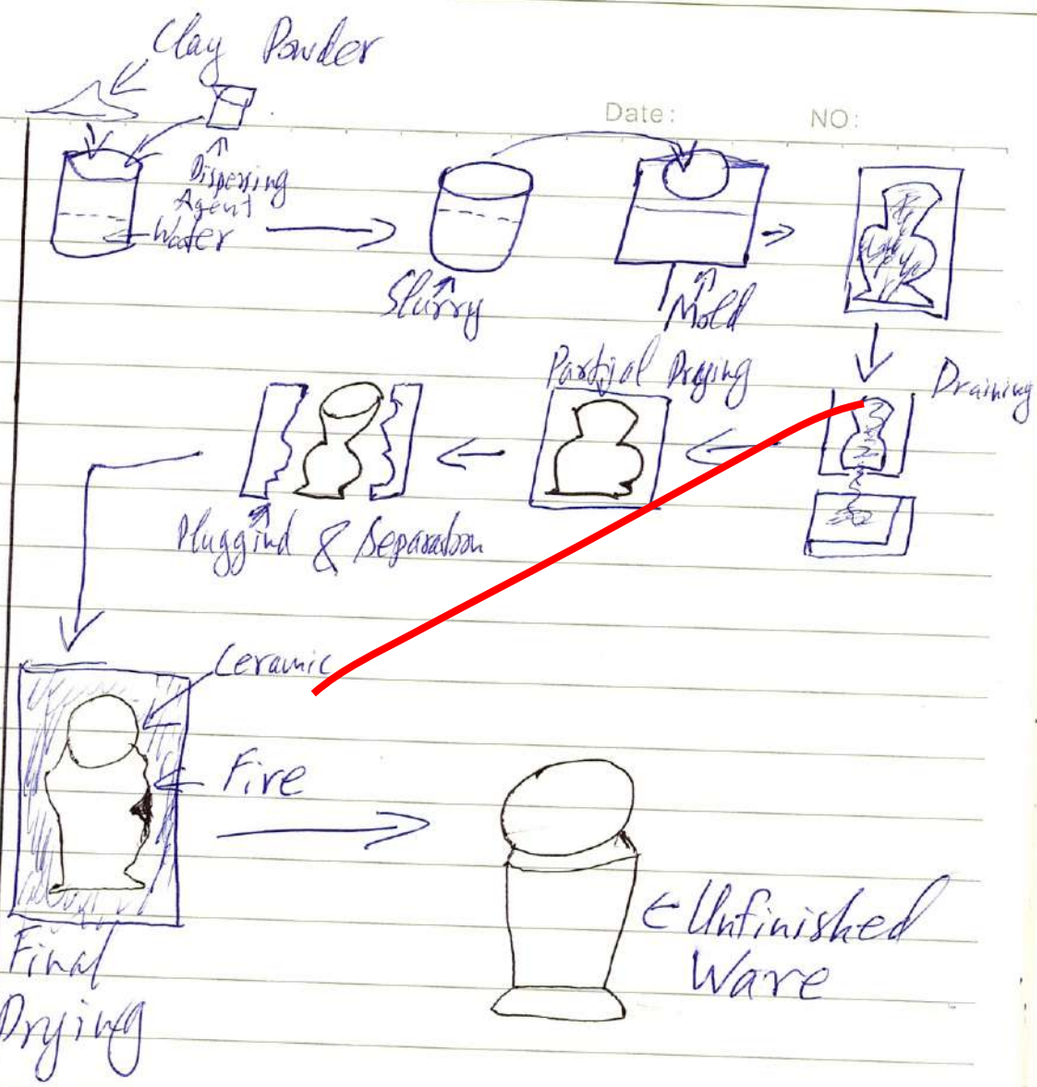

Figure A: Formation of ceramic.

(v) Greenhouse Effect:

Definition: Greenhouse effect may be defined as a process that occurs when gases in Earth's atmosphere trap the Sun's heat (figure B).

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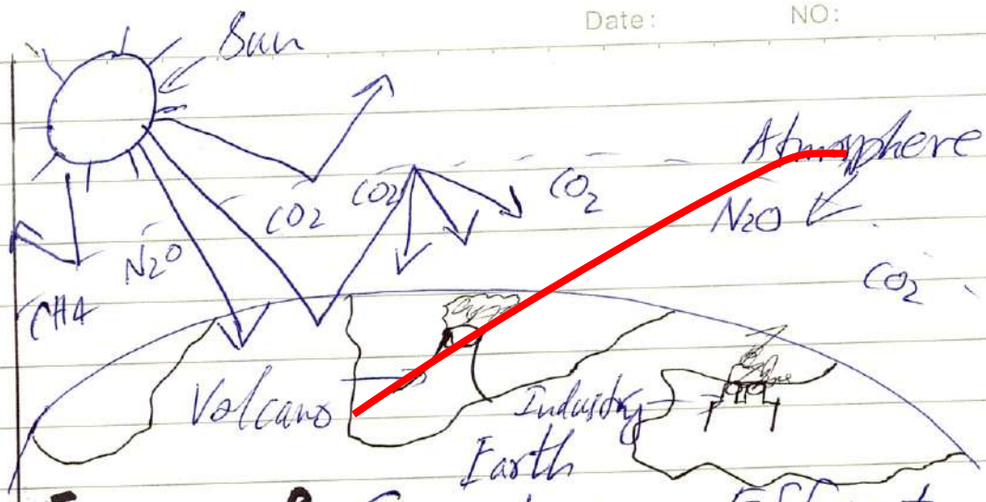

Figure B: Greenhouse Effect

(b)

Answer: Bonding in Water Molecule: To understand the phenomenal bonding in water molecule we need to understand polarity of water molecule.

Polarity of H_2O Molecule: The key to understanding water's chemical behavior is its molecular structure.

Molecular Structure of H_2O Molecule: A H_2O molecule consists of two hydrogen (H) atoms bonded to an oxygen (O) atom, and its overall structure is bent (Figure C).

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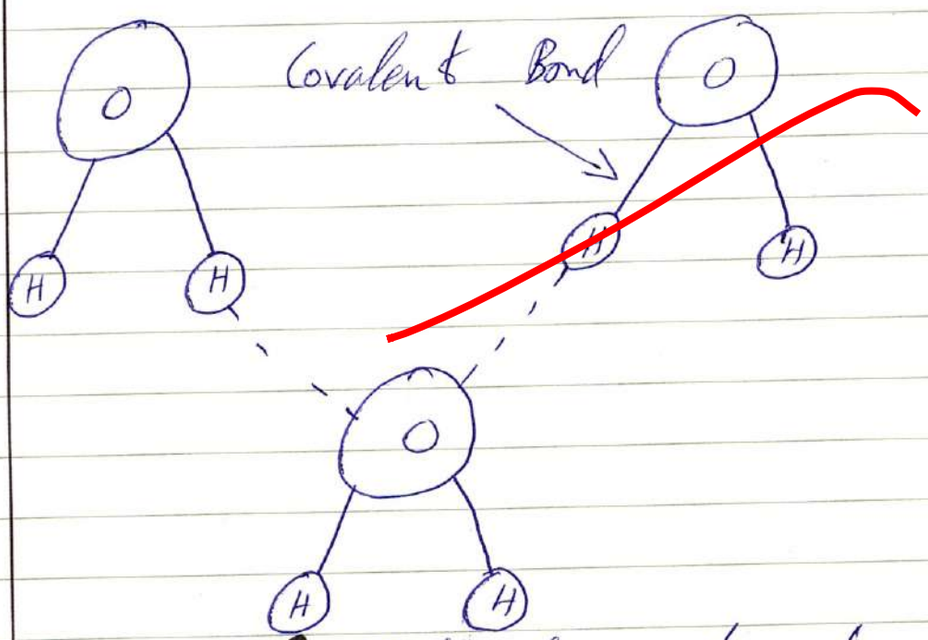

Figure C: Molecular structure of H_2O molecule.

Reason of Bent Structure of H_2O Molecule: H_2O molecule is bent because the O atom, in addition to forming bonds with the H atoms, carries two pairs of unshared electrons. All of the electron pairs-shared and unshared-repel each other.

Hydrogen Bonding in H_2O Molecule: Thanks to their polarity, H_2O molecules happily

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attract each other. The positive end of H atom associates with the negative end of O atom (Figure D).

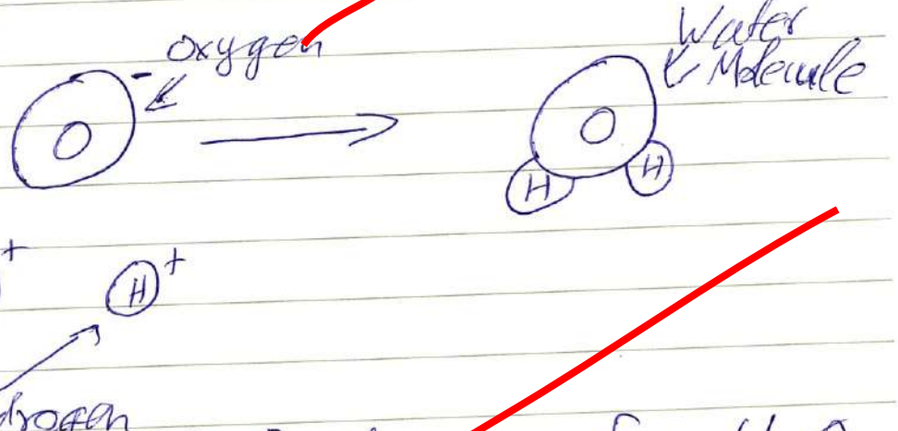

Figure D: Bonding of H_2O molecule.

Example of Hydrogen Bonds: These attractions are an example of hydrogen bonds, weak interactions that form between a H with a partial positive charge and a more electronegative atom, such as oxygen.

(c)

Answer: (c) Waves Used in Radar: Radar uses radio waves which

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are electromagnetic waves, and travel at a speed of 300,000,000 m/s (Figure E).

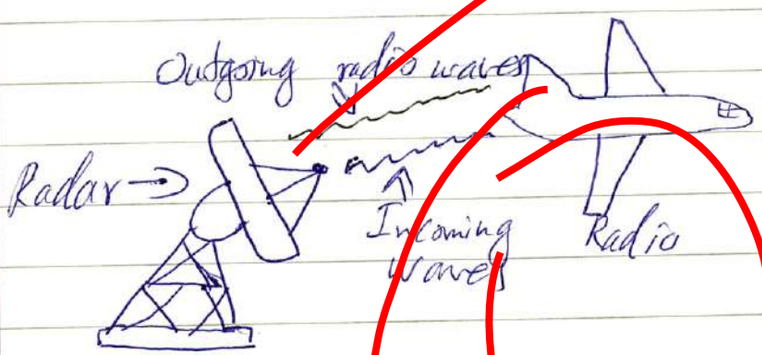

Figure E: Waves used by Radar.

(ii) Waves Used in Sonar:
Ultrasonic waves are used Sonar, which can penetrate H_2O to long distances because of their high frequency and short wavelength (Figure F).

Figure F: Use of Sonar by ship.

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(iii) Waves Used in Lidar: Lidar systems use light from pulsed laser beams with a wavelength in the near-infrared range (NIR) (Figure G).

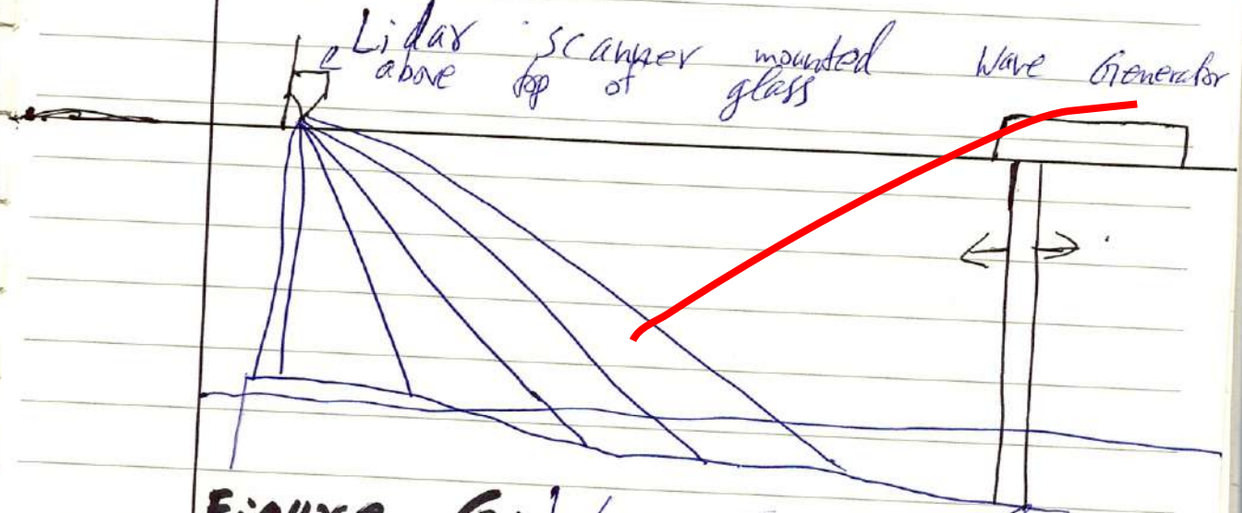

Figure G: Waves used in Lidar.

(iv) Waves Used in Mobile Phones: Mobile phones use radio waves which are transmitted through a network of fixed antennas called base stations (Figure H).

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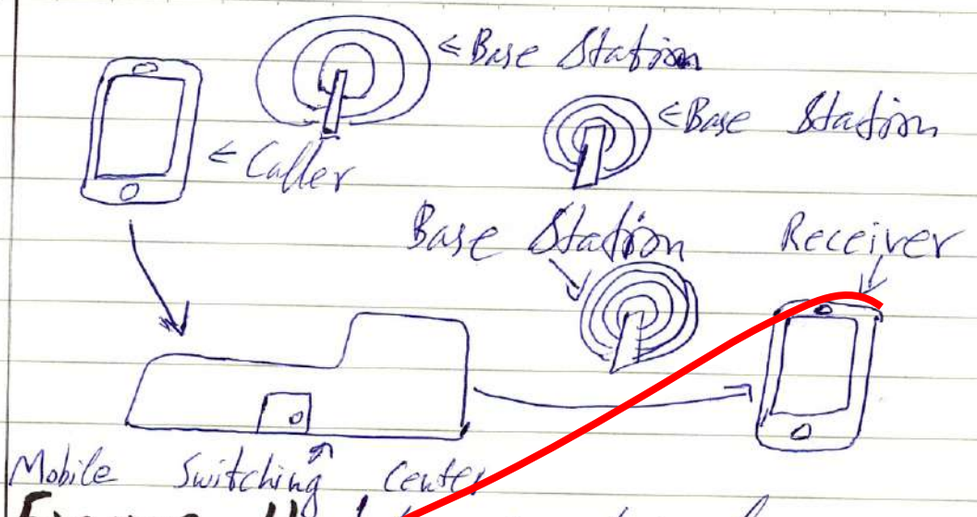

Figure H: Waves used in mobile phones.

(v) Waves Used in ~~Transistors~~ Thermistors:

The waves used in thermistors are heat waves which they use to detect changes in temperature.

(d)

Answer: Artificial Intelligence:

Definition: Artificial intelligence (AI) may be defined as the intelligence of machines or software as opposed to the intelligence of humans or animals.

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Advantages of Artificial Intelligence: The advantages of artificial intelligence are given below:

(i) AI drives down (decreases) the time taken to complete a task.

(ii) AI enables the execution of hitherto complex tasks without significant cost outlays.

(iii) AI operates 24/7 without interruptions or breaks and has no down time.

(iv) AI augments the capabilities of different abled individuals.

(v) AI has mass market potential, it can be deployed across industries.

Disadvantages of Artificial Intelligence: The disadvantages of AI are as follows:

(i) Use of AI is more likely to increase human laziness.

(ii) AI is effective but also expensive.

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(iii) As AI can do work effective with 0% error, it will increase unemployment.
(iv) Since AI systems make predictions based on a set of algorithms, these can lack creativity.
(v) AI systems can work faster and without a breaks, but they cannot evaluate emotions before making a decision.

Question no. 5: (d)

Answer: GPS:

Definition: Global Positioning System (GPS) is a satellite based radio navigation system (Figure I).

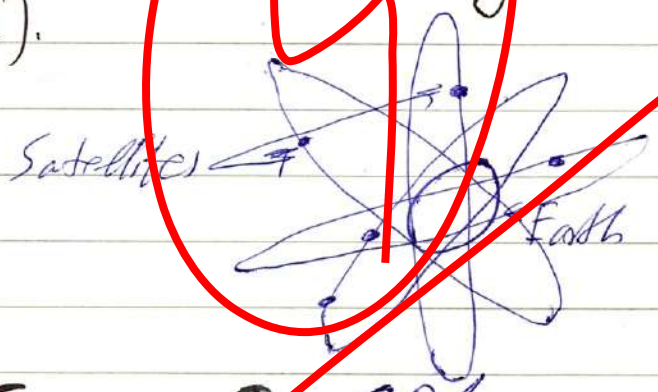

Figure I: GPS

Date: NO:

Start of GPS: GPS was started by the US Department of Defence in 1973.

Number of Satellites: GPS consists of a total 31 satellites developed and operated by US.

Accuracy of GPS: GPS unit is normally accurate to within two meters Circular Error Probability (CEP).

Increase in Accuracy of GPS: The accuracy of GPS is further increased through algorithms built into GPS insights.

GIS:

Definition: Geographic Information System (GIS) may be defined as a computer system that analyzes and displays geographically referenced information.

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Start of GIS:

The field of GIS started in the 1960s as computers and early concepts of quantitative and computational geography emerged.

Developer of GIS:

In 1960, Roger Tomlinson (17-11-1933 to 7 February, 2014), who was an English Canadian geographer, known as the father of GIS, worked through his pioneering work to initiate, plan, and ~~del~~ develop the GIS.

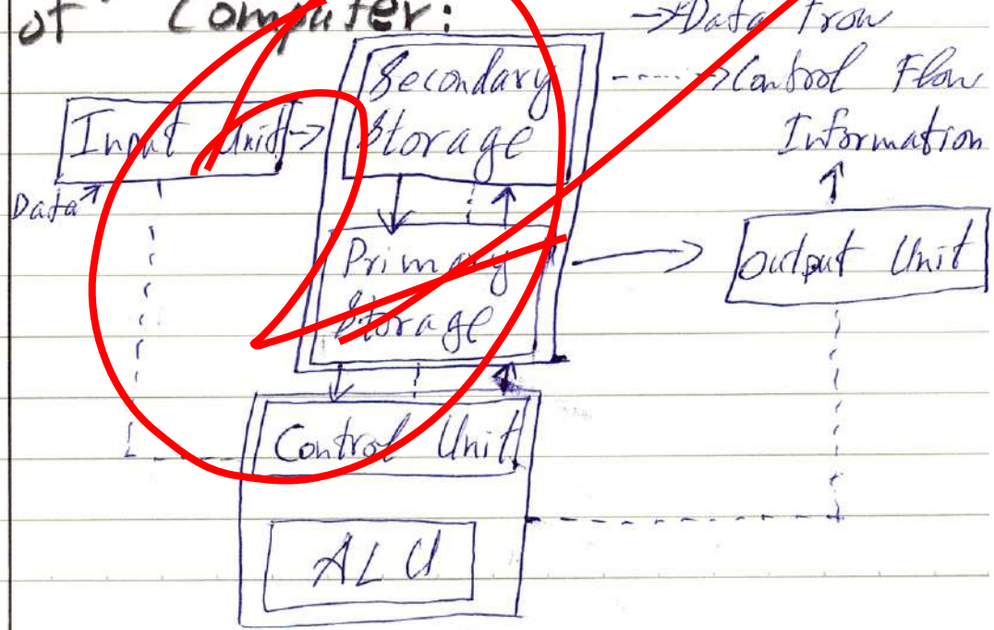
GIS makes Employees More Efficient:

GIS saves both labour, time, and budget. It allows employees to be more efficient when mapping out job sites due to the sheer volume of data they can access.

Date: NO:

Figure 1: Working of optical fiber. Each light particle (photon) bounces down the optical fibre fibre with continued internal mirror-like reflection.

Answer: (a) Block Diagram of Input and Output Devices of Computer:



Date: NO:

Question no. 7:

(a)

Solution:

Given Data

Total Seats = 400

Occupied Seats = 325

%age = ?

Well known fact

$$\text{Percentage} = \frac{\text{Part}}{\text{Whole}} \times 100$$

By putting values in above formula

$$\text{Percentage} = \frac{325}{400} \times 100$$

$$= 0.8125 \times 100$$

$$= 81.25\% \text{ Ans}$$

Hence, the attendance at a percent of capacity is equal to 81.25%.

(b)

Solution:

Given Data

Date: NO:

1st Number of People = 30 people
1st Weight of Sugar = 40 kg
1st Time = 10 days

2nd Number of People = 80 people
2nd Weight = 320 kg
Time = ?

Here, number of days depends on both persons and weight of sugar

∴ we will take compound ratio of 80:30 and 40:320

10:x = 80×40 : 30×320
= 3200 : 9600

Since ratios are equal, product of extremes is equal to product of means

10:x = 3200:9600
⇒ 10×9600 = x(9600) × (3200)
⇒ 3200x = 10×9600
Divide by 3200 on both sides

$$\frac{3200x}{3200} = \frac{10 \times 9600}{3200}$$

Date: No:

$$X = \frac{960}{32}$$

$$x = 30 \text{ days}$$ Ans

Hence, 80 persons will use 320 kg sugar in 30 days.

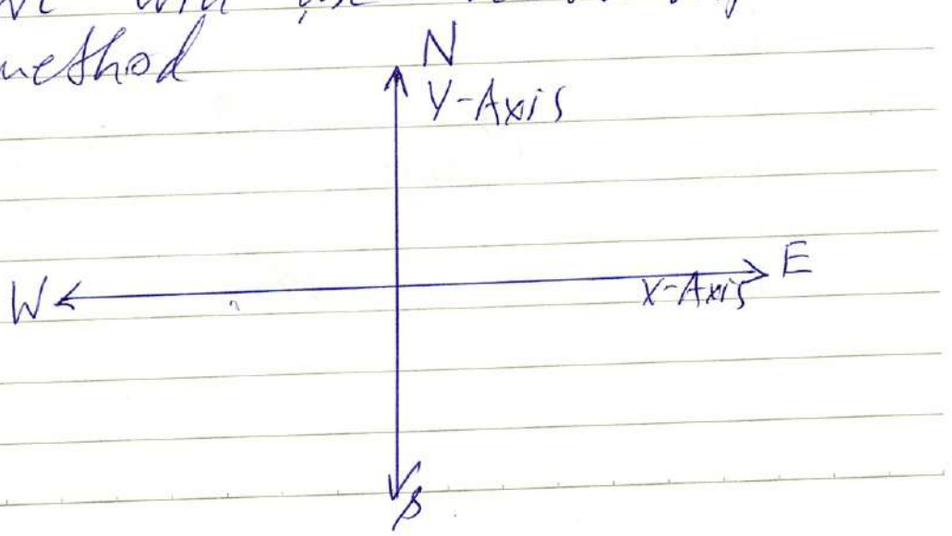
(c)

Solution:

Given Data

Distance Travelled South = 5 km (i)
Distance Travelled West = 3 km (ii)
Distance Travelled North = 4 km (iii)
Distance Travelled South-East = 2 km (iv)
Distance From Start = ?

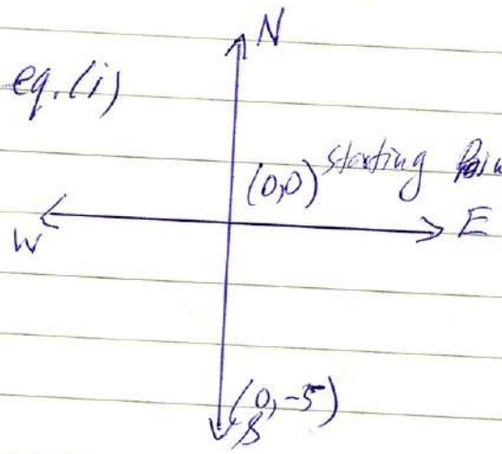
We will use vector displacement method



Date: NO:

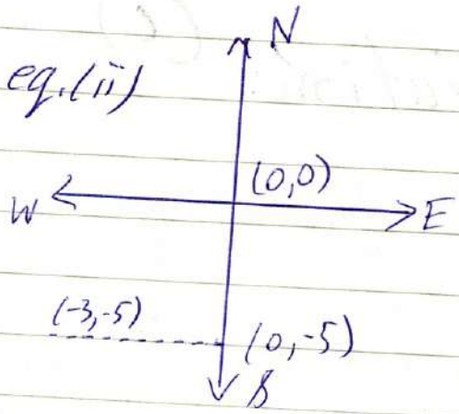
Step-1:

According to eq.(i)



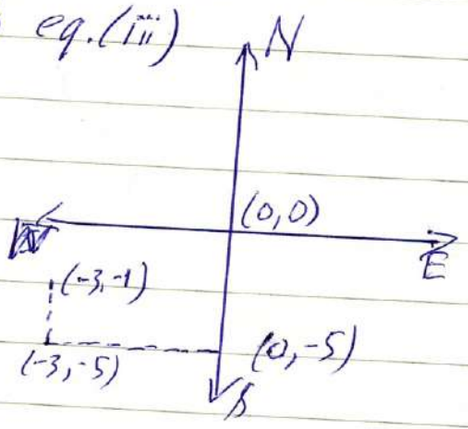
Step-2:

According to eq.(ii)



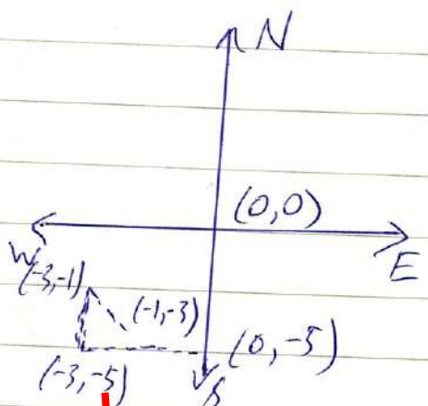
Step-3:

According to eq.(iii)



Date: NO:

Step-4:
According to eq.(iv)



We will find Displacement of (-1,-3) from (0,0)

We know that

Distance = $\sqrt{(\text{Distance of x-axis} - \text{Distance of near x axis})^2 + (\text{Distance of y-axis} - \text{Distance of nearer y axis})^2}$

By putting values, we get

Distance = $\sqrt{(-1-0)^2 + (-3-0)^2}$

$= \sqrt{1+9}$

$= \sqrt{10}$ km Ans.

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(d)

Solution:

Given Data

radius of cylinder = r
= 10 cm

height of cylinder = h
= 36 cm

volume of cylinder = V
= ?

We know that

$V = \pi r^2 h$

By putting values we get

$V = \pi (10)^2 (36)$
$= \pi (100)(36)$
$= (3600)\pi$
$= 11,304 \text{ cm}^3$
$= 113 \text{ m}^3$ Ans

Hence, volume of cylinder is 113 m^3.

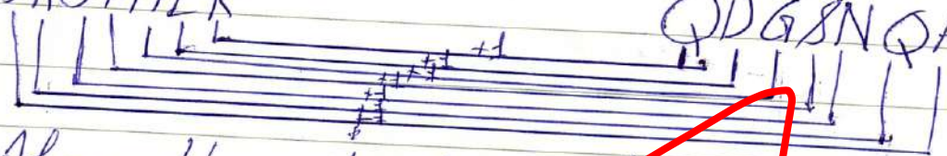
Date: NO:

Question no.8: (a)

Solution:

There are 7 letters in the word BROTHER as well as QDGSNQA

BROTHER QDGSNQA



Here, the technique/pattern to obtain the coded word is by taking the immediately following letters of the word but in the reverse order. It means, in the coded form, the letters are coded by taking their immediately next letters in the reverse order i.e.

SISTER QDSRHR

So, the coded word for SISTER would be written as QDSRHR.

Date: NO:

(c)

Solution:

Given Data

Length = l
$= 15$ cm

Width $= 12$ cm
$= w$

Area $= ?$

Perimeter $= ?$

We know that

Area $= l \times w$

Putting values, we get

Area $= (15)(12)$

$= 180 \text{ cm}^2$

Now,

Perimeter $= 2(l + w)$

Putting values, we get

$= 2(15 + 12)$

$= 2(27)$

$= 54$ cm

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Hence, Area of given shape is 180 cm^2 and perimeter is 54 cm.

(d)

Solution:

Mean:

Definition: Mean may be defined as a quantity that has a value which is intermediate to the extreme values of a set of numbers.

Given Data

Age = 15, 15, 16, 16, 16, 17, 17, 18, 19

Mean = ?

We know that

$$\text{Mean} = \frac{\text{Total}}{\text{Number}}$$

Putting the values we get

$$\text{Mean} = \frac{15+15+16+16+16+17+17+18+19}{9}$$

$$= \frac{144}{9} = 16$$

Date: NO:

(c)

Solution:

Given Data

Length = l
$= 15$ cm

Width $= 12$ cm
$= w$

Area $= ?$

Perimeter $= ?$

We know that

$\text{Area} = l \times w$

Putting values, we get

$\text{Area} = (15)(12)$

$= 180 \text{ cm}^2$

Now,

$\text{Perimeter} = 2(l + w)$

Putting values, we get

$= 2(15 + 12)$

$= 2(27)$

$= 54$ cm

Date: NO:

= 16 (iii)

Medium

Definition: Medium may be defined as the middle value of a sorted list of numbers.

In the ages given, the medium is the 5th age i.e. 16. Ans. (iii)

Mode:

Definition: Mode may be defined as the number in a set of numbers that appears the most often.

In the ages given, the age (number) that appears most often is 16.
∴ 16 is the mode. Ans. (iii)

Date: NO:

Range:

Definition: Range may be defined as the difference between the highest and lowest value from a set of numbers.

Given Data

Ages = 15, 15, 16, 16, 16, 17, 17, 18, 19

Range = ?

We know that

Range = Highest value - smallest value

By putting data values, we get

Range = 19 - 15

= 4 Ans. (iv)