GSA Mock Exam (Section I)

Name: Fateha Aiman
Batch: 369

Question No 03 @

Explain and draw the structure of sun?

1) **Sun**

The sun is a massive, glowing ball of plasma composed of **Helium and Hydrogen**, which gives light and heat to Earth.

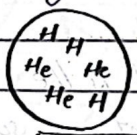


Fig: Sun

2) **Structure of Sun**

The Sun's structure consists of following layers:-

(i) **Core Zone**

The hottest region of sun, where nuclear fusion reactions take place, it extends about **25%** of solar radius.

The temperature of core is ~15 million °C

(ii) Radiative Zone

Thermal radiations transfer the intense heat of core to outwards as photon, taking thousands of years. (~7-2 million °C)

(iii) Connective Zone

Hot plasma rises and cools in convection currents (~2 million - 5500°C)

(iv) Photosphere

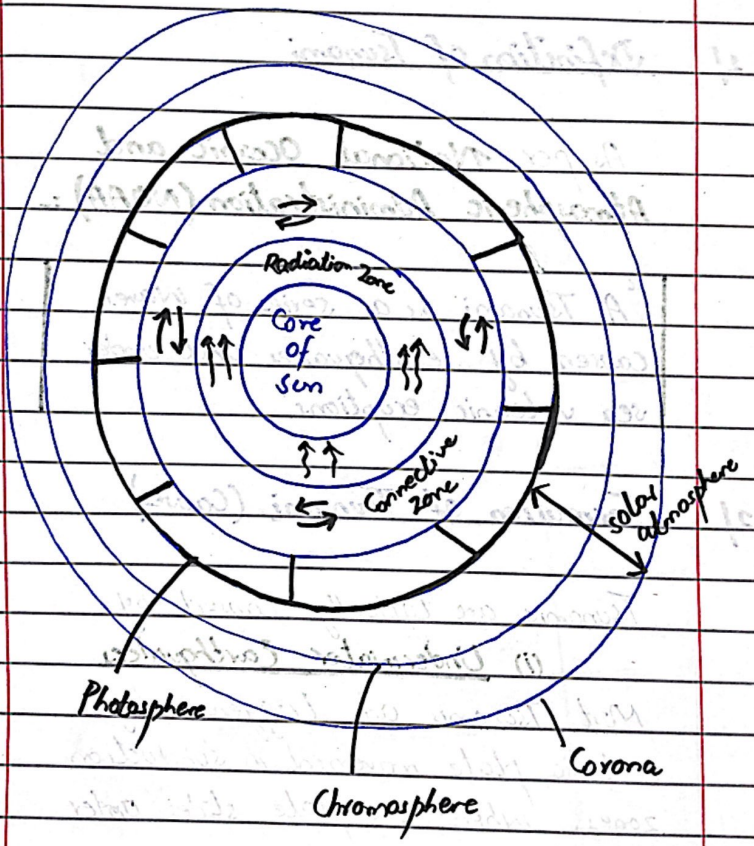
It is the visible layer, a boundary between sun's interior and solar atmosphere, emitting heat and light (~5500°C)

(iv) Chromosphere

A reddish atmospheric layer, seen during solar eclipses. (~4000 - 25000 °C)

vi) Corona

The outermost region of sun, which is extremely hot (1-3 million °C) and source of solar wind.



(6)

What is Tsunami ? How it is generated ? Give examples of few recent Tsunamis ?

1/ Definition of Tsunami

As per National Oceanic and Atmospheric Administration (NOAA) :-

> "A Tsunami is a series of waves caused by earthquakes and under sea volcanic eruptions"

2/ Formation of Tsunami (Causes)

Tsunamis are typically caused by :-

(i) Underwater Earthquakes

Most Tsunamis are triggered by tectonic plate movements in subduction zones, where one plate slides under the other.

(ii) Volcanic Eruptions

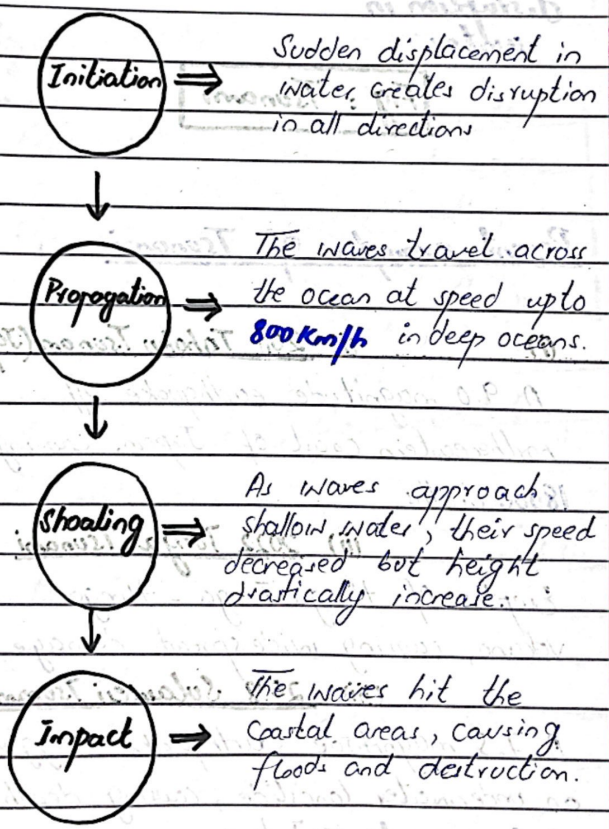
Explosive eruptions or collapse of volcanic

islands can lead to displace large amounts of water.

(iii) **Landslides**

Submarines or large coastal landslides can push water upwards to create waves.

3| Mechanism of Tsunami Formation



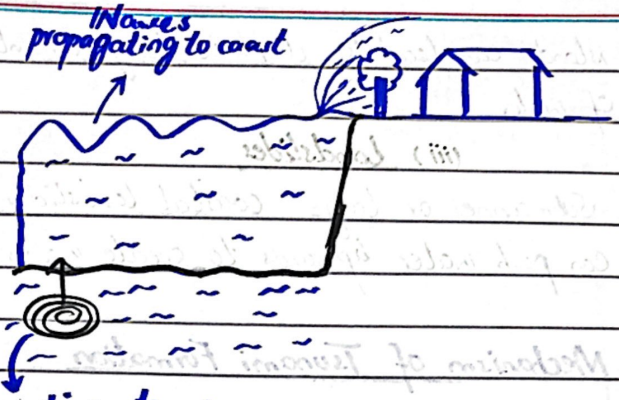


Fig : Tsunami

4| Recent examples of Tsunami

(i) 2011 Tohoku Tsunami (Japan)

A 9.0 magnitude earthquake off northeastern coast of Japan, causing **18000** deaths.

(ii) 2022 Tonga Tsunami

Eruption of Hunga Tonga – Hunga volcano, causing widespread damage.

(iii) 2018 Sulawesi Tsunami

A 7.5 magnitude earthquake triggered an underwater landslide, causing death of **4000 people** in Indonesia.

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Discuss Environmental pollution? How could be its harmful effects? Give a few measures to curb it?

1/ **Environmental Pollution**

As defined by World Health Organization (WHO):-

> "Environmental pollution refers to the contamination of natural resources (Air, water, soil) due to anthropogenic or natural activities, disrupting the ecosystems and harming life forms."

2/ **Harmful effects of Environmental Pollution**

(i) **On Human Health**

Air pollution causes asthma, bronchitis, lung cancer. Waterborne diseases such as cholera, diarrhea and hepatitis are caused by contaminated water.

(ii) On Ecosystem

The environmental pollution causes biodiversity loss, eutrophication and climate change which leads to global warming

(iii) On Economy

Soil and air pollution reduce agricultural productivity. Increased health care burden is put on governments.

3| Measures to Curb environmental pollution

Reducing air pollution

- By Promoting renewable energy resources e.g solar, wind
- Enforcing strict emission standards for vehicles and industries
- Adoption of public transport, car pooling and reducing vehicular pollution

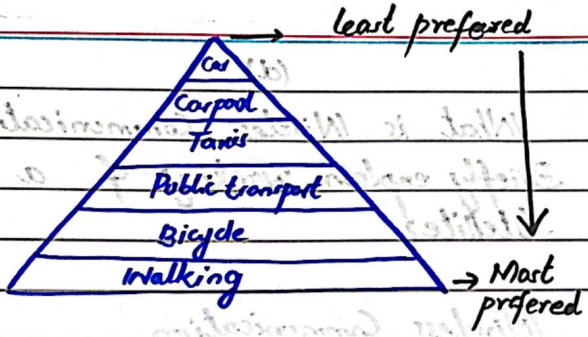


Fig: Green transport Pyramid

Limiting usage of chemical fertilizers

Reducing water pollution and soil pollution

Treat industrial and municipal waste water before discharge

Reduce plastic usage to avoid ocean and river contamination

Implement **Sustainable agriculture** to prevent chemical runoff.

Proper disposal of Hazardous waste e.g E waste

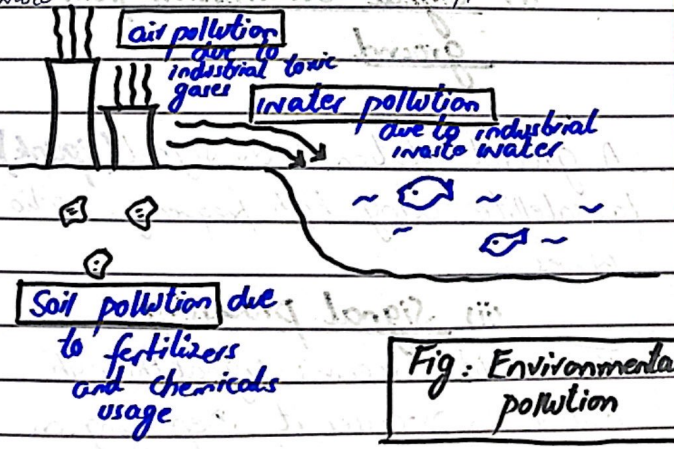


Fig: Environmental pollution

(d)

What is Wireless Communication? Briefly explain working of a satellite?

1/ **Wireless Communication**

Wireless communication is the transfer of information between devices without use of physical connection e.g. cables.

For instance, Mobile phones, WiFi, Bluetooth and GPS systems use Wireless communication.

2/ **Working of a Satellite**

(i) **Signal transmission from ground**

A ground station sends signal **(Uplink)** to satellite using high frequency radio waves.

(ii) **Signal processing**

The satellite receives signal through antenna, processes it. Depending on

its function, satellite may amplify, convert or redirect the signal.

(iii) Signal transmission to ground

The satellite sends processed signal **(downlink)** to another ground station or user device on earth.

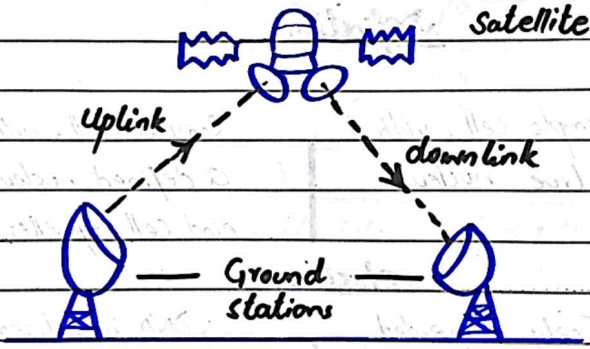
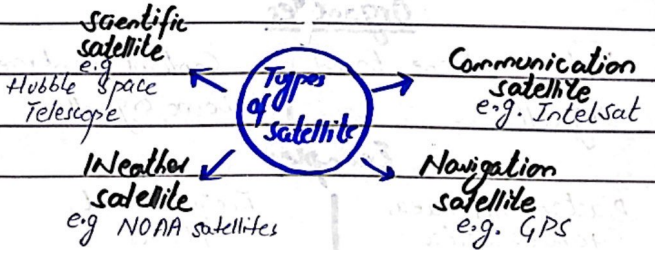


Fig: Working of Satellite

3| Types of Satellite



Question No. 04

(a)

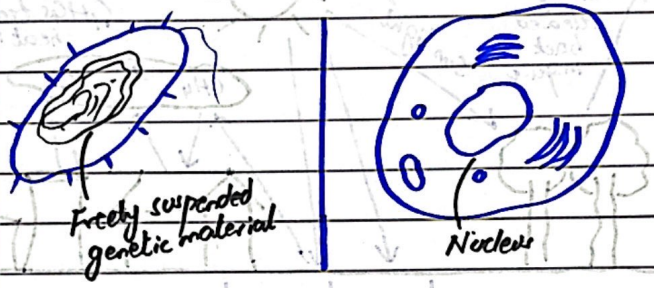
Differentiate between Prokaryotic and Eukaryotic cells?

Prokaryotic Cell	Eukaryotic cell
Definition	
Simple cell, without a true nucleus.	Complex cell, with a defined nucleus and cell organelles.
Nucleus	
Freely suspended genetic material	DNA is enclosed in nuclear membrane
Size	
0.1 - 0.5 Hm diameter	10 - 100 Hm diameter
Organelles	
Lacks membrane bound organelles	Contains membrane bound organelles
Examples	
Bacteria, Archaea, Cyanobacteria	Fungi, animal, plants

Reproduction

Asexual (Binary fission)	Both asexual (mitosis) and sexual (miosis)

Diagram



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What is global Warming ? What is Kyoto protocol?

1/ **Global Warming**

(i) **Definition**

Global Warming as defined by Intergovernmental Panel on Climate Change (IPCC)

The observed increase in global average temperature near Earth surface and in

the troposphere due to rising levels of greenhouse gases since preindustrial period, primarily caused by human activities as well as natural processes."

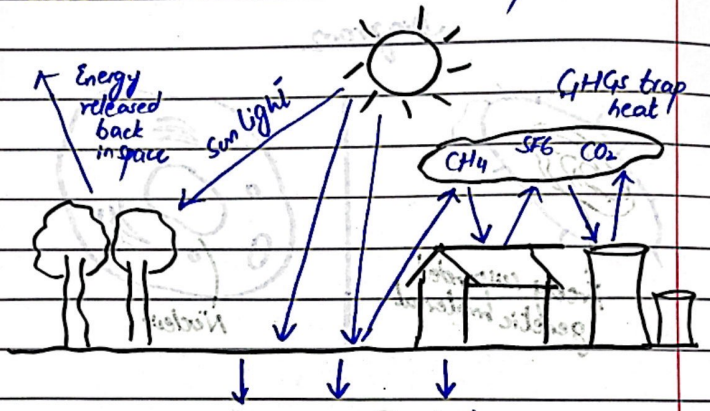
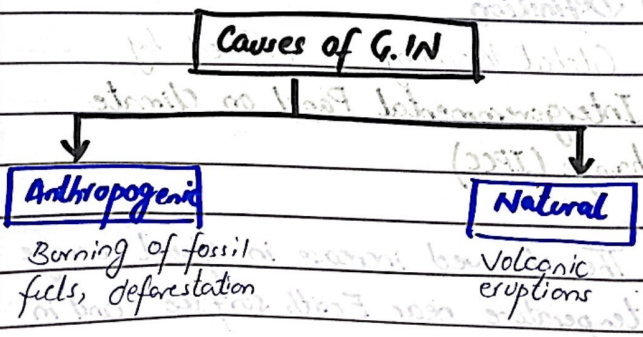
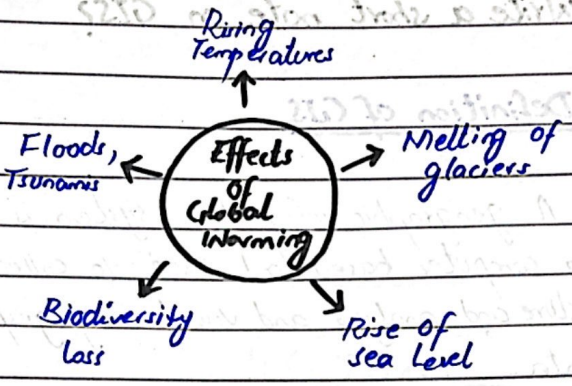


Fig: Global Warming

(ii) Causes of Global Warming



(iii) Effects of Global Warming



2| Kyoto Protocol

Kyoto protocol is an international treaty adopted in 1997 under **UNFCCC** to reduce and combat GHG emissions and global warming.

Key features of Kyoto Protocol

- Developed countries committed to limit GHG emissions by an average of **5.2%** below in 1990s
- Countries can **trade** carbon emission allowances
- Under **clean development mechanism** developed countries can fund emissions reduction projects in developing countries and earn credits
- Recognized that developed countries are responsible for higher emissions

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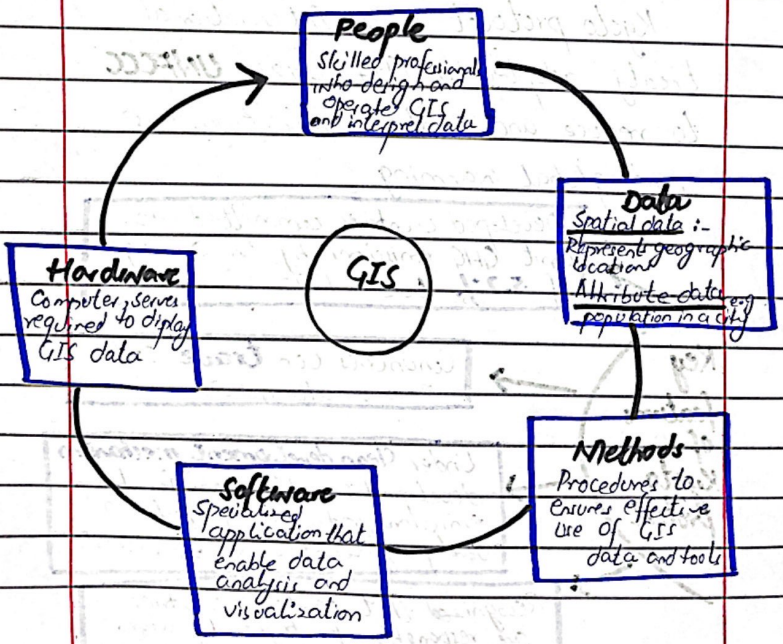
Write a short note on GIS?

Definition of GIS

A geographic information system is a computer based tool used to collect, store, analyze and visualize geographic data.

2| Components of GIS



3/ **Functions of GIS**

(i) Data Capture

Collecting geographic data from sources like satellite imagery, GPS devices and field surveys

(ii) Data Storage

Organizing data in data bases for easily retrieval and management.

(iii) Data Analysis

Performing spatial analysis like overlaying maps, identifying patterns and modelling scenarios.

(iv) Visualization

Creating maps, graphs, 3D models for better understanding

(v) Data sharing

Distributing GIS data and results through GIS applications.

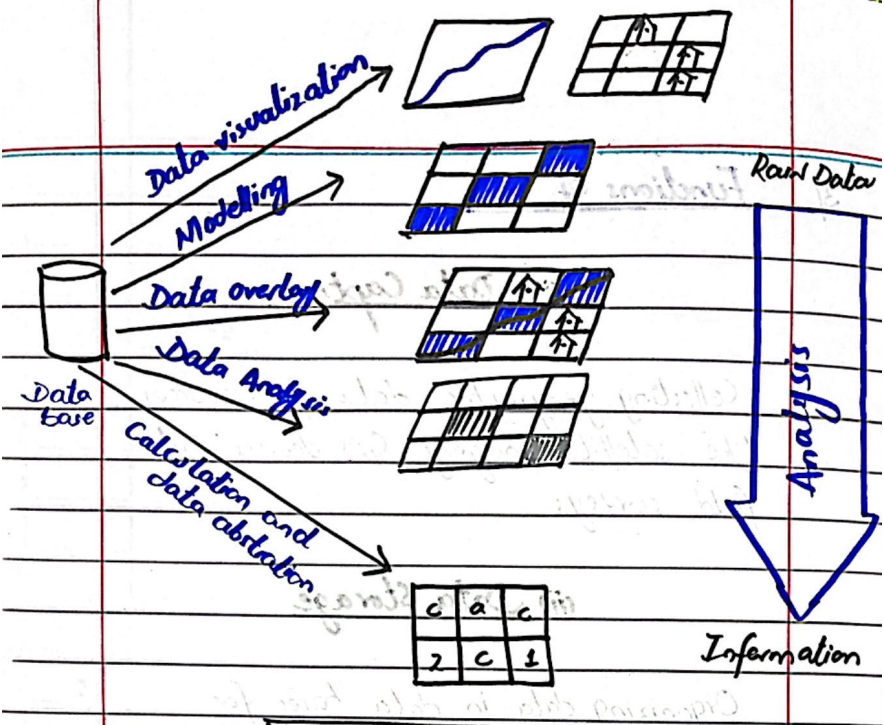
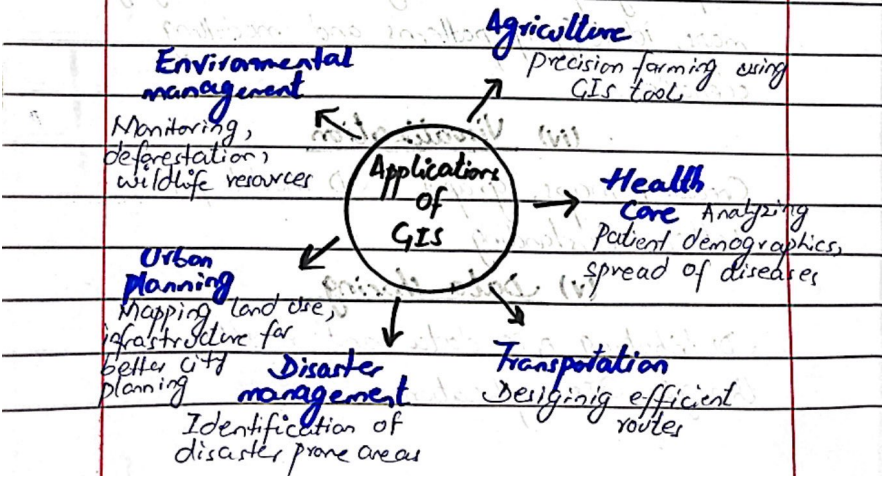


Fig : Functions of GIS

4/ Applications of GIS



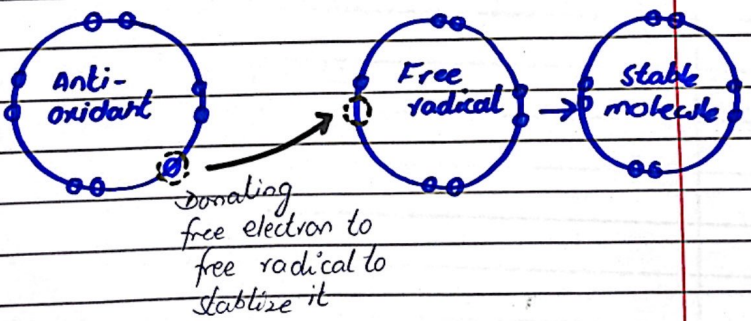
(d)

Briefly describe antioxidants?

1/ Definition of Antioxidants

Antioxidants are the molecules that help protect body from damage caused by harmful molecules known as **Free radicals**. Free radicals are highly reactive, unstable molecules that can damage cells, proteins and DNA

2/ Working of Antioxidants



Common types of Antioxidants

Vitamin

Vit C : Found in Citrus fruits

Vit E : Found in nuts, seeds

Vit A : Found in Carrots, sweet potatoes

Mineral

Selenium : Found in nuts, sea-food and grains

Phytochemical

Found in fruits, vegetables, dark Choclate

Section II

Question 6

(a)

Solution

Let, three digits of number by x, y, z

Given that

$$x + y + z = 15 \rightarrow (i)$$

$$y + z = 12 \rightarrow (ii)$$

$$y - z = 2 \rightarrow (iii)$$

Solving (ii) and (iii)

$$y + z = 12$$
$$y - z = 2$$
$$2y = 14$$

$$y = \frac{14}{2}$$

$$\boxed{y = 7}$$

Putting in (ii)

$$y + z = 12$$
$$7 + z = 12$$
$$z = 12 - 7 \Rightarrow \boxed{z = 5}$$

Putting y and z in (i)

$$x + y + z = 15$$

$$x + 7 + 5 = 15$$

$$x + 12 = 15$$

$$x = 15 - 12$$

$$\boxed{x = 3}$$

So the three digit number is **375**

(c)

Sol

Diameter of circle = 6cm

Circumference = ?

Area = ?

As

$$\text{Diameter} = 2(\text{Radius})$$

$$\text{Radius} = \frac{\text{Diameter}}{2}$$

$$\text{Radius} = \frac{6}{2} = 3\text{cm}$$

Circumference of circle $= 2\pi r$

Putting value of r

$$\text{Circumference} = 2(3.14)(3)$$

$$\boxed{\text{Circumference} = 18.84 \text{ cm}}$$

$$\text{Area} = \pi r^2$$
$$= (3.14)(3)^2$$
$$= (3.14)(9)$$

$$\boxed{\text{Area} = 28.26 \text{ cm}^2}$$

(d)

13, 24, 46, 90, 178, ____

Sol

$24 - 13 = 11$

$46 = (11 \times 2) + 24$

$90 = (22 \times 2) + 46$

$178 = (44 \times 2) + 90$

$(88 \times 2) + 178 = \boxed{354}$

(iii)

5, 6, 9, 14, 21, ____

Addition of prime numbers in each entry

$5+1 = 6$

$6+3 = 9$

$9+5 = 14$

$14+7 = 21$

$\Downarrow$

$21+11 = \boxed{32}$

(b)

Question No: 8

(a)

Given that

Width of room = 60% of length

$\boxed{\text{Length} = 5\,ft}$

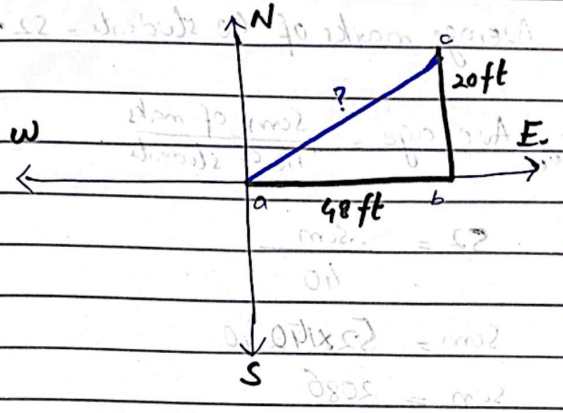
$\text{Width} = \frac{60 \times 5}{100}$

$\boxed{\text{Width} = 3\,ft}$

Area of room $= 5 \times 3 = \boxed{15\,ft^2}$

Perimeter $= 2(L+W) = 2(5+3) = 2(8) = \boxed{16\,ft}$

(b)



As we know

By Pythagoras theorm

$$(hyp)^2 = (Base)^2 + (perpendicular)^2$$

In Δabc,

base = ab = 48ft

per = bc = 20ft

hyp = ac = ?

$$(hyp)^2 = (48)^2 + (20)^2$$

$$= 2304 + 400$$

$$(hyp)^2 = 2704$$

$$\sqrt{(hyp)^2} = \sqrt{2704}$$

$$\boxed{hyp = 52\,ft}$$

(c)

Average marks of 40 students = 52.15

$$\text{Average} = \frac{\text{sum of marks}}{\text{no. of students}}$$

$$52 = \frac{\text{sum}}{40}$$

$$\text{Sum} = 52.15 \times 40$$

$$\text{Sum} = 2086$$

Marks of a student = 49 (instead of correct marks of 85)

Corrected marks (Total) = 2086 − 49 + 85

= 2122

Average of new marks $= \frac{2122}{40}$

$$= \boxed{53.05}$$

(d)

People who like veg pizza = A = 37

People who like chicken pizza = B = 25

People who either like vegetable or chicken

$A \cup B = 37 + 25 = 62$

Condition

People who like neither vegetable or chicken = 3

Thus,

People who like either veg or chicken

$A \cup B = 62 - 3 = 59$

Probability of random person picked to like chicken pizza $= \frac{25}{59}$

$= 0.42337$

$\simeq 0.42$