

GSA Mock Exam (Section I)

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Batch : 369

Question No 03

①

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.



2/ Structure of Sun

Fig: 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 $^{\circ}\text{C}$

(ii) Radiative Zone

Thermal radiations transfer the intense heat of core to outwards as photon, taking thousands of years. ($\approx 7-2$ million $^{\circ}\text{C}$)

(iii) Convective Zone

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

(iv) Photosphere

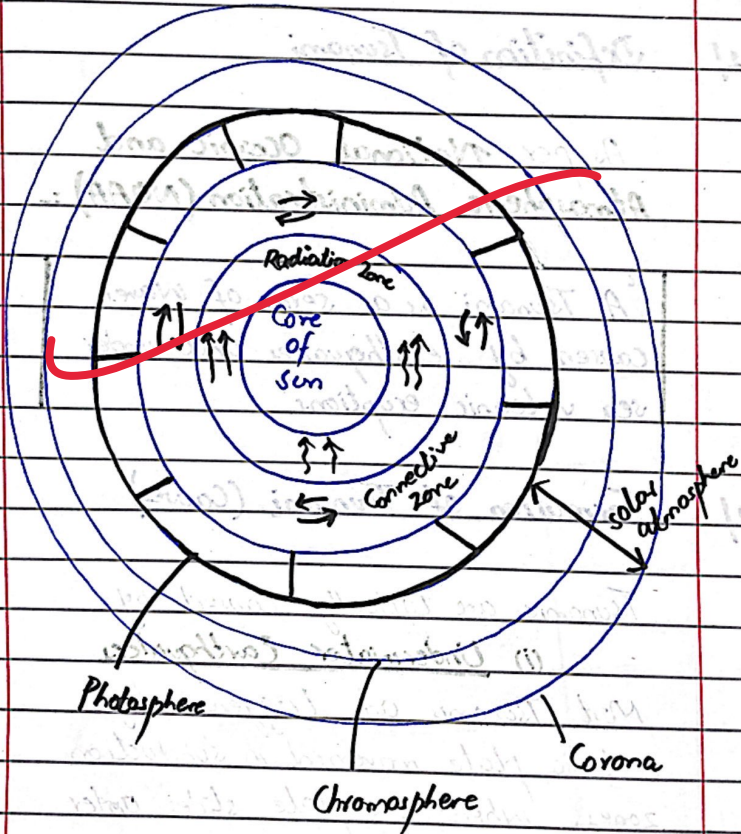
It is the visible layer, a boundary between sun's interior and solar atmosphere, emitting heat and light ($\approx 5500^{\circ}\text{C}$)

(iv) Chromosphere

A reddish atmospheric layer, seen during solar eclipses. ($\approx 4000 - 25000^{\circ}\text{C}$)

(ii) Corona

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



(b)

(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

~~Initiation~~

~~→ sudden displacement in water creates disruption in all directions~~

~~Propagation~~

~~→ The waves travel across the ocean at speed up to 800 Km/h in deep oceans.~~

~~Shoaling~~

~~→ As waves approach shallow water, their speed decreased but height drastically increase.~~

~~Impact~~

~~→ The waves hit the coastal areas, causing floods and destruction.~~

Waves propagating to coast

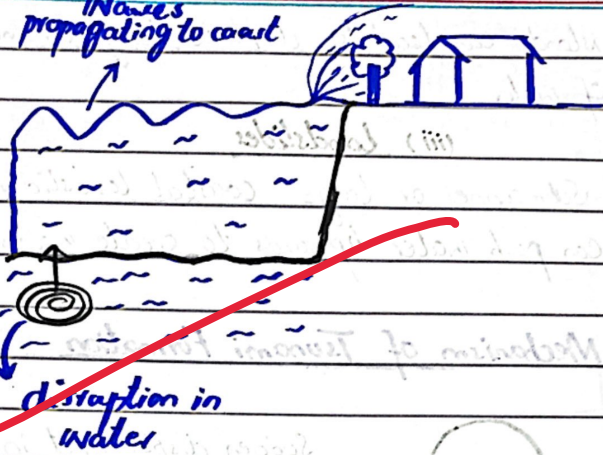


Fig : Tsunami

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.

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

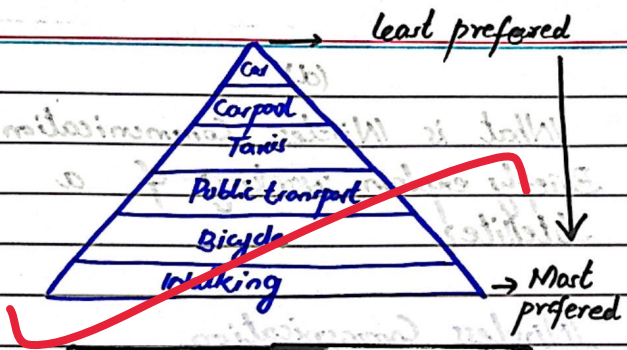


Fig: Green transport pyramid

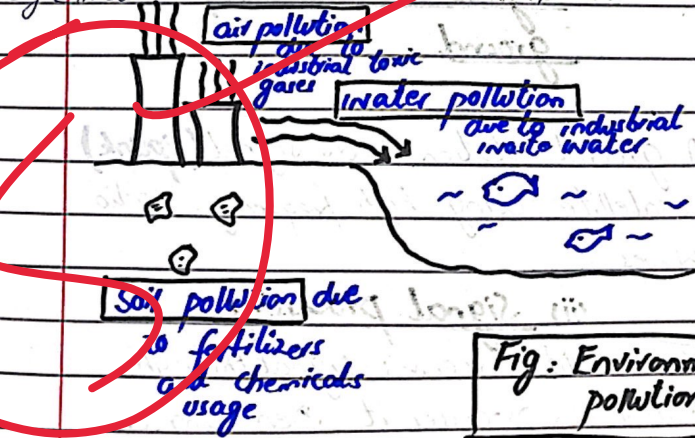
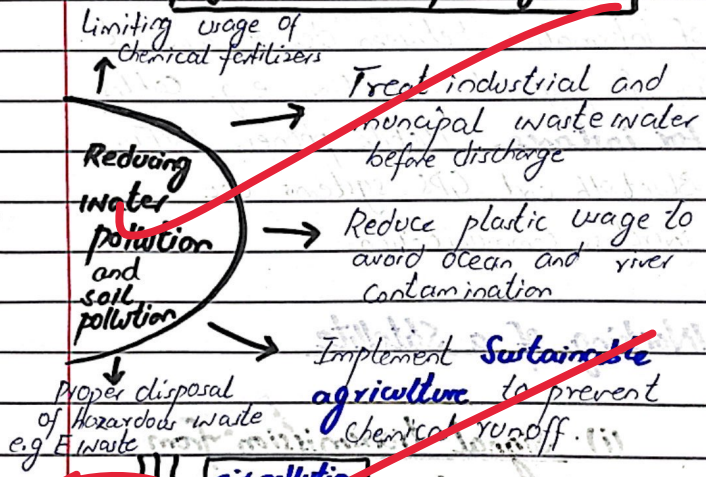


Fig: Environmental pollution

(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.

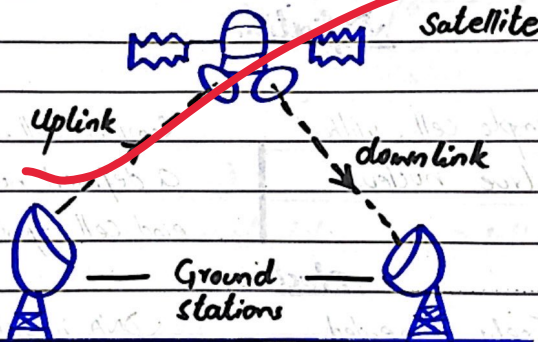
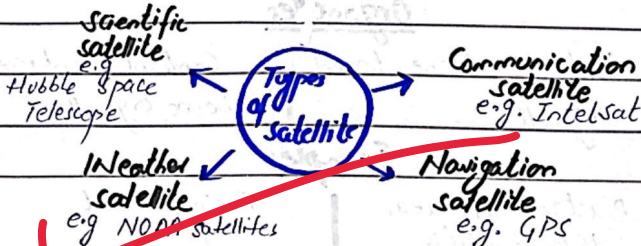


Fig: Working of Satellite

3) Types of Satellite



Question No. 04

①
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

0.5 - 0.5 μ m diameter

10 - 100 μ m diameter

Organelles

Lacks membrane bound organelles

Contains membrane bound organelles

Examples

Bacteria, Archaea, Cyanobacteria

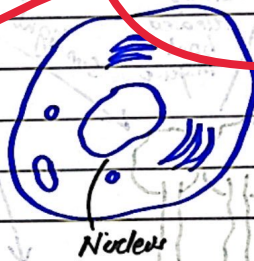
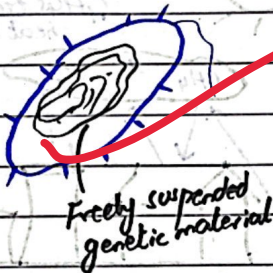
Fungi, animal, plants

Reproduction

Asexual
(Binary fission)

Both asexual
(mitosis) and
Sexual (meiosis)

Diagram



(6)

What is global warming? What is Kyoto protocol?

1/ Global Warming

(i) Definition

Global Warming is 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."

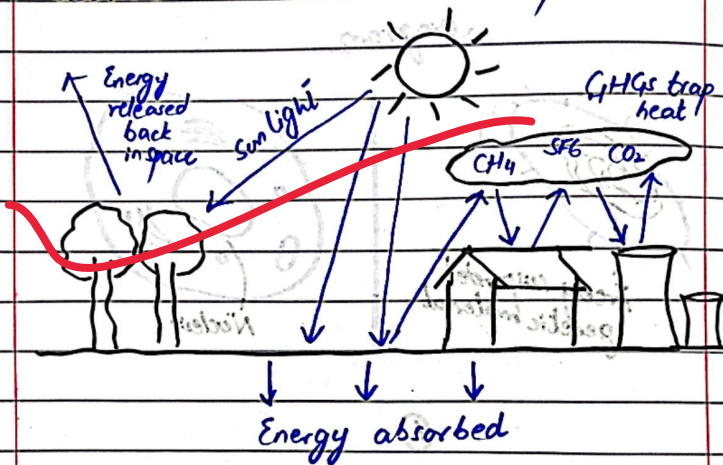


Fig: Global Warming

(ii) Causes of Global Warming

Causes of G.W

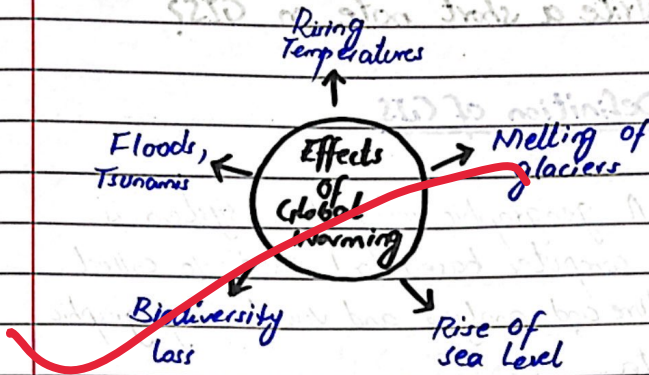
Anthropogenic

Burning of fossil
fuels
deforestation

Natural

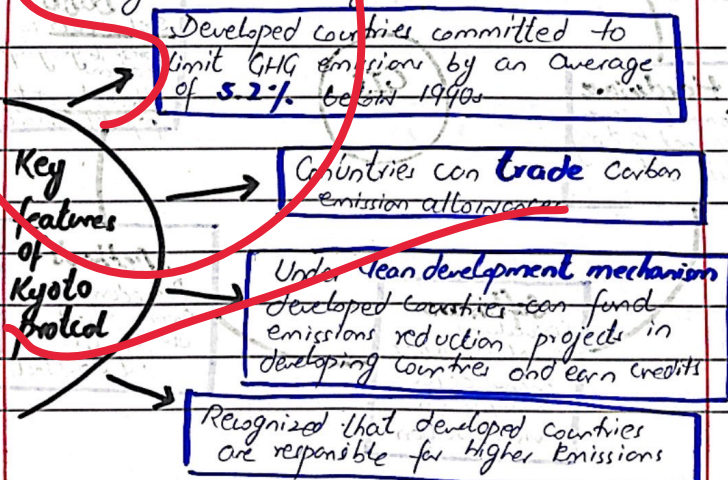
Volcanic
eruptions

(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.

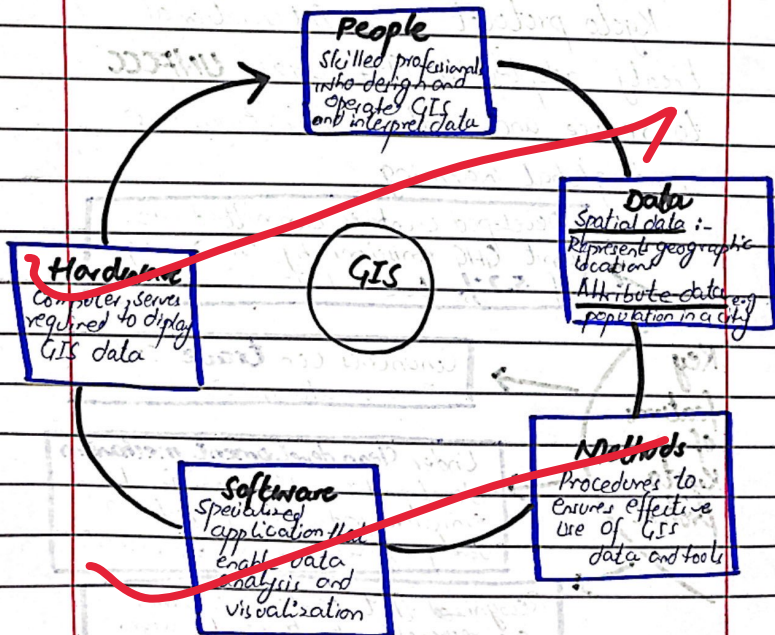


Write a short note on GIS?

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 easy retrieval and management.

(iii) Data Analysis

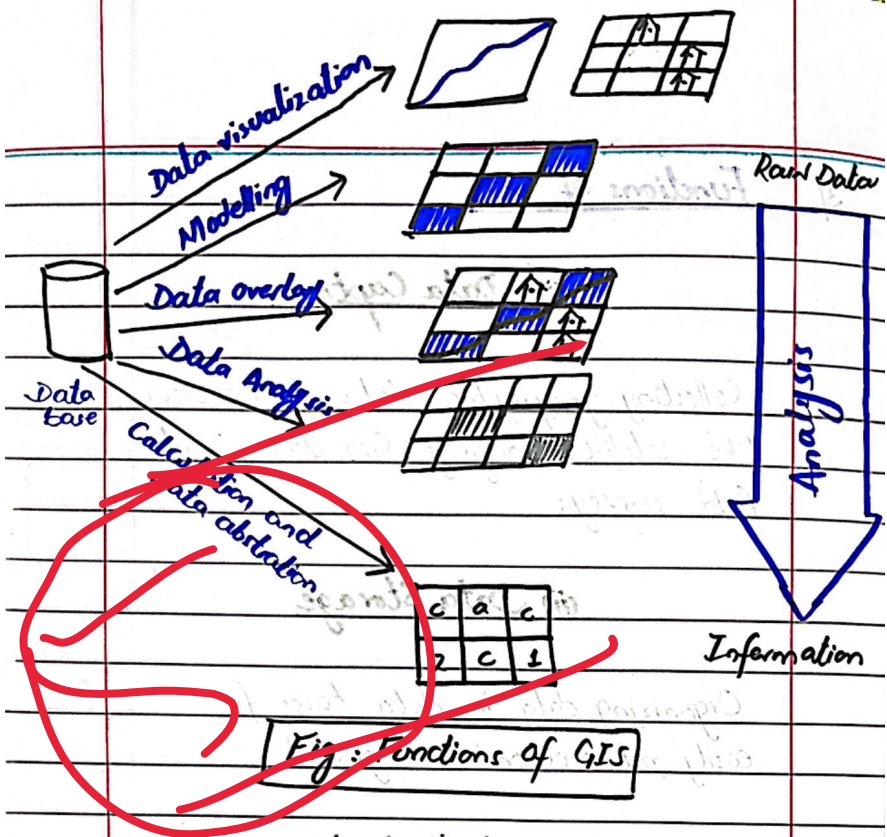
Performing spatial analysis like overlaying maps, identifying patterns and modelling scenarios.

(iv) Visualization

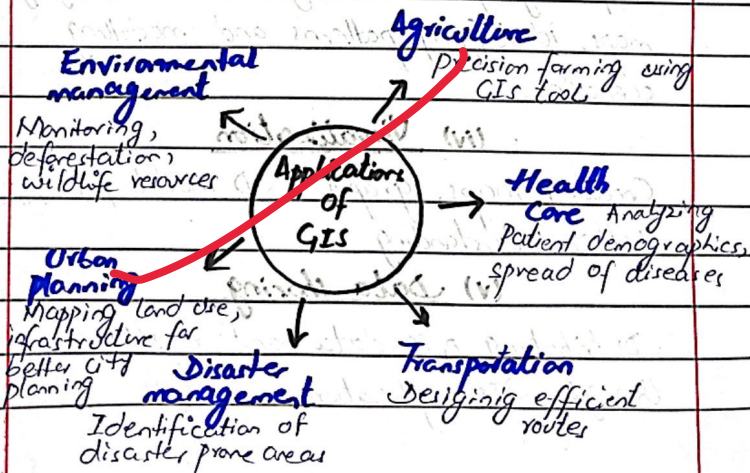
Creating maps, graphs, 3D models for better understanding.

(v) Data sharing

Distributing GIS data and results through GIS applications.



4 Applications of GIS



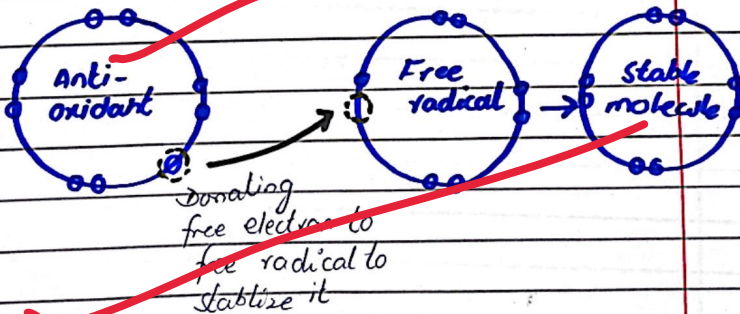
(d)

Briefly describe antioxidants?

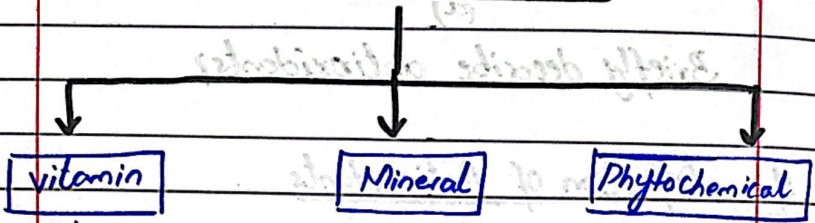
1) Definition of Antioxidants

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



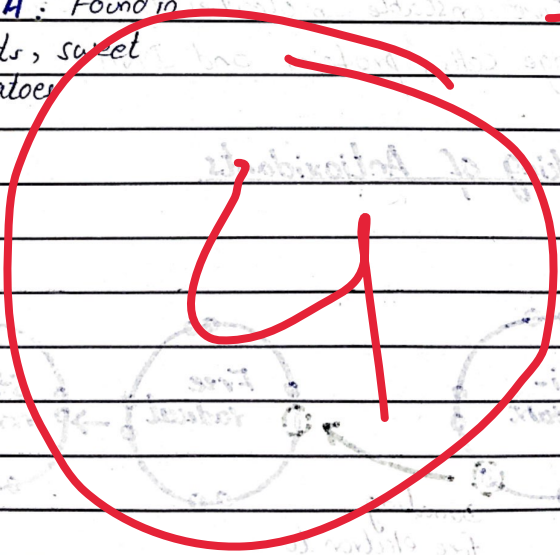
~~Vit C: Found in Citrus fruits~~

~~Vit E: Found in nuts, seeds~~

~~Vit A: Found in Carrots, sweet potatoes~~

~~Selenium: Found in nuts, seafood and grains~~

~~Found in fruits, vegetables, dark Chocolate~~



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)

$$y + z = 12$$

$$y - z = 2$$

$$\hline 2y = 14$$

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

$$\boxed{y = 7}$$

Putting in (ii)

$$y + z = 12$$

$$7 + z = 12$$

$$z = 12 - 7 \Rightarrow$$

$$\boxed{z = 5}$$

Putting y and z in it

$$x + y + z = 15$$

$$x + 7 + 5 = 15$$

$$x + 12 = 15$$

$$x = 15 - 12$$

$$x = 3$$

So the three digit number is **375**

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 = $2\pi r$
of circle

Putting value of r

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

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

$$\text{Area} = \pi r^2$$

$$= (3.14)(3)^2$$

$$= (3.14)(9)$$

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

(d)

13, 24, 46, 90, 178, ...

Sol

$$24 - 13 = 11$$

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

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

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

$$(88 \times 2) + 178 = 354$$

5, 6, 9, 14, 21, —

Addition of prime numbers in each entry

$$5 + 1 = 6$$

$$6 + 3 = 9$$

$$9 + 5 = 14$$

$$14 + 7 = 21$$

$$21 + 11 = \boxed{32}$$

Question No. 8

(a)

Given that

Width of room = 60% of length

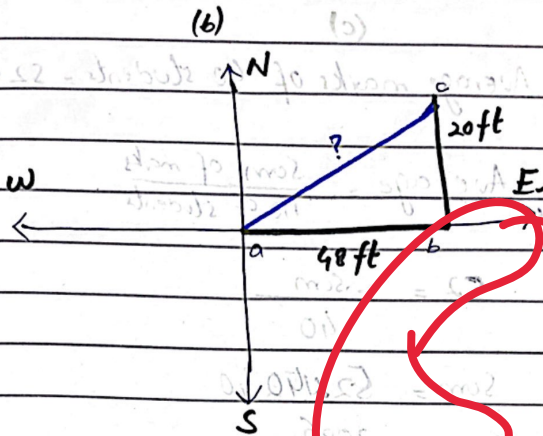
$$\boxed{\text{Length} = 5 \text{ ft}}$$

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

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

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

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



As we know

By Pythagoras theorem

$$(\text{hyp})^2 = (\text{Base})^2 + (\text{perpendicular})^2$$

In Δabc

$$\text{base} = ab = 48 \text{ ft}$$

$$\text{per} = bc = 20 \text{ ft}$$

$$\text{hyp} = ac = ?$$

$$(\text{hyp})^2 = (48)^2 + (20)^2$$

$$= 2304 + 400$$

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

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

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

(c) (d)

Average marks of 40 students = 52.15

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

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

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

$$\text{Sum} = 2086$$

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

$$\text{Corrected marks (Total)} = 2086 - 49 + 85$$

$$= 2122$$

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

$$= \boxed{53.05}$$

(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 = $\frac{25}{59}$

$$= 0.4237$$

$$\approx 0.42$$

Good attempt

Wish you best of luck