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NOA Mock 7 CSS-2024

General Science And.

Ability

Part - II

Section - I

Question No. 2

b. Distinguish water soluble and fat soluble vitamins. Give examples of diets containing different vitamins.

Answer.

Classification of Vitamins:

Vitamins are classified into

two categories:

1- Water - soluble Vitamins

2- Fat - soluble vitamins

1. Fat - Soluble Vitamins

Fat - Soluble vitamins include Vitamin A, D, E and K. They are usually absorbed with the help of foods that contain fats. The fat containing these vitamins is broken down by bile, a liquid released by the liver, and the body then absorbs the breakdown material/products.

These vitamins are stored in the body and need not to be consumed every day.

Examples of Diets containing Fat - soluble vitamins

- a- Green Vegetables : Green vegetables contain Vitamin A, E and K.
- b- Egg : Egg contains Vitamin A and Vitamin D.
- c- Milk : Milk contains Vitamin A and Vitamin D.
- d- Cod's Liver Oil : It contains Vitamin D.
- e- Margarine, Seeds : It contains Vitamin E.

2- Water Soluble Vitamins

Water-soluble vitamins include Vitamin B and Vitamin C. Vitamin B is composed of 8 vitamins. These vitamins cannot be stored in the body and thereby need to be taken regularly to replenish the body's needs.

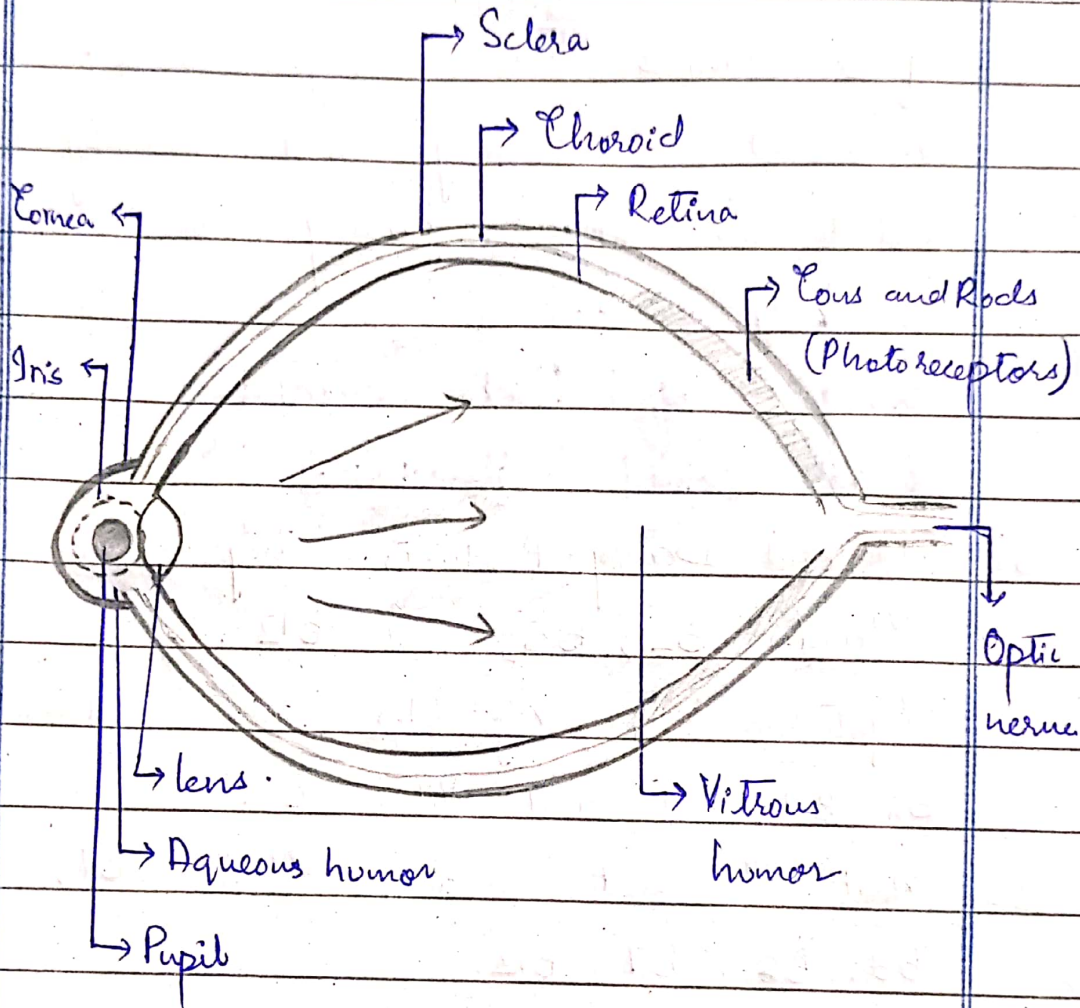
Examples of Diet containing Water-Soluble Vitamins.

- a- Milk and Dairy Products: They contain Vitamin B2, B5, and B12.
- b- Vegetables: The vegetables contain vitamin B6, B7, B9 and Vitamin C.
- c- Meat: The meat contains Vitamin B1, B3, B6, B7, B12.
- d- Grains: The grains contain Vitamin B1, B3, B6, and B9.
- e- Citrus fruits: They contain Vitamin C.

c- Explain the structure of eye.

Answer:

Structure of Eye



Human eye is a sensory organ. It provides sensory information to the individuals in the form of visuals.

1. Sclera:

It is the outermost layer that protects the eye.

2- Choroid

It is present beneath the sclera.
 It is little thicker and reddish as well due to the presence of capillaries.
 The choroid is responsible for the nourishment of the eye.

3- Cornea

It is the outermost and transparent layer. The light waves interact with the cornea first and it is responsible for the bending of light waves.

4- Iris :

It is the pigmented muscle which controls the movement of pupil.

5- Pupil

A small hole from where the light enters into the eye.

6- lens

The reception and the focusing of light occurs at the lens.

7- Retina

The retina is the innermost and the most sensitive region.

1/1/20

The retina has small extensions called cones and rods.

8- Cones and Rods

Cones and rods have photoreceptors in them. Photoreceptors convert the light waves into an action potential i.e. image formation. So, the image forms at the retinal region.

9. Optic nerves

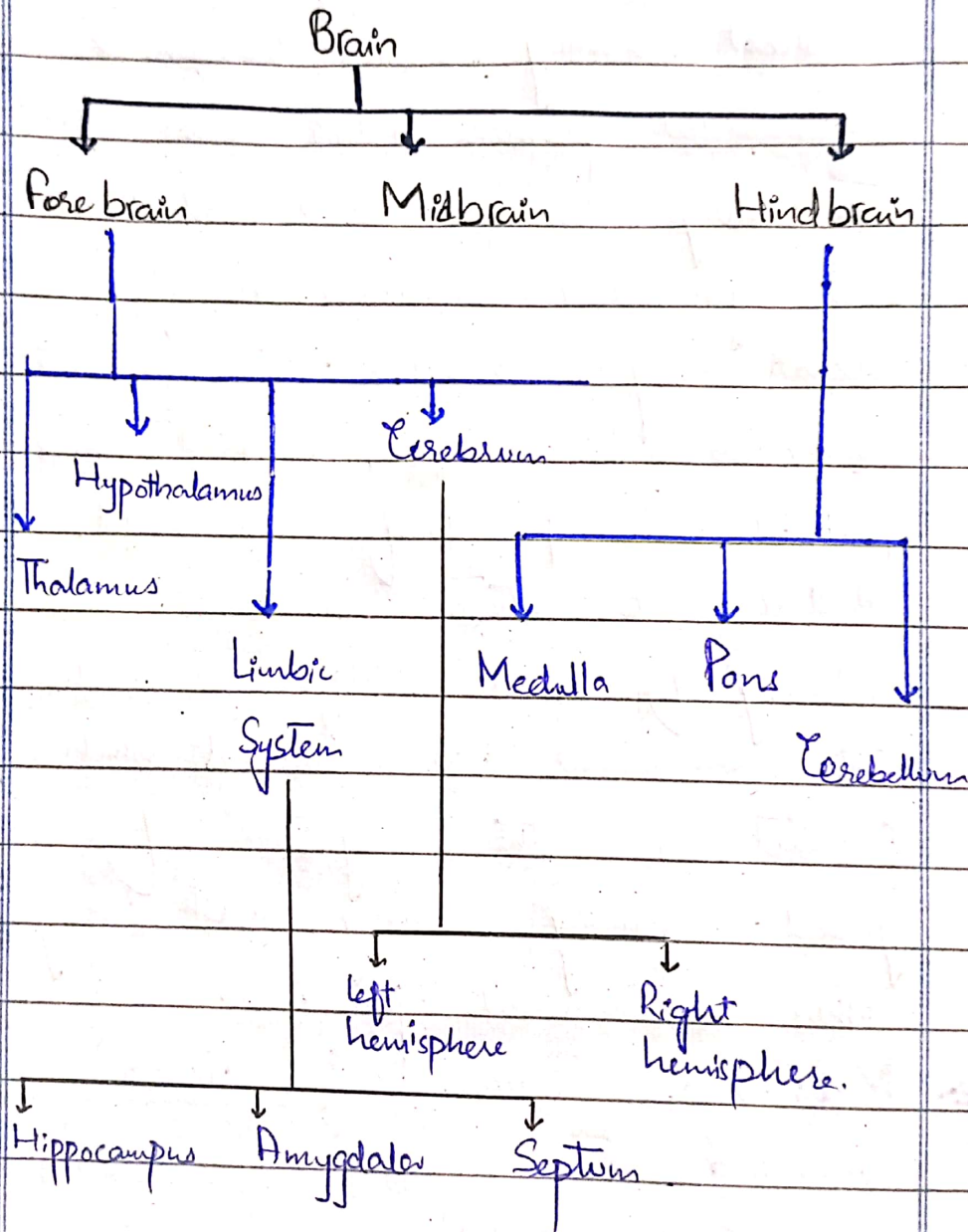
Optic nerve transmits the image towards the brain. The brain then recognizes the image.

10- Aqueous humor and Vitreous humor

Aqueous humor is at the frontal side i.e. between the iris and the cornea while vitreous humor is in the inner side. These are the fluid filled regions/parts. They are involved in the maintenance of fluid balance.

d. Draw a flow chart of different parts of the brain.

Answer :-



Question No. 3:-

a. Global warming is a wild beast and we all are poking at it which sticks, justify?

Answer:

Global warming is an international environmental problem. A look back at the history reveals that industrial and agricultural revolutions have tremendously contributed towards the social, economic, scientific, cultural and political developments of the world.

And due to these revolutions the intensity of human interferences within the environment has increased which resulted into the instigation of global warming along with many other environmental problems.

⇒ Man-made causes of global warming:

1- Green house gases:

Green house gases are all such gases which have the ability to

absorb, trap and scatter heat.

As per IPCC, the CO_2 contribution towards the global warming is 61%, CH_4 contribution towards global warming is 15%, CFCs contribution is 11% and N_2O contribution is 4%.

All these gases are emitted from the refrigerators, spray cans (CFCs), and from the fertilizers, pesticides and organic wastes (N_2O).

So almost 91% of global warming is due to these 4 factors proving that we are poking at it which sticks.

2- Enhanced green house effect and Depletion of ozone layer.

The enhanced green house gases results in the enhanced green house effect and the depletion of ozone layer. These causes are purely man-made. So, global warming is a wild beast and we all are poking at it which sticks.

3. Other causes.

The other man-made causes of global warming includes

- a. Population Explosion
- b. Deforestation
- c. Rapid Urbanization
- d. Weapons of Mass Destruction
- e. Solid Waste
- f. Eruption of Wildfires.

⇒ Effects of Global Warming

Global warming is perceived as a great threat. No aspect of our life is free from the effects of global warming. Some of the effects of the global warming are following:

1. A direct threat to life
2. Melting of glaciers / Ice loss / Break-down of ice sheet.
3. Rising global Sea levels
4. Threat to the coastal population
5. Emergence of International Environmental Refugee Problem.

- 1 / 1 / 20
- 6- Poverty
 - 7- Unemployment
 - 8- Increasing intensity and frequency of disasters.
 - 9- Effects on agriculture.
 - 10- Health effects of global warming.
 - 11- Political effects / rising conflicts.

All the causes and the effects of global warming proves that it is a wild beast and we all are poking at it which stiches.

b. What is the origin of universe, how the age of universe can be calculated?

Answer:-

Origin of the Universe

There are two types of theories focusing on the origin of the universe.

I- Early Theories

These theories directly focused on the development of the earth.

They include:

i- Nebular Hypothesis (1755)

It suggests that the solar system is formed from gas and dust orbiting a star (sun).

ii- Planetsimal Hypothesis (1900)

It suggests that the planets/matter were produced when a passing star almost collided with the sun. During the near collision, hot gases were pulled out of both stars and the gases were then condensed.

II- Modern Theories

The modern theories directly focused on the development of universe.

These include:

i- Expanding Universe Theory / Big Bang Theory.

According to the big bang theory, the universe originated in the following steps:

1/1/20

Singularity (All energy)



On expansion, energy started transforming into matter



Small particles (Very small, like quarks)



Electrons (excited), protons, neutrons and nuclei



Electrons (Stable)



Atom (electrons came under the influence of nucleus)



He



H₂



Matter

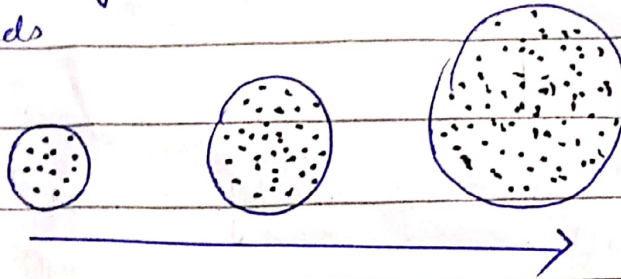


Universe.

ii-

Steady State Theory

It states that the matter is continuously created as the universe expands



iii-

Big Crunch Theory

It focuses on the re-collapsing of the universe.

iv- Cyclic Theory.

Universe undergoes endless cycles of expansion and cooling, each beginning with a big bang and ending in a big crunch.

Methods To Find The Age of Universe

To estimate the age of universe, scientists rely on two main methods

1- Calculating the expansion rate of the Universe.

This is done by using the

Hubble's constant.

Let us assume that universe is expanding at a constant speed. Hubble noted that the further a galaxy was, the faster it was moving. Scientists were then able to use Hubble Constant to estimate the age of the universe by working backward, all the way back to the Big Bang.

2. Determining the age of the oldest stars

Astronomers determine the age of stars by observing the spectrum, luminosity, mass and motion through the space. Blue stars have high energy and burn fuel easily while red stars have low energy. From this, they can determine how old a star is and how much longer it has to live.

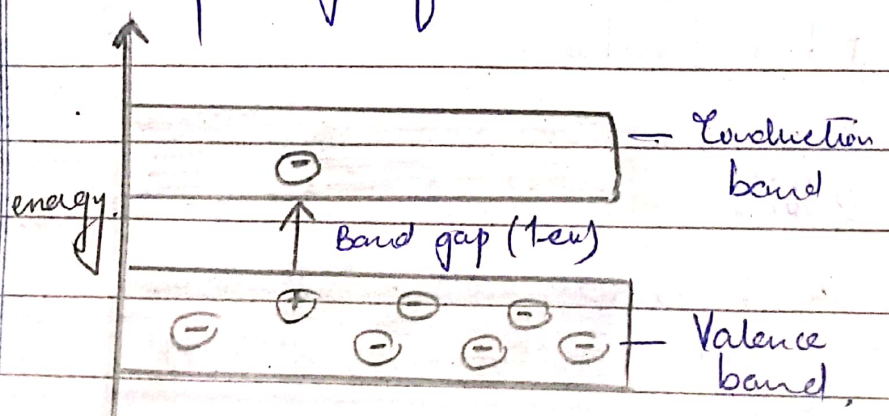
c. Write a short note on semi-conductors.

Answer:-

Semi-Conductors

Semi-conductors are the materials that possess the property of electrical conductivity less than conductors. The forbidden energy gap in semiconductor is small i.e, 1eV. Their conductivity is intermediate ranges from $10^{-7} - 10^{31}$ Ω/m . Similarly, their resistance is also moderate i.e, $10^{-5} - 10^5 \Omega/m$.

In semi conductors, the flow of current occurs due to the movement of electrons and holes. In addition, the temperature co-efficient of resistance is negative in semi-conductors. The conduction band and the valence band of semi-conductors are partially filled with electrons.



Semi-conductor

Examples:

- 1 - Silicon
- 2 - Germanium
- 3 - Arsenic.

Applications

They are used in

- a - Diodes
- b - Transistors
- c - Opt couplers.

d. What is eclipse? Distinguish between solar and lunar eclipse.

Answer:-

Eclipse:

The obscuring of one astronomical object by another is called eclipse.

Difference between Solar and Lunar eclipse:

Solar Eclipse

Lunar Eclipse

1- It occurs when the moon comes in between the earth and the sun resulting in the

The lunar eclipse is one in which the earth is between the sun and

Formation of shadow on the earth.

the moon.

2- It occurs once in a month.

It occurs twice a year.

3- It lasts for about 5-7 minutes.

It lasts for an hour.

4- It is witnessed in a few places.

It is witnessed in many places.

5- It occurs during day time.

It occurs during night time.

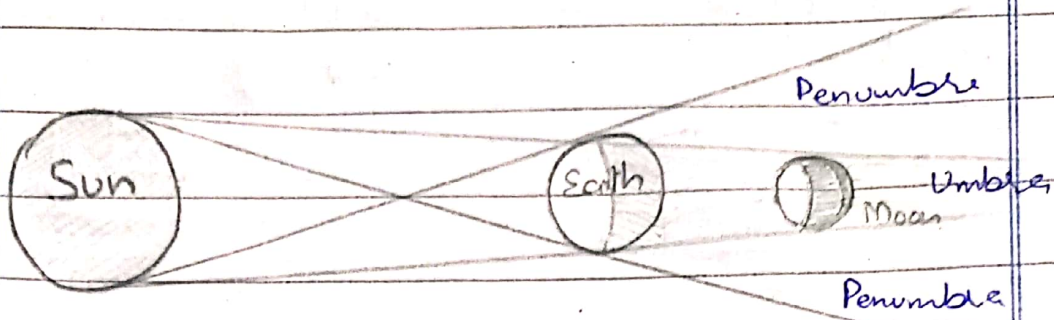
6- The solar eclipse happens in the new moon phase.

When the moon is in its full moon phase, a lunar eclipse happens.

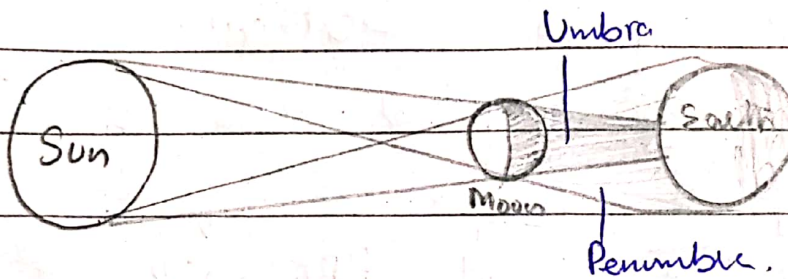
7- If directly seen through the naked eye, then there are high chances of losing vision, as it damages the retina.

Witnessing lunar eclipse with bare eyes is harmless as it does not cause any damage to the eyes.

Lunar Eclipse



Solar Eclipse



Section - II

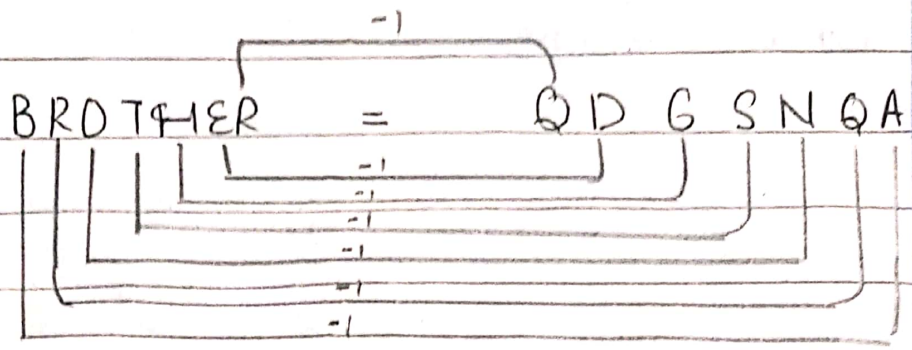
Question No. 8 :-

a. If in a certain language, BROTHER is written as QDGSNQA, then in the same language, SISTER would be written as: -

Answer:

BROTHER = QDGSNQA.

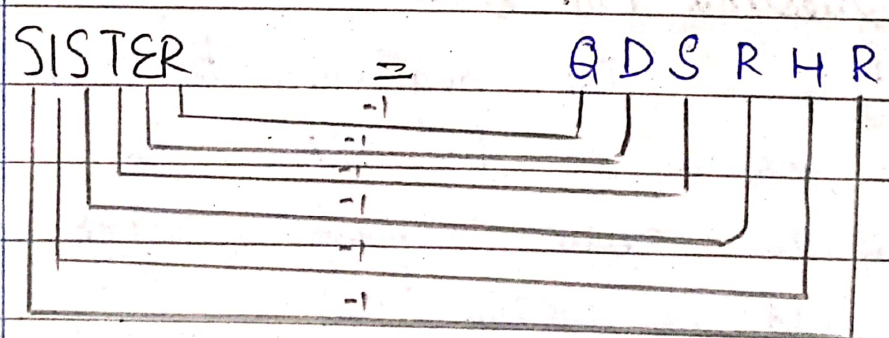
SISTER = ?



In language, a letter that comes first in the word BROTHER has to be compared to the last letter of the word in language QDGSNQA.

Moreover, the compared letter is always a previous letter of a letter in the word BROTHER.

So, for the word SISTER, the word in the language would be.



Thus

SISTER = QDSRHR / Answer

b- A card is drawn at random from a box containing 12 cards numbered 1, 2, 3, ..., 12. find the probability of drawing

i- even number.

ii - perfect square

iii - negative number

iv - a number less than 13.

Answer.

$$\text{Probability} = \frac{\text{no. of favourable outcomes}}{\text{Total no. of outcomes}}$$

i- Even number:

$$P = \frac{6}{12} = 0.5$$

$$P = 0.5 \quad \text{Ans}$$

ii- perfect square

$$P = \frac{4}{12} = 0.33$$

$$P = 0.33 \quad \text{Ans}$$

iii- Negative number.

$$P = \frac{0}{12} = 0$$

$$P = 0 \quad \text{Ans}$$

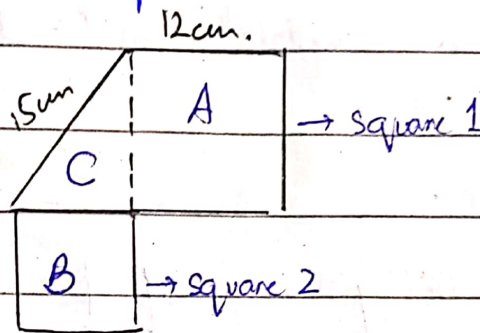
0.166
6 110
6
40
36
40

iv- A number less than 13

$$p = \frac{12}{12}$$

$p = 1$ Answer

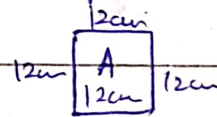
c- Calculate the total area and perimeter of the following shape.



Solution

1st calculate the area of square A.

$$A = \text{length} \times \text{length}$$
$$= 12\text{cm} \times 12\text{cm}$$



$$A = 144\text{cm}^2$$

Now calculate the area of triangle - for this we need to find the sides of triangle.

$$(\text{hyp})^2 = (\text{base})^2 + (\text{per})^2$$

$$(15\text{cm})^2 = (\text{base})^2 + (12\text{cm})^2$$

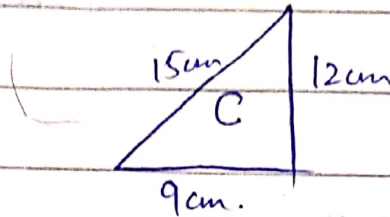
$$225 = (\text{base})^2 + 144$$

$$(\text{base})^2 = 225 - 144$$

$$\sqrt{(\text{base})^2} = \sqrt{81}$$

$$\boxed{\text{base} = 9 \text{ cm}}$$

Thus

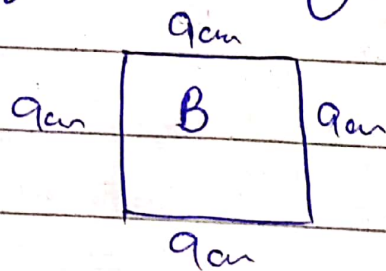


$$\text{Area of Triangle} = \frac{1}{2} \times \text{base} \times \text{height}$$

$$= \frac{1}{2} \times 9 \text{ cm} \times 12 \text{ cm}$$

$$\boxed{\text{Area of triangle} = 54 \text{ cm}^2}$$

Now find area of square B



$$\text{Area of square} = s^2$$

$$= 9 \text{ cm} \times 9 \text{ cm}$$

$$\boxed{\text{Area of square} = 81 \text{ cm}^2}$$

Now adding areas of A, B and C.

$$\begin{aligned} \text{Area of shape} &= A + B + C \\ &= 144\text{cm}^2 + 81\text{cm}^2 + 54\text{cm}^2 \end{aligned}$$

144
81
54
279

Area of shape = 279cm ²	Answer
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Now finding the perimeter

Perimeter of A

$$\begin{aligned} &12\text{cm} + 12\text{cm} + 12\text{cm} + 12\text{cm} \\ &= 48\text{cm} \end{aligned}$$

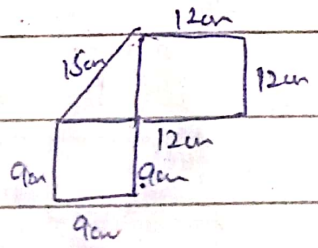
Perimeter of B

$$\begin{aligned} &9\text{cm} + 9\text{cm} + 9\text{cm} + 9\text{cm} \\ &= 36\text{cm} \end{aligned}$$

Perimeter of C

$$\begin{aligned} &15\text{cm} + 12\text{cm} + 9\text{cm} \\ &= 36\text{cm} \end{aligned}$$

Perimeter of the shape



$$\begin{aligned}
 &= 12\text{cm} + 12\text{cm} + 12\text{cm} + 15\text{cm} + 9\text{cm} + 9\text{cm} + 9\text{cm} \\
 &= 36\text{cm} + 15\text{cm} + 27\text{cm} \\
 &= 78\text{cm}
 \end{aligned}$$

$$\begin{array}{r}
 36 \\
 27 \\
 15 \\
 \hline
 78
 \end{array}$$

Thus

Perimeter of shape = 78cm

 Answer -

d. There are 9 students in a group having ages 15, 15, 16, 16, 16, 17, 17, 18, 19. Calculate the mean, median, mode and range of their ages. Also define the above mentioned terms.

Answer.

1- Mean :-

It is the measure of central tendency. It is found by adding all the numbers together and then dividing the sum of numbers by the number of number.

$$\text{Mean} = \frac{\text{Sum of ages of students}}{\text{Total no. of students}}$$

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

$$\text{Mean} = \frac{30 + 48 + 34 + 18 + 19}{9}$$

$$= \frac{149}{9}$$

$$\boxed{\text{Mean} = 16.5}$$

2 - Median

It is a statistical term used to represent the mid value in the arranged data.

15, 15, 16, 16, 16, 17, 17, 18, 19

$$\text{So } \boxed{\text{Median} = 16}$$

3 - Mode

A statistical term used to represent the most repeated value in the given data.

15, 15, 16, 16, 16, 17, 17, 18, 19

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$$\text{Mode} = 16$$

4. Range

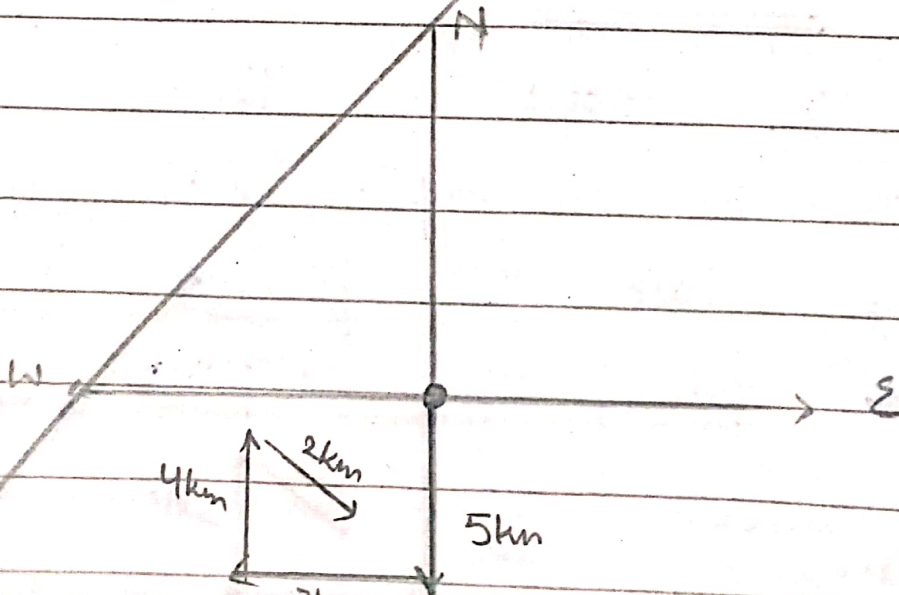
It is the difference of the maximum and minimum value in the given data.

$$\begin{aligned} \text{Range} &= \text{Maximum} - \text{Minimum} \\ &= 19 - 15 \end{aligned}$$

$$\text{Range} = 4$$

Question No. 7

c. A crow travels south 5km, and then 3km west, and then 4km north. Finally travel 2km south east. How far is the crow from the initial point.

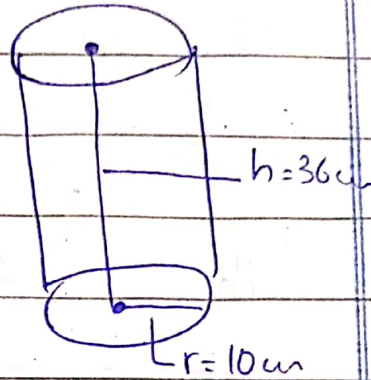


d. If the radius of the cylinder is 10cm and height is 36cm. Find the volume of cylinder.

Answer

$$\text{radius} = 10\text{cm}$$

$$\text{height} = 36\text{cm}$$



$$\text{Volume} = ?$$

$$\begin{aligned} \text{Volume of cylinder} &= \pi r^2 h \\ &= \frac{22}{7} (10)^2 \times 36\text{cm} \end{aligned}$$

$$= \frac{22}{7} \times 100 \times 36\text{cm}$$

$$V = 11314\text{cm}^3 \quad \text{Answer}$$

b. If 30 persons use 40kg of sugar in 10 days. Find in how many days 80 persons will use 320 kg of sugar?

Answer.

Persons	:	Sugar	:	Days
↓ 30	:	↑ 40kg	:	10 ↑
↓ 80	:	↑ 320kg	:	x ↑

$$\frac{x}{10} = \frac{30}{80} \times \frac{320}{40}$$

$$x = \frac{30}{80} \times \frac{320}{40} \times 10$$

x = 30 days | Answer.

a. A concert hall 400 seats of which 325 are occupied. Express the attendance as percent of capacity.

Answer.

Percent of capacity ^(x) = ?

$$x\% \text{ of } 400 = 325$$

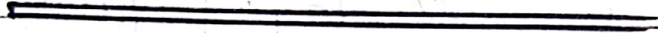
$$\frac{x}{100} \times 400 = 325$$

$$\pi = \frac{325 \times 100}{400}$$

$$\pi = \frac{325}{4}$$

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

So the hall is filled to 81.25% capacity.



$$x = \frac{325 \times 100}{400}$$

$$x = \frac{325}{4}$$

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

So the hall is filled to
81.25% capacity -
