

Dos and Don'ts for General Science & Ability Paper

Hi there, you've done well. Know that acquiring knowledge is one thing and reproducing it in paper according to what's asked is another. There are a few things I would like to highlight.

1. A 5 marks part requires at least 2 and at max 3 sides of a paper. Know that there can be two or three parts of a question and their marks are divided accordingly. So address all of them in a just manner.

2. Focus on time management. You get 35 minutes to solve one question and about 8 minutes per 5 mark part. Manage your time accordingly.

3. You need to understand that your paper is supposed to look more scientific than theoretical. So add flowcharts and diagrams where required.

4. Your handwriting and neatness can be really impactful. Avoid cutting and overwriting.

5. Focus on your spellings and your grammar. Here, in GSA there's no deduction in marks but your expression will definitely create an impact.

6. In ability portion, give explanation for analytical ability question in words. You need to understand that a 5 mark part requires all steps written and explained.

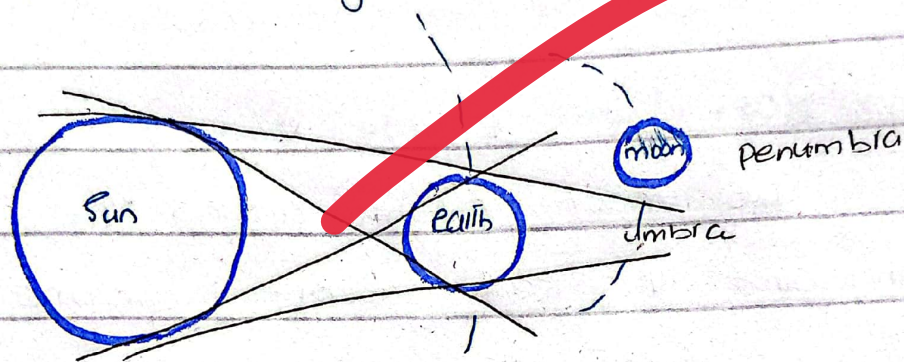
Good luck for CSS 2025. You're gonna rock in sha Allah. :)

Types of lunar eclipses

Lunar eclipses can be categorised into three types.

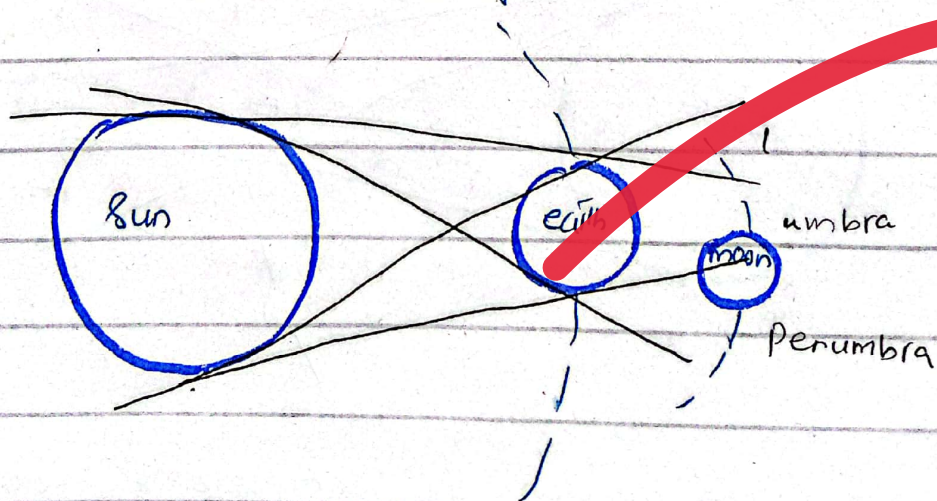
1) Penumbral Lunar eclipse

When the moon passes through the penumbral region of earth's shadow.



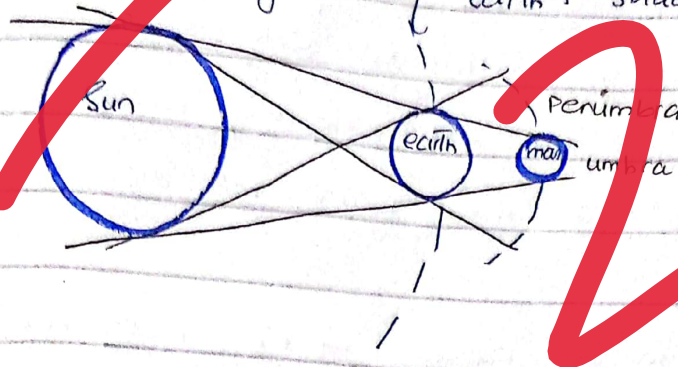
2) partial Lunar eclipse

When the moon is partly in umbral region and partly penumbral.



a) ~~Complete~~ Total Lunar Eclipse.

When the moon falls completely in the umbral region of earth's shadow.

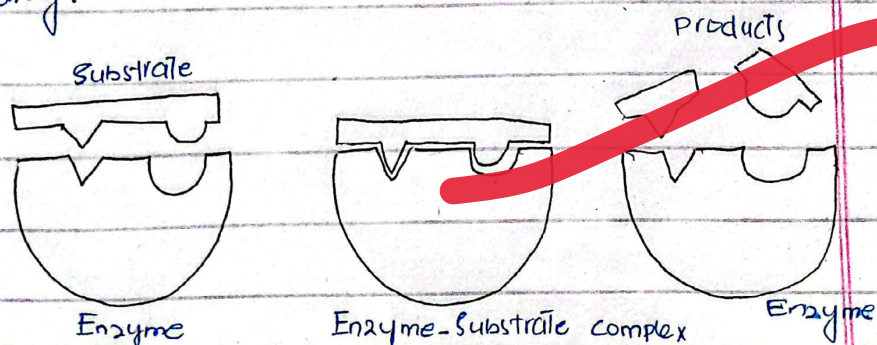


b) Explain the function of enzymes in details with examples

Enzymes are sophisticated organic compounds composed of amino acids that act as catalysts hence also called biocatalysts.

Structure of enzymes

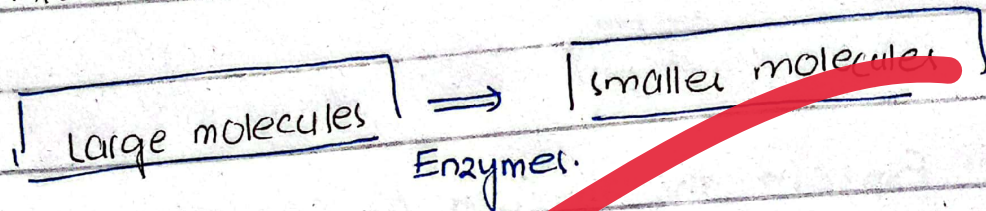
Enzymes catalyse selective reactions only.



Functions of Enzymes

As the name biocatalyst imply, they are catalysts in living organisms. Catalysts only speed up reactions, in this case bio-reactions and do not take part in them.

i) Aid in breakdown of large molecules into smaller ones.



Examples: Digestion, breathing.

ii) Take part in body movement such as muscle contraction

iii) Aid in blood clotting, healing of wounds, controlling hormone production of hormones.

Specific Enzymes and their functions

Lipase → digest fats in gut.

Amylase → in saliva - starch into sugars.

Maltase → maltose into glucose.

Trypsin → in small intestine - break protein into amino acids

Lactase → lactose into glucose and galactose

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(c) Give a brief account of electromagnetic radiations. What is EMR spectrum

Electromagnetic radiations are waves in the electromagnetic field that travel through space. They do not require a medium and thus can travel through a vacuum.

They are basically a energy form.

Examples of EMR

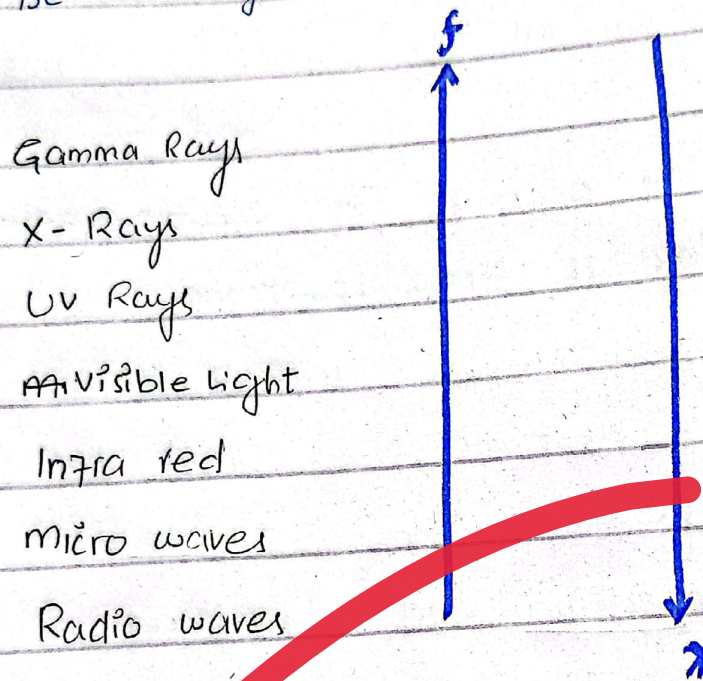
EMRs include :

- Radio waves
- microwaves
- X-rays
- Gamma rays
- visible light

The EMR Spectrum

It is a full range of electro-magnetic radiation organized by frequency and wavelength.

The mentioned types can be arranged as:

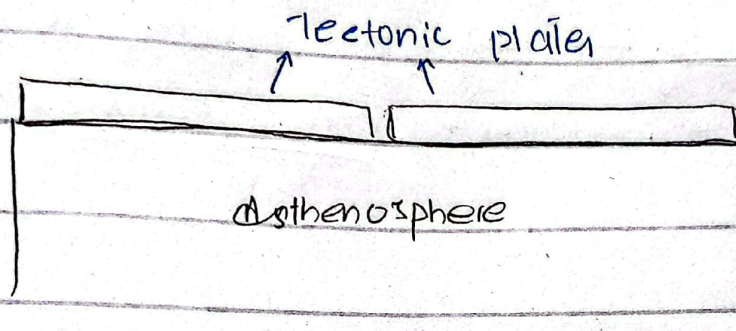


As visible:

- Gamma rays have highest frequency but lowest wavelength.
- Radio waves have lower frequency and longest wavelength.
- Visible light falls in the middle of the spectrum.

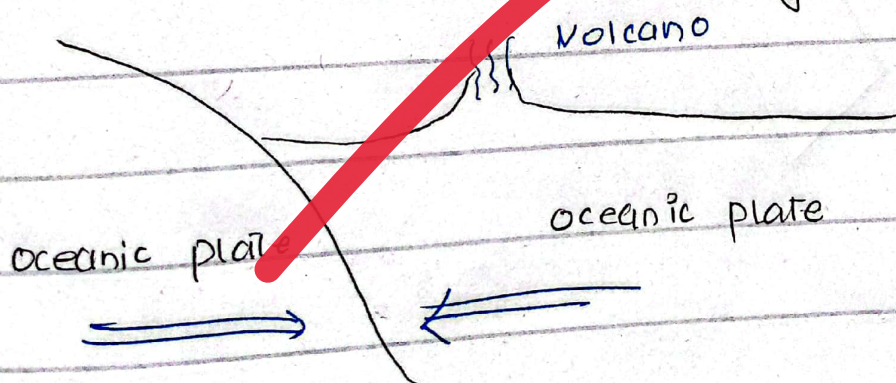
(d) Are earth quakes and volcanoes connected?

Yes, earth quakes and volcanoes are connected. It is because both are connected with the tectonic plates. There are large slabs floating above the earth's Asthenosphere.

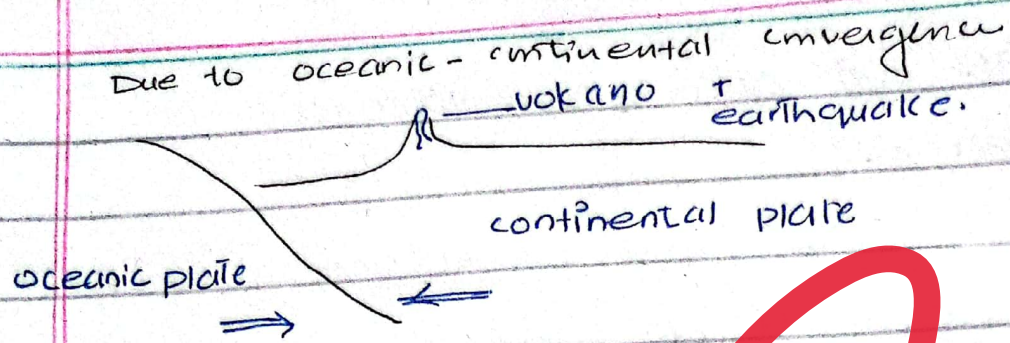


These plates move towards or away from each other. Their relative motion result in earthquakes or eruption and formation of volcanoes.

Due to oceanic - oceanic convergence

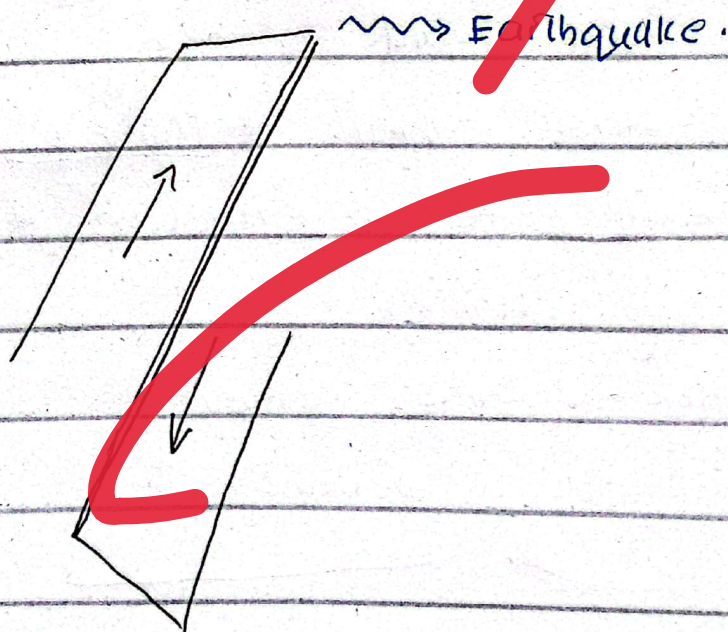


There also occur earth quaker.



Thus, through the plate convergences,
both the phenomena occur.

However, in case of transform
boundary — when two plates slide
past one another, only earthquakes
occur.



Q.4.

Q. What is noise pollution? Give its harmful effects and ways to curb.

Noise pollution is when there is unnecessary noise in the environment and the noise is to the point that it harms the human health.

A report backed by multiple ^{researcher} reports said that every 5 decibels increase in noise increases heart-related risks by 34%.

Harmful Effects of noise pollution

The following are the adverse effects of noise pollution.

- o Hypertension

noise pollution → elevated blood levels

- o Hearing loss

noise pollution → damage to eardrums

- o sleeping disorders

lack of sleep → fatigue, irritation

o Cardiovascular issues

noise pollution → heart-related issue →

probable death.

Nearly 40-45 patients of heart-related problems are admitted in Karachi only

prevention of noise pollution

o Banning unnecessary honking of vehicles.

o soundproof buildings especially hospitals, schools and residential areas.

o Alternatives in using explosives for mining.

o Reforestation and afforestation since plants absorb noise effects.

b) What is the importance of dietary fibers in diet? How would be a plate of food considered balanced.

Dietary fibers are the indigestible material in food. Its main role is to keep the digestive system healthy. Since it is mostly non-nutritional in value, it is also called roughage.

Importance of dietary fibres

It performs the following functions in the body.

- o Help manage weight loss

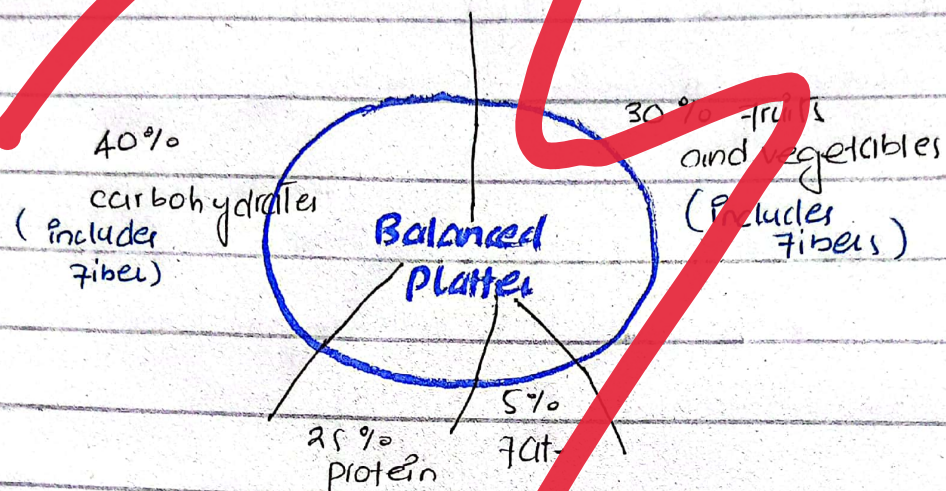
Fiber is filling → less need to eat → stays in the guts longer without being absorbed → weight loss.

- o Help reduce risk of heart disease and type 2 diabetes

→ absorb water → lower cholesterol levels → regulate blood sugar levels.

Adds bulk to the stool $\rightarrow$ prevents constipation, easy faecal movement.

A plate of balanced diet



c) Elaborate drinking water quality standards

Drinking water quality standards describes the quality parameters set for drinking water.

They vary from country to country.

Pakistan Environmental agency protection gave guidelines in 2008 in National Standards for Quality Drinking Water (NSQDW). Similarly, WHO set up Guideline for Drinking-water Quality (GDWG) in 1993.

Standard parameters for quality drinking water

The parameters include:

parameter	Pakistan standard	WHO standard
o E-Coli	must be undetectable	must be undetectable
o Taste	Acceptable	Acceptable
o chloride	$< 250 \text{ mg/L}$	$< 250 \text{ mg/L}$
o mercury	$< 0.001 \text{ mg/L}$	$< 0.001 \text{ mg/L}$

Safe drinking water in Pakistan

PCR WR, 2021 report (safe water %)

o 31% in country.

Islamabad $\rightarrow$ 71%

Lahore $\rightarrow$ 69%

Peshawar $\rightarrow$ 50%

Quetta $\rightarrow$ 35%

Karachi $\rightarrow$ 71%

Recommendations to maintain standards of Quality Drinking water (NSQDW):

- o Standard examination of water

- o public awareness

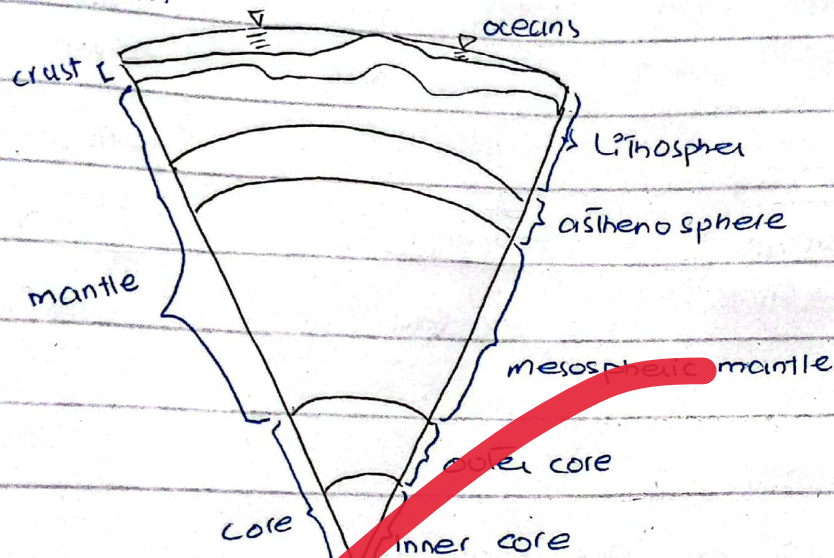
- o Low cost measures — cheaper water to poorer households

- o Increased water quality and quantity in water scarce areas such as Balochistan and western Sindh.

- o Contingency plans for water access after disasters such as floods.

Q. Explain Lithosphere. What are rocks and minerals

Lithosphere is the mechanical part of the earth based on physical properties such as rheology into the earth.

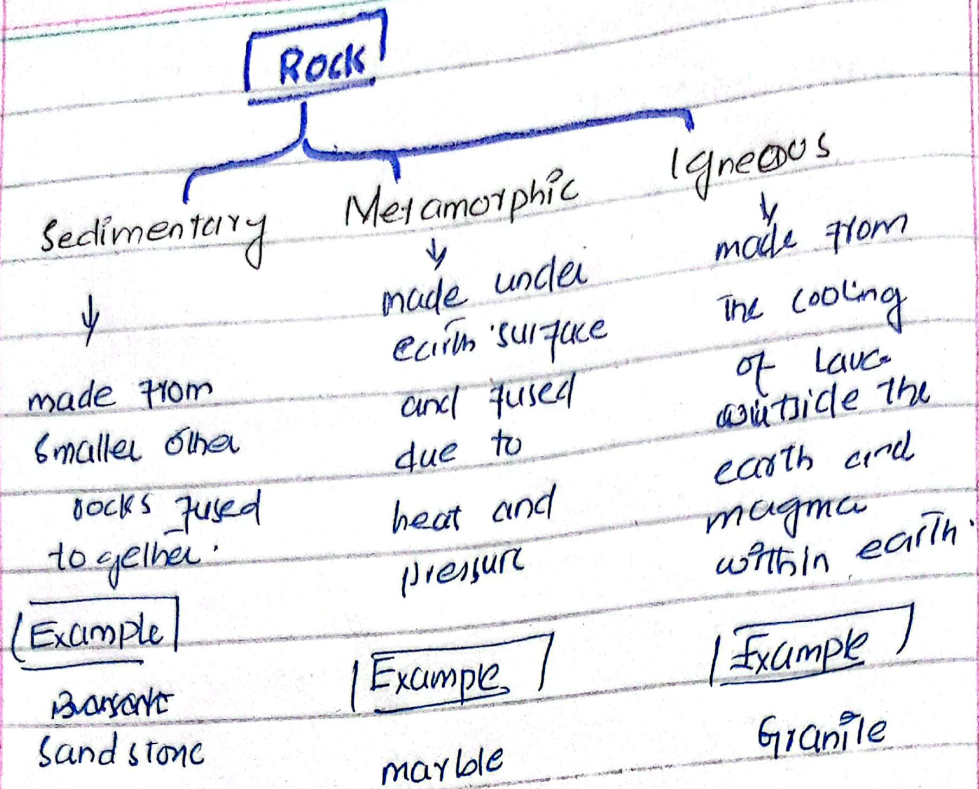


As can be seen from the diagram, Lithosphere is upper mantle and crust together.

The Lithosphere comprises rocks and minerals.

Rocks

Rocks are naturally occurring material comprising one or more minerals.



minerals

minerals are naturally occurring inorganic solids that have crystalline structures and definite chemical composition.

98% of minerals are made from eight elements:

magnesium, Iron, Silicon, Oxygen, calcium, Aluminium, Sodium and potassium.

Examples

Quartz, Diamond, Gypsum.

SECTION-B

Q.6

(a) Determine 'K'.

Given numbers

9, 8, 10, K, 12

Arithmetic mean. = 15

As,

$$AM = \frac{\text{No. sum of observations}}{\text{No. of observations}}$$

$$15 = \frac{9 + 8 + K + 10 + 12}{5}$$

$$39 + K = 15(5)$$

$$K = 75 - 39$$

$$\boxed{K = 35}$$

(b) Initial quantity of sugar solution

Ratio of sugar^{sol} and colored water

= 4 : 3

With the addition of 10 L of colored water, the new ratio is

4 : 5

Let the quantity of sugar^{sol} be x and that of water be y.

$$\Rightarrow x : y = 4 : 3$$

$$\frac{x}{y} = \frac{4}{3} \quad \text{--- (1)}$$

After addition of 10 L colored water

$$\frac{x}{y+10} = \frac{4}{5} \quad \text{--- (2)}$$

From eq (1) we get

$$x = \frac{4y}{3} \quad \text{--- (3)}$$

putting eq (3) in (2).

$$\frac{4y}{3(y+10)} = \frac{4}{5}$$

$$20y = 12(y+10)$$

$$20y = 12y + 120$$

$$8y = 120$$

$$y = 15$$

putting y in eq (3)

$$x = \frac{4(15)}{3}$$

$$x = 20$$

Thus, the initial quantity of sugar solution was 20 L.

c) volume of a football

Radius of football = 12 cm = r

The volume of a sphere = $\frac{4}{3} \pi r^3$

Substituting r,

Volume of the football is:

$$\frac{4}{3} \pi (12)^3$$

$$= \frac{4}{3} \pi (1728)$$

$$= 2304 \pi \text{ cm}^3$$

or

taking π at 3.14

$$= 7234.56 \text{ cm}^3$$

d) missing number in the series

-10, -8, 6, 40, 102, ?

The series is such that the difference of the differences has an increment of 8.

$$\begin{array}{ccccccc} & 2 & 14 & 34 & 62 & \Rightarrow 62 + 36 = 98 \\ \hline -10 & -8 & 6 & 40 & 102 & & \\ \hline & 12 & 20 & 28 & \Rightarrow 36 & & \end{array}$$

Thus the missing number is $102 + 98$
 $= 200$

Q7.

(a) value of $y\%$ of 20 in terms of x

Given

$$20\% \text{ of } x = y \rightarrow y = 0.2x$$

$$\therefore y\% \text{ of } 20$$

substituting y with x

$$(0.2x)\% \text{ of } 20.$$

$$= \frac{0.2x}{100} \times 20$$

$$= \frac{4x}{100}$$

$$\therefore y\% \text{ of } 20 \text{ in terms of } x$$

$$= \boxed{\frac{4x}{100}} \text{ or } \boxed{0.04x}$$

(b) Find the monthly salary of P

Given

$$\text{Average salary of P and Q} = \text{Rs } 5050$$

$$\Rightarrow \frac{P+Q}{2} = 5050 \rightarrow (1)$$

$$P+Q = \text{Rs } 10100 \rightarrow (1)$$

$$\text{Average salary of Q and R} = \text{Rs } 6250$$

$$\Rightarrow \frac{Q+R}{2} = 6250$$

$$Q+R = \text{Rs } 12500 \rightarrow (2)$$

Average salary of P and R = Rs 5200

$$\frac{P+R}{2} = 5200$$

$$P+R = \text{Rs } 10,400 \text{ --- (3)}$$

from eq (1)

$$R = 10,100 - P \text{ --- (4)}$$

putting eq (4) in eq (2)

$$10,100 - P + R = 12500$$

$$-P + R = 2400 \text{ --- (5)}$$

Adding eq (3) and (5)

$$2R = 12500$$

$$R = \text{Rs } 6400 \text{ --- (6)}$$

putting eq (6) in eq (3)

$$P + 6,400 = 10,400$$

$$P = 4000$$

Thus, The monthly salary of P is

$$\boxed{\text{Rs } 4000}$$

c. probability of each event to occur

Given

Two coins tossed 500 times.

Events

Two heads = 105 times
One head = 275 times
No head = 120 times.

probability = $\frac{\text{Number of favorable outcomes}}{\text{Total number of favorable outcomes}}$

$$P(\text{Two head}) = \frac{105}{500} = \frac{21}{100} = \boxed{0.21 \text{ or } 21\%}$$

$$p(\text{one head}) = \frac{275}{500} = \frac{55}{100} = \boxed{0.55 \text{ or } 55\%}$$

$$p(\text{no head}) = \frac{120}{500} = \frac{24}{100} = \boxed{0.24 \text{ or } 24\%}$$

..

(d) sum of Jamie's age now and Jamie's dad's age now

Given

Jamies Dad = 4 x Jamie

let Jamie's dad's age = x

and Jamie's age = y

$\Rightarrow x = 4y$ — (1)

In 14 years

$$x + 14 = (y + 14) 2$$

$$x + 14 = 2y + 28$$

$$x - 2y = 14 \quad \text{--- (2)}$$

Adding eq (1) and eq (2)

$$x + 4y - 2y = 14$$

$$2y = 14$$

$$y = 7$$

$$\text{and } x = 4y = 4 \times 7 = 28$$

Thus the ages are

$$\text{Jamie} = \underline{7 \text{ years}}$$

$$\text{Jamie's dad} = \underline{28 \text{ years}}$$