

Dos and Don'ts for the General Science & Ability Paper
Hi there — you've prepared well! Remember, knowing the content is one thing, but presenting it in the paper exactly as required is another. Here are a few key points to keep in mind:

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1. For a 5-mark part, aim to write at least 2 and at most 3 sides of the answer sheet. Often, a question has two or three parts, and the marks are divided accordingly — so address each part fairly.

2. Manage your time wisely — you have about 35 minutes per full question, which comes down to around 8 minutes for each 5-mark part. Stick to this to avoid rushing later.

3. Make your answers look scientific, not just theoretical. Use flowcharts and diagrams wherever they add clarity.

4. Neatness matters — keep your handwriting clean, avoid cutting or overwriting.

5. Mind your spelling and grammar — while GSA doesn't deduct marks for these, your expression leaves an impression.

6. In the ability portion, explain analytical ability questions in words. For a 5-mark part, show all steps and provide clear explanations.

Here's a brief key/sample of your Ability questions

Q.6 ⇒ Mitochondria in Human Cell

a) Candy ratio problem

Given: Packets in flavors Apple : Berry : Cherry : Date = 3 : 6 : 2 : 5.

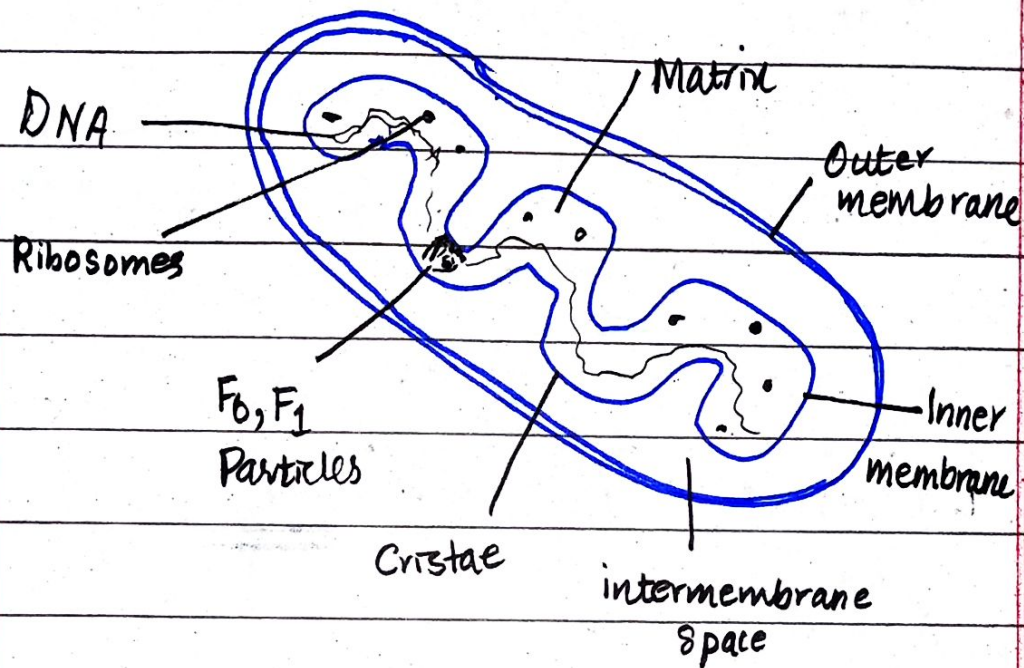
Asked: If Apple candies exceed Date candies by 35, how many Berry candies are there?

Note (consistency check): The ratio shows Apple = 3 parts

— 1 — 1 — 30

→ Structure of Mitochondria:

→ Mitochondria are bounded by two membranes: outer and inner, and between them is intermembrane space.



→ Inner membrane forms many infoldings called cristae.

→ Cristae contains small knob like structures called F₁ particles.

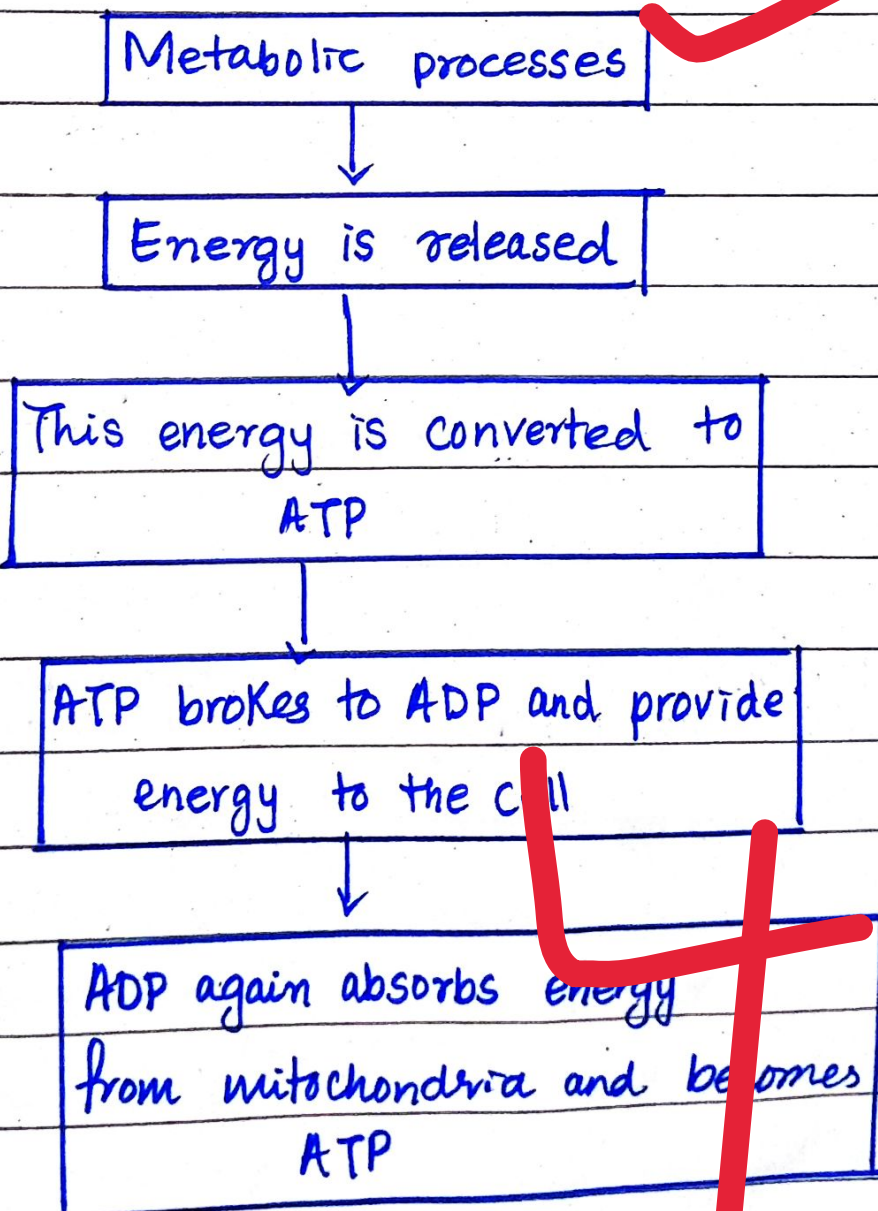
→ Functions of Mitochondria:

Mitochondria performs very important functions in the body

1) Important metabolic processes like Krebs cycle, aerobic respiration, fatty

acid metabolism takes place in Mitochondria.

- These processes release energy which is transferred to energy rich compounds ATP
- ATP provides energy to cell on demand and breaks to ADP.
- ADP absorbed energy from mitochondria and again becomes ATP.

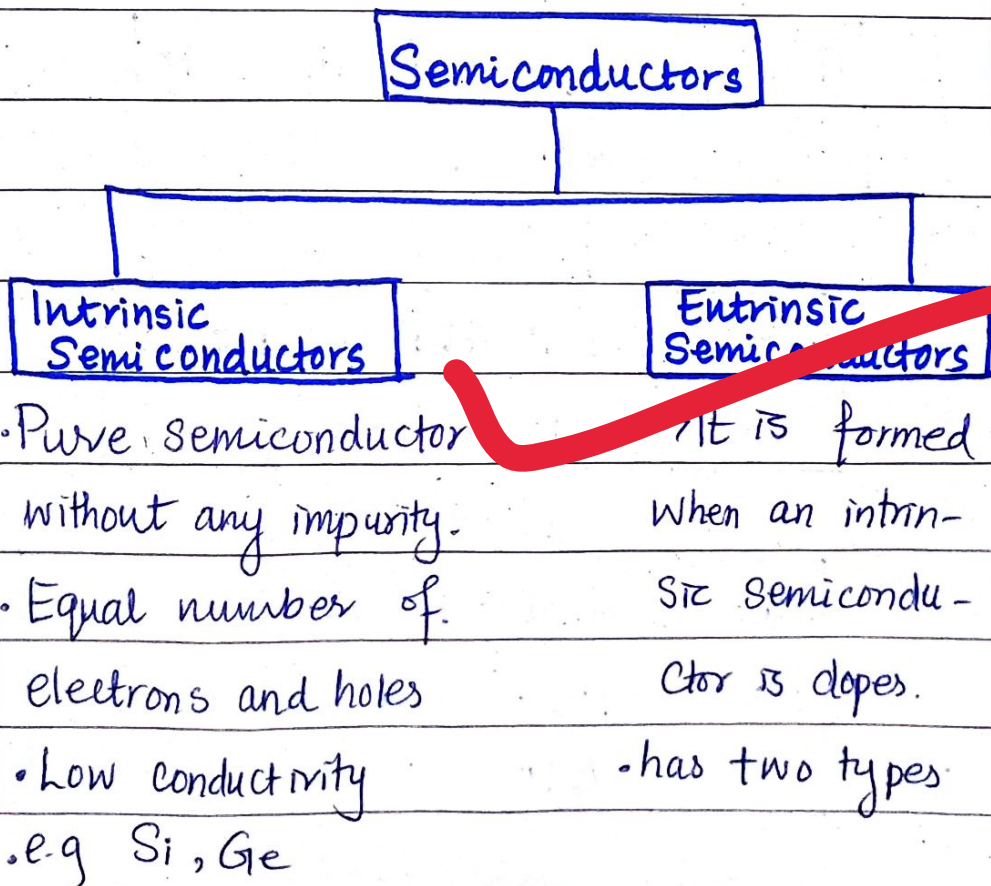


b. DOPING:

Doping is the process of adding small amount of impurities to a pure semi-conductor to change its electrical conductivity.

→ Doping is done for;

- 1) To increase the number of free electrons or ions.
- 2) To control conductivity and make semiconductors usable in transistors, ICs etc.



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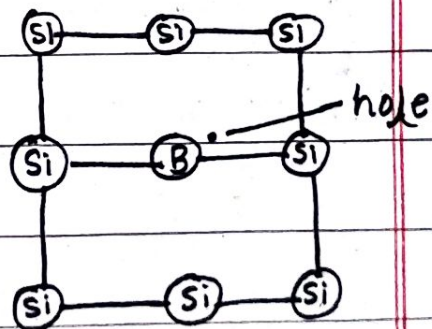
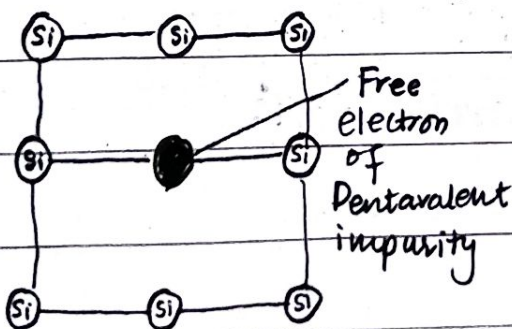
Extrinsic Semiconductor

N-Type Semiconductor

- Doped with a pentavalent impurity
- 4 electrons bond with Si atoms, 5th becomes free.
- Majority carriers are electrons
- Minority carriers are holes
- Negative charge dominates

P-Type Semiconductor

- Doped with a trivalent impurity
- 3 electrons bond with silicon atoms, one remain vacant.
- Majority carriers are holes
- Electrons are minority carriers
- Positive charge dominates.



1-1-20

6. c. Merits and Demerits of Volcanic Eruption

Volcanic Eruption:

A volcanic eruption is a sudden release of magma, gases, and ash from beneath the Earth's crust through an opening called a volcano.

When the pressure inside the earth becomes too high, the magma forces its way up and erupts on to the surface, becoming lava.

It has some merits and demerits too.

MERITS OF VOLCANIC ERUPTION

i) Formation of Fertile Soil:

Volcanic ash and lava break down to form rich, mineral soils that are excellent for farming.

ii) Mineral Resources:

Volcanoes bring valuable minerals like copper, gold, and diamond closer to the surface.

iii) Production of Geothermal Energy:

Heat from volcanic activity can be used to produce clean energy

iv) Tourism:

Volcanic landscapes attracts tourism, boosting local economies.

DEMERITS OF VOLCANIC ERUPTION

i) Loss of life and property:

Explosive eruptions can destroy towns and kill people.

ii) Cause of air pollution:

Ash and gases pollute the air, causing breathing problems and acid rain.

iii) Climate impact: Global Cooling:

Volcanic gases can block sunlight, causing global cooling.

iv) Destruction of Vegetation:

Lava and ash bury crops and forests.

v) Displacement of people

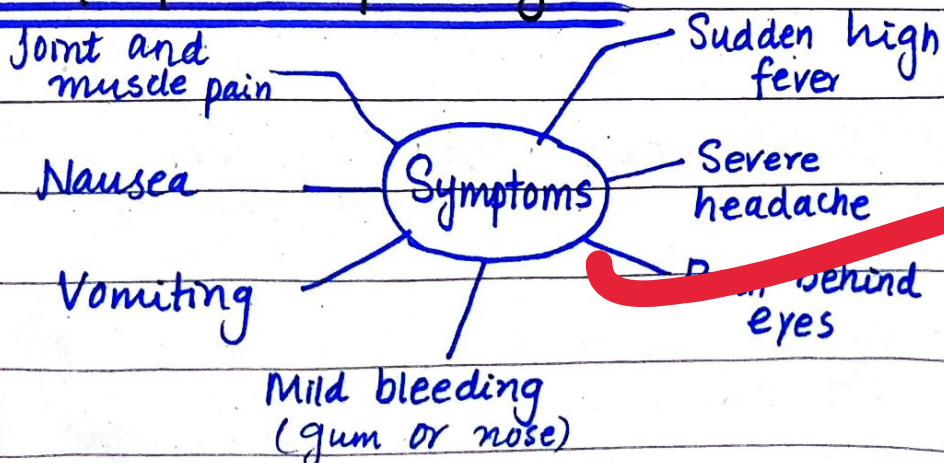
Populations near volcanoes often have to relocate permanently.

d. DENGUE

Dengue is a viral disease transmitted to humans through the bite of infected female *Aedes aegypti* mosquitoes.

→ It is also known as "breakbone fever" because of severe joint and muscle pain it causes.

Symptoms of Dengue:



Causative Agents:

- The disease is caused by Dengue Virus (DENV)
- There are four different strains of the virus:

→ DENV-1

→ DENV-2

→ DENV-3

→ DENV-4

Remedies: Treatment and Prevention.

There is no specific antiviral cure for dengue, but symptoms can be managed-

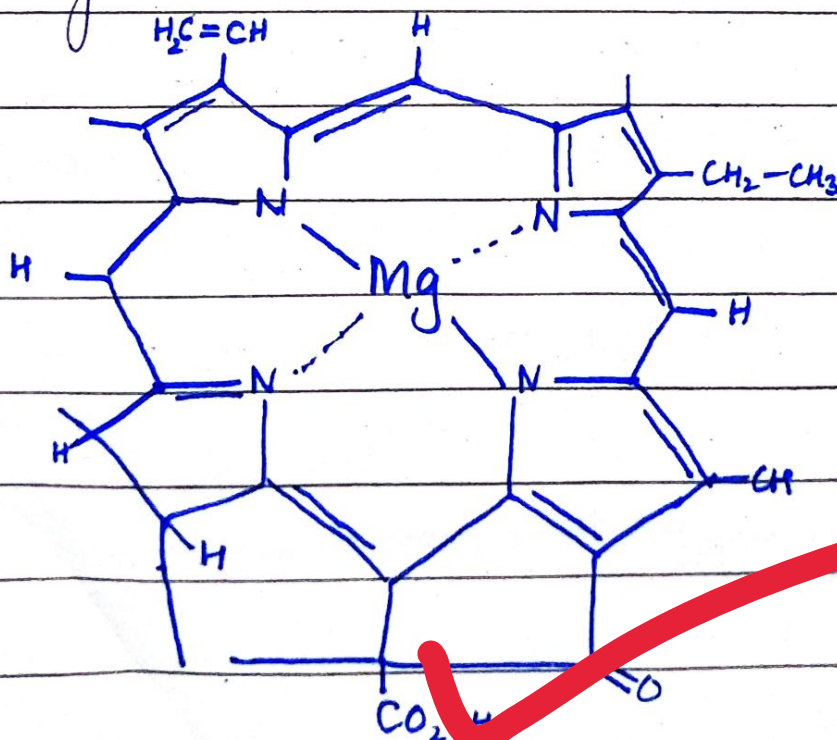
- 1) Drink plenty of fluid to prevent dehydration.
- 2) Use paracetamol for fever and pain.
- 3) Eliminate mosquito breeding sites
- 4) Wear long sleeve ~~clothes~~
- 5) Use mosquito repellants & nets.

QUESTION # 04

a. Chlorophyll:

- It is a green pigment found in chloroplast of plant cells.
- It plays a major role in photosynthesis by trapping sunlight.
- Chemical composition:

- It is an organic compound made of carbon, hydrogen, oxygen, nitrogen, and magnesium.
- It has porphyrin ring with a central magnesium atom, which gives it its green color.



Chlorophyll
b

Accessory
pigment—
helps absorb
extra light

Chlorophyll

Chlorophyll
c, d, e

Help in capturing
light at different λ .

Chlorophyll
a

• ~~Maintain~~
pigment in
photosynthesis

Functions of Chlorophyll:

- 1) Absorbs sunlight and ~~reflects~~
green light.
- 2) Converts light energy into chemical
energy.
- 3) Passes absorbed energy to other
molecules to produce glucose, which
serves as food for the plant.

b. Ribosomes:

Ribosomes are small, round,
non-membranous organelles found
in all living cells.

They are also known as 'protein factories' because they are the site of protein synthesis.

Process of Protein formation:

Protein formation occurs in two steps;

- 1) Transcription
- 2) Translation.

In 2nd, Ribosomes play their role.

- i. **Initiation** → Small subunit of the ribosome binds to mRNA.
- tRNA carrying the amino acid methionine (AUG) starts codon binds to ribosome.
 - large subunit then joins to form a complete ribosome.

- ii. **Elongation** → Ribosomes move along the mRNA codon by

- Each codon on mRNA matches with an anticodon on tRNA.
- Ribosomes help form peptide bonds between amino acids $\rightarrow$ forming a polypeptide chain.

iii. **Termination** → When the ribosome reaches a stop codon (UAA, UAG, UGA), it releases a completed protein.

- The ribosome then detaches from mRNA and separate into its subunits.

c. Solid Waste Management:

Solid Waste management refers to the systematic control, collection, treatment, and disposal of solid wastes in an environmentally friendly

economical manner.

i- Open Dumping

- ^{Waste} Water is dumped in open areas or landfills without any treatment.
- Simple and cheap method.
- Causes foul smell, pollution, and diseases

ii. Landfilling:

- Waste is buried in a properly pit or trench.
- Cost effective and can be used to reclaim low-lying land.
- Can cause groundwater contamination.

iii. Incineration:

- Waste are burned at higher temperatures, reducing them to ash.
- Can generate energy
- Can release ~~or~~ harmful gases if not managed properly.

iv. Composting:

- Biological decomposition of organic waste into nutrient rich compost.
- Eco-friendly and inexpensive.
- Not suitable for inorganic waste.

d. Define the following terms:

i) Biofuel:

It is a type of fuel produced from biological sources e.g plants, animal wastes.

For example, Ethanol, biodiesel.

ii) Adulteration:

It is the process of adding inferior, harmful, or cheaper substances to food to increase profit.

For example mixing water in milk.

iii) Hydrosphere:

It includes all the water present

on earth's surface, underground,
and in the atmosphere.

e.g. Oceans, river, glaciers, lakes etc

iv) Troposphere:

It is the lowest layer of the
earth's atmosphere, where all
weather phenomena occurs.

v) Isotopes:

Isotopes are atoms of the same
element that have same proton
number but different Neutron
number (Atomic mass).

e.g. ^1_1H Hydrogen has 3
isotopes:

→ Protium ^1_1H

→ Deuterium ^2_1H

→ Tritium ^3_1H

SECTION-II

QUESTION # 06

a. Given data:

Candies = Apple, Berry, Cherry, Date

$$\text{Ratio} = 3 : 6 : 2 : 5$$

If apple candies exceed Date candies by 35, how many Berry candies are there?

$$\text{As } \text{Apple} - \text{Date} = 35$$

$$3n - 5n = 35$$

$$-2n = 35$$

$$n = -17.5$$

Now the total ratio becomes

$$A : B : C : D$$

$$5 : 6 : 2 : 3$$

$$5n - 3n = 2n = 35 \quad n = 17.5$$

$$\text{Berry} = 6n = 6 \times 17.5 = 105$$

So, the berry candies = 105

⑧
1/1/2020
b. Given Data:

Price of Camera = \$200

Discount = 25%

Tax = 6%

Total amount to be paid:

At first we have to find the price after discount. So,

25% of 200 = ?

$$\frac{25}{100} \times 200 = 50$$

It's mean the price will be:

$$200 - 50 = 150 \$$$

As, there is 6% tax, So we have to find 6% of 150-

6% of 150 =

$$\frac{6}{100} \times 150 = \frac{90}{10} = 9$$

So,

Total Price = Discounted price + Tax

$$= \$150 + \$9$$

Total price = \$159

c. Given Data:

Total distance covered = 36 Km

Speed = 18 Km/hr

Starting time = 1:00 PM

Time does it reach = ?

As we know that;

~~Velocity = Dist~~

Distance = Velocity $\times$ Time

$$S = vt$$

$$t = \frac{S}{v}$$

$$t = \frac{36 \text{ Km}}{18 \text{ Km/hr}}$$

$$t = 2 \text{ hr}$$

So, if the starting time was 1 PM

then, it would have reached by

3 PM as it took 2 hours

$$\text{So, } 1 \text{ PM} + 2 \text{ hrs} = 3 \text{ PM}$$

d. i. STSTATCITS = STATISTICS

ii. LGEBMAR = GAMBLER

QUESTION # 07

i) Given Data:

$$\text{Diameter} = 14\text{cm}$$

$$\text{Volume} = ?$$

As we know that

$$V_{\text{sphere}} = \frac{4}{3} \pi r^3$$

$$V = \frac{4}{3} \pi \left(\frac{d}{2}\right)^3 \quad \because r = \frac{d}{2}$$

$$V = \frac{4}{3} \times \frac{22}{7} \left(\frac{14}{2}\right)^3$$

$$V = \frac{4}{3} \times \frac{22}{7} (7)^3$$

$$V = \frac{4}{3} \times \frac{22}{7} (343)$$

$$V = \frac{4}{3} \times 22 (49)$$

$$V = \frac{4}{3} \times 1078$$

$$V = 1437.33 \text{ cm}^3$$

$$\begin{array}{r} 49 \\ 7 \overline{) 343} \\ \underline{28} \\ 63 \end{array}$$

$$\begin{array}{r} 49 \\ 7 \overline{) 343} \\ \underline{28} \\ 63 \end{array}$$

$$49 \times 22$$

$$\begin{array}{r} 98 \\ 98 \times \\ \hline 1078 \end{array}$$

$$\begin{array}{r} 343 \\ 3 \overline{) 1078} \\ \underline{9} \\ 178 \\ \underline{15} \\ 28 \\ \underline{27} \\ 1 \end{array}$$

b. Five friends total savings

= 25000.

Total Savings = 25000.

Total Ratio = ~~1:2~~ 1:5

Share of 1st friend = $\frac{25000}{15} \times 1$

= 1667

of 2nd friend = $\frac{25000 \times 2}{15}$

= $\frac{50000}{15}$ = 3333

of 3rd friend = $\frac{25000}{15} \times 3$

= 5000

of 4th friend = $\frac{25000}{15} \times 4$

= ~~5000~~ ~~8333~~ 6667

of 5th friend = $\frac{25000}{15} \times 5$

= ~~10000~~ 8333.

The Smallest Share is of 1st

friend = 1667 Rs.

$$\begin{array}{r} 16 \\ 15 \overline{) 25000} \\ \underline{15} \\ 10000 \\ \underline{90} \\ 1000 \end{array}$$

c. i. 2, 6, 18, 54, 162, 486

All the numbers fit in this because every next number is multiplied by 3.

1) 2

2) $6 = 2 \times 3$

3) $18 = 6 \times 3$

4) $54 = 18 \times 3$

5) $162 = 54 \times 3$

6) $486 = 162 \times 3$

ii. 3, 5, 7, 11, 13, —

The next number will be 17 as this is the sequence of prime numbers and 17 is the next prime number.

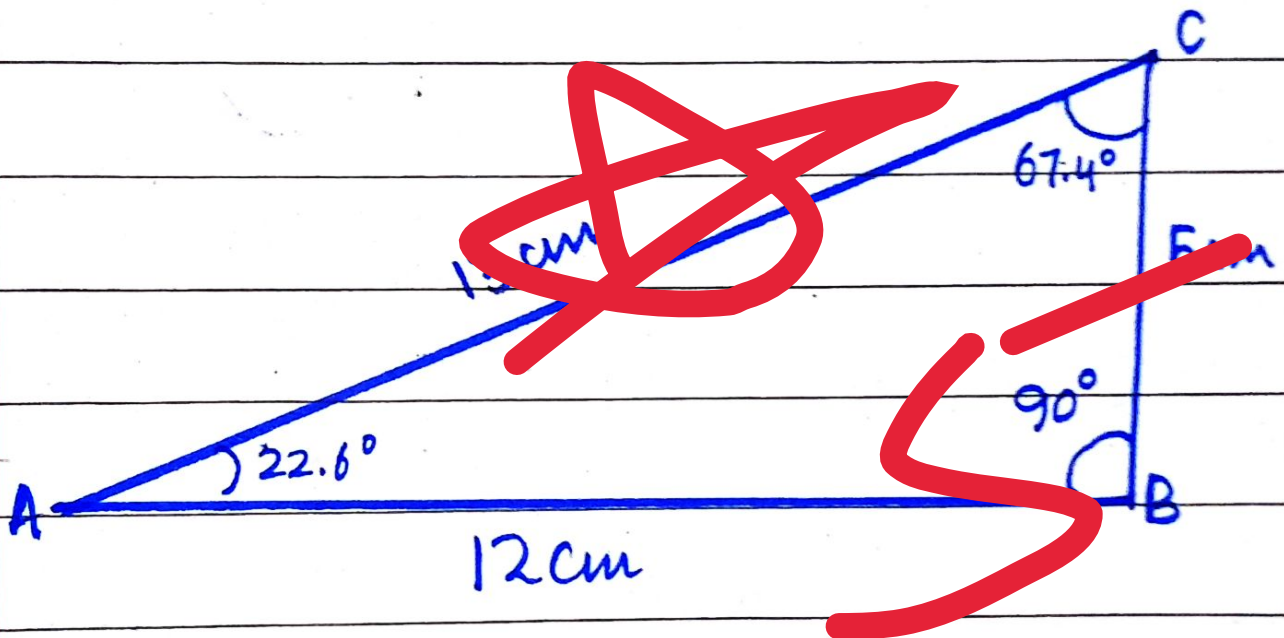
d. Angles.

Side 1 = 12cm

Side 2 = 13cm

Side 3 = 5cm

Let's draw a $\triangle$.



Base = $AB = 12\text{cm}$ $\angle AC = 22.6^\circ$

Perpendicular = $BC = 5\text{cm}$ $\angle AB = 90^\circ$

Hypotenuse = AC $\angle BC = 67.4^\circ$

$$67.4^\circ + 22.6^\circ + 90^\circ = 180^\circ$$