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PART-I

SECTION-I

QUESTION NO:02

PART A:

GLOBAL WARMING:

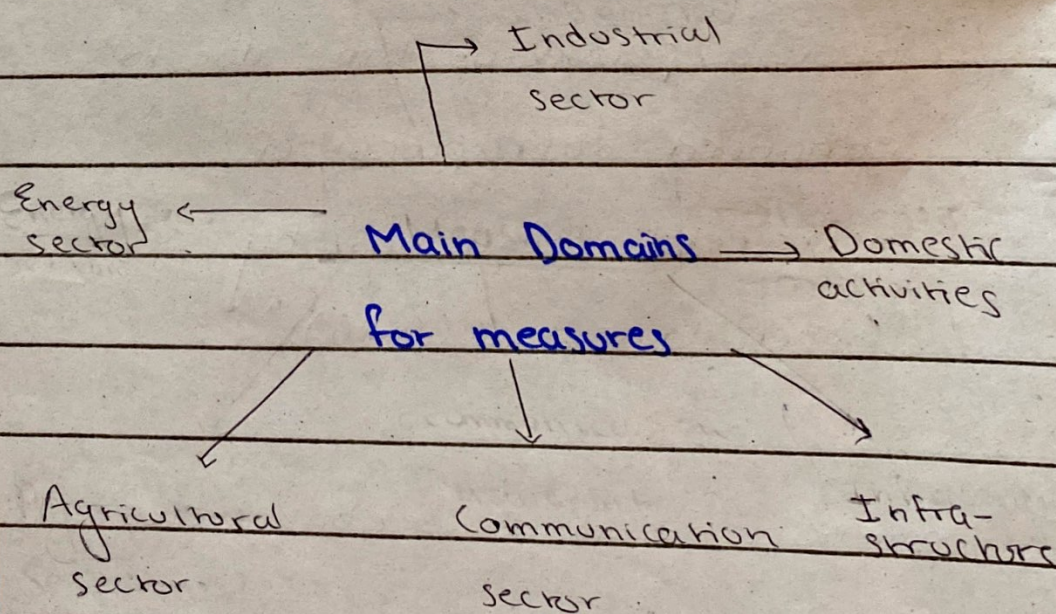
Global warming phenomena can be defined as,

"As An increase in temperature over a period of time due to enhanced entrapment of infrared radiations by Green House Gas (GHG)."

This phenomena is exacerbated due to anthropogenic activities

MEASURES TO BE TAKEN IN COP29 TO COUNTER GLOBAL WARMING ::

The episode of global warming is hitting the developed and least developed countries the most. Despite less contribution in emission of CO₂, an accelerated affect is faced by developing countries. To counter this affect, several measures can be adopted in COP29.



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① Renewable Energy sector:

Main shift towards renewable energy sector & should be done to decrease \uparrow emission of CO_2 and other GHGs in fossil fuel burning.

Example:

Hydropower, solar energy, wind power,

② Agricultural sector transformation:

Agricultural activities including cultivation of certain crops releases CH_4 . Such activities should be replaced by climate friendly agricultural policies.

Example:

Climate resilient seeds, and climate friendly cash crops should be cultivated.

③ Communication Sector transformation:

Combustion of fossil fuel in cars releases a huge amount of CO_2 in atmosphere. To encounter this climate friendly communication should be adopted.

Example:

- (i) Electric vehicles should be used to overcome combustion of fossil fuels
- (ii) Catalytic converters should be used in cars to decrease NO_2 emission in atmosphere.

④ Climate resilient infrastructure:

Urbanisation should be planned in such a way that climate change related disasters are kept in mind

Example:

- (i) Buildings resilient to climate disaster.
- (ii) Plantation to decrease CO_2 in atmosphere

⑤ Environment friendly domestic activities:

Domestic activities should include the "3R strategy"; recycle, reuse and reduce consumption.

Example:

- (i) Domestic waste segregated into recycling and non recycling parts.
- (ii) Products should be reused and consumption should be reduced.

⑥ Industrial sector:

Production in industrial sector is also one of main production and emission of CO_2 into atmosphere. Combustion of fossil fuels in industrial sector. Emission should be decreased.

Example:

- (i) Decrease production of products which involves an increase amount of fossil fuel production.

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(ii) Carbon trading with other countries
to balance out total carbon emission.

Above sectors of the developing countries can be transformed by the policy adoption and fund mobilisation at COP29. This will assist the developing countries to counter the phenomena of global warming affecting the least developed countries the most.

PART (B):

CIRCULATORY SYSTEM OF BODY:

Circulatory system of body can be defined as,

"Close net

capillaries, veins and

organs involved in circulation

of blood throughout the

body for proper functioning."

Artries veins and capillaries

constitute a major portion of the

circulatory system of the body,

involved in transportation of blood

and fluids

FUNCTIONS OF ARTRIES, VEINS AND CAPILLARIES:

① Function of arties:

Artries are thick layered vessels
which are involved in:

(i) Transportation of oxygenated
blood from the heart towards
organ

(ii) Exception of pulmonary artery which transport deoxygenated blood from heart towards lung for oxygenation.

② Function of veins:

Veins are thick layered vessels which includes valves and are involved in:

(i) Transportation of de-oxygenated blood from organs to heart for oxygenation.

(ii) Veins carry blood away from organs including toxins and waste products.

(iii) Pulmonary vein supplying oxygenated blood towards heart.

③ Function of capillaries:

Capillaries are a single layered, thin vessels in close proximity with organs.

involved in:

- (i) Exchange of nutrients between the vessels and organs.
- (ii) Exchange of gaseous material and fluids between vessels and organs.

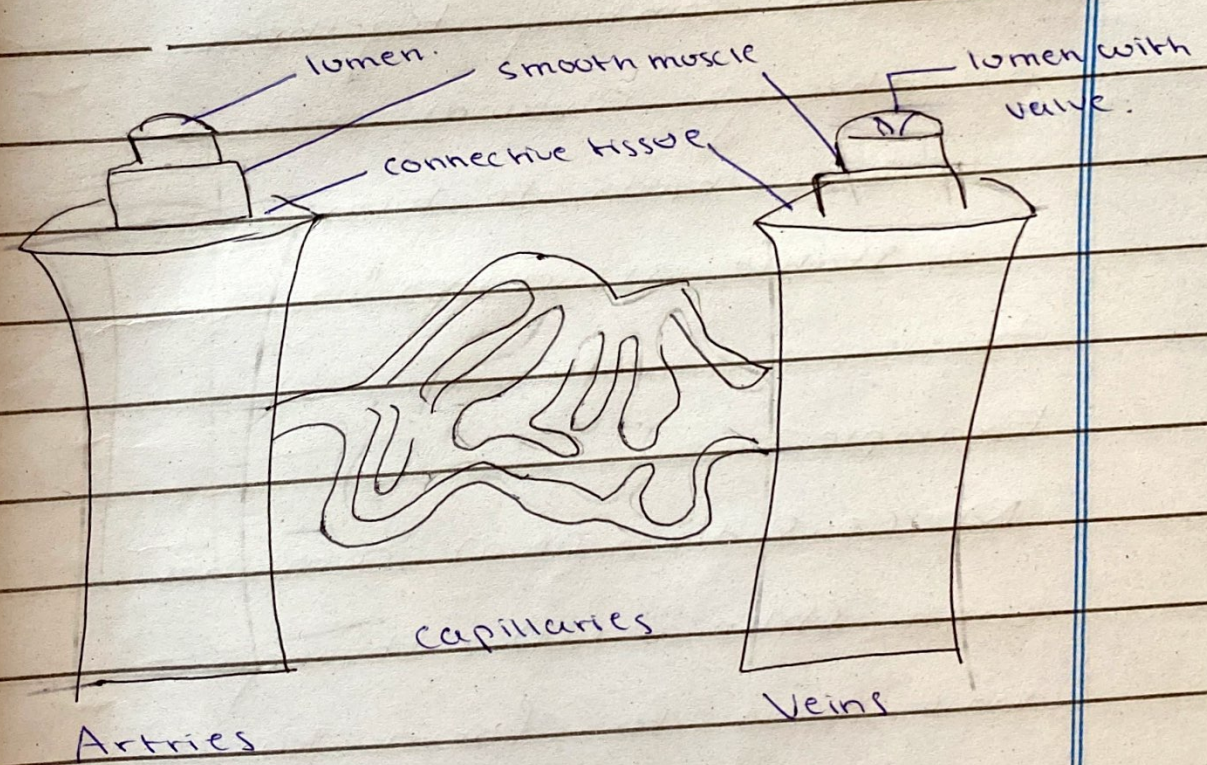


fig: Artries, capillaries
veins.

PART (C):

CHEMICAL BONDING IN ATOMS:

Chemical bonding in atoms can be defined as,

"Atoms combining together through covalent or ionic bonds to form stable structures."

Example:

~~Sodium~~ Sodium (Na) combines with Chlorine (Cl) through ionic bond to form lattice of NaCl.

REASON OF CHEMICAL BONDING IN ATOMS:

Atoms form chemical

due to following reasons:

(i) To fulfil the valence shell octet rule to gain stability, complete set of electrons in outermost shell through sharing (covalent) bond or transfer (ionic) bond stabilises an atom.

(ii) To form stable structure of molecules

Example:

Carbon, in its outershell possesses 4 electron and share each electron with 4 hydrogen to complete 8 electrons in its valence shell.

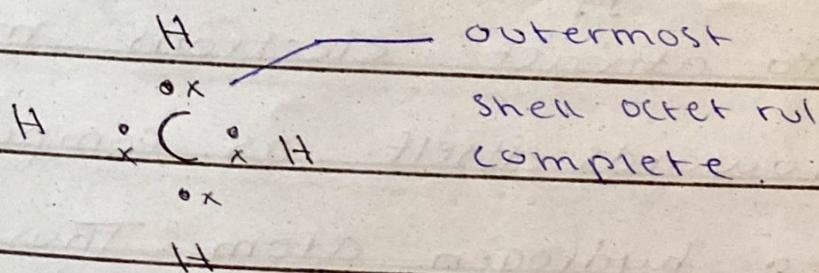


fig. CH₄ covalent

STRUCTURE OF WATER:

Structure of water molecules has following characteristics:

(i) Type of bond between atoms:

"Polar covalent" bond present between 1 Oxygen and 2 Hydrogen molecules. 6 outermost electrons are present in oxygen atom which through sharing of 1 electron of 2 hydrogen atoms completes octet rule.

(ii) Presence of charge on atom:

Due to high electronegativity of oxygen atom, it is able to attract electrons more towards itself. as compared to hydrogen atom. Thus oxygen atom acquires "partial

negative charge" ($- \delta$) and hydrogen atom acquires "partial positive charge" ($+ \delta$)

(iii) Shape of water molecule:

It is "bent shaped" due to repulsion of outermost electron in oxygen atom

(iv) Bond between molecules:

Between water molecules "Vander wall forces" are present

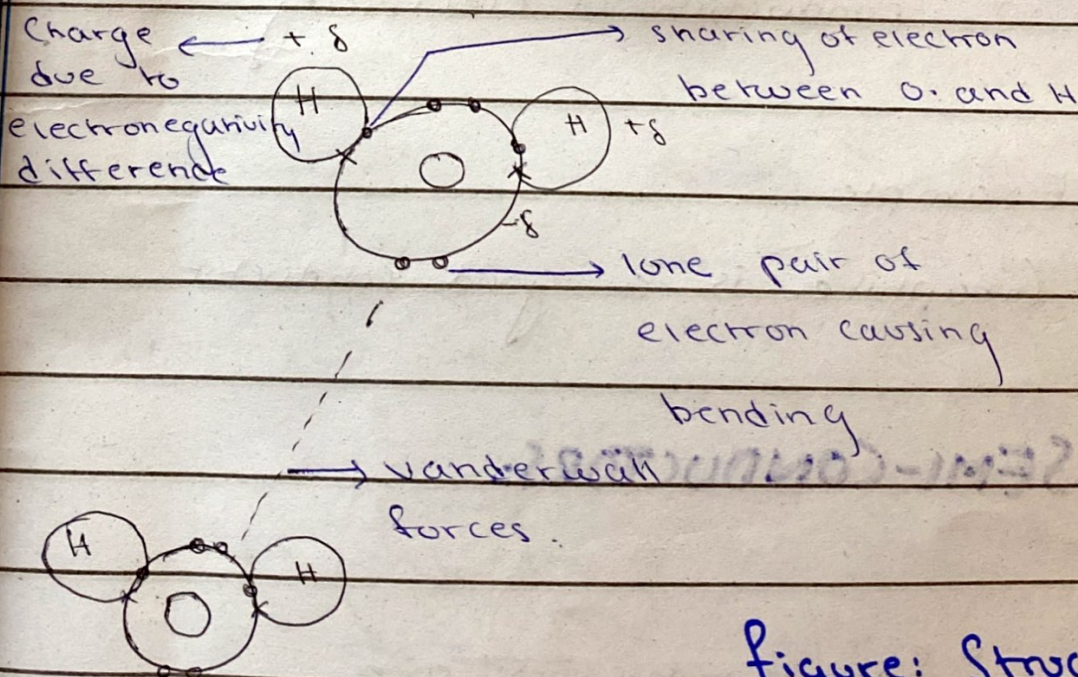


Figure: Structure of H_2O molecule

PART D:

TYPES OF MATERIALS:

There are different types of material based on their composition and structure.

1) CONDUCTORS:

"Conductors are the materials which contain free electron for conduction of electricity."

Example.

Graphite is a good conductor.

② SEMI-CONDUCTORS:

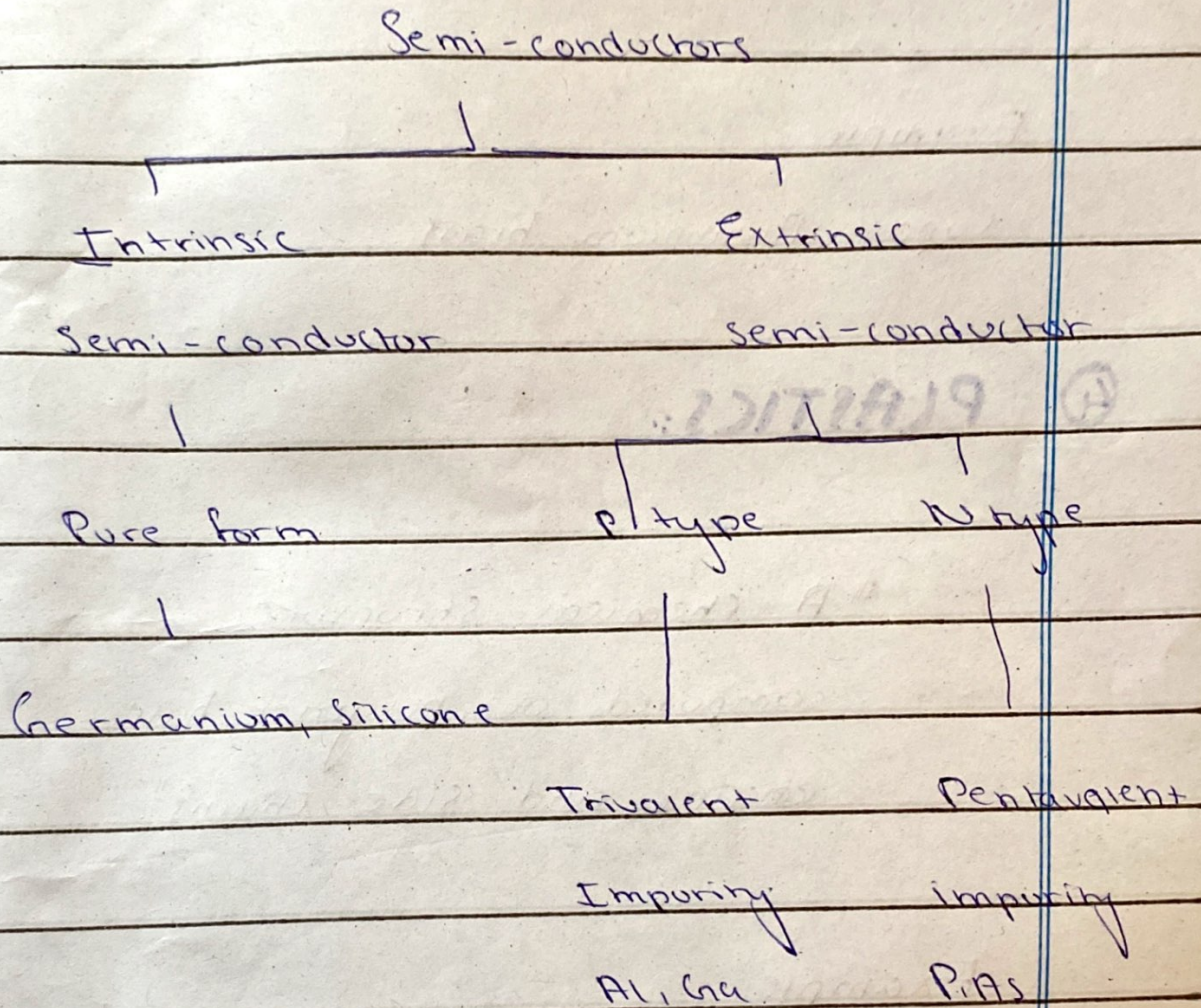
"Semi conductors are

the materials which

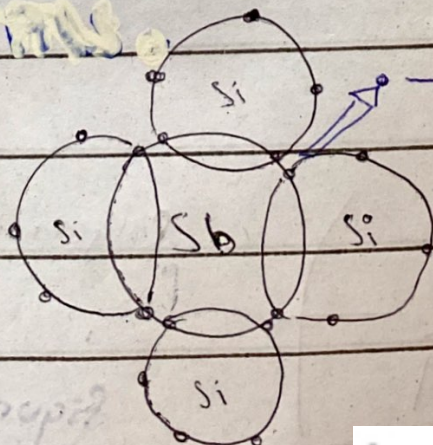
have conductivity between

conductors (metals) and
insulators (ceramics)

Example:



METALS



Donor impurity
contributes
free electron.

Figure:
P-Type

③ METALS:

"Any substance capable of conducting electricity at absolute zero."

Example

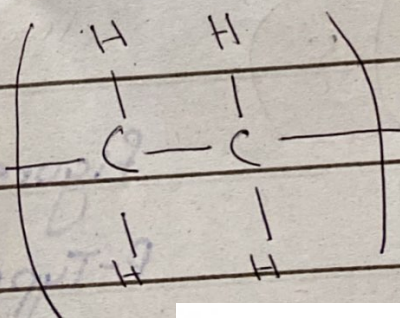
Copper, Aluminium, brass

④ PLASTICS:

"A chemical structure composed of polymer base chains and side chains."

Example:

Acrylics, polyesters, Silicones, polyurethanes.



Polyethylene

Figure:

Plastic

⑤ CERAMICS:

" A ceramic is an inorganic non-metallic solid based on oxide, nitride, carbide, shaped and fixed at high temperature "

Example:

Zirconia, uranium oxide, Silicon Carbide

QUESTION NO: 03

PART(A):

REASONS OF DECREASED FOOD QUALITY WITH ADVANCEMENT OF TECHNOLOGY:

The quantity of food is based on the multiple factors and has decreased due to

following reasons:

(1) Decline in nutritional quality of food:

Incorporation of major and essential nutrients in food has declined over time. This has lowered the consumption of balanced diet including carbohydrate, proteins and fats.

(2) Addition of food preservatives:

Increased consumption and enhanced efficiency has inclined food industry to use more a large amount to food preservatives such as oxidatives, which lowers nutritional value.

(3) Contamination of food:

During large scale production and fast food

there are more chances of
contamination of food during
process

④ Food adulteration on rise.
Mixing of certain elements in
food is also on rise

⑤ Addition of food carbonated
drinks in lifestyle:

Carbonated and fizzy drinks
are acidic in nature which
deteriorates health. has a
negative impact on health

PART (B):

**SOLID WASTE MANAGE-
MENT:**

① "Solid waste management

is the pr

of solid waste

material through


incineration, burial

or compost formation."

PROBLEMS FACED DURING SOLID WASTE MANAGE- MENT:

① Selection of appropriate
place for land filling:

Appropriate place should be
selected for land filling
otherwise danger of contamination
of nearby water resource
or negative affect on soil
for cultivation or ~~crop~~
heat wave conduction from
waste material can cause
tectonic displacement.

②  Equipment for incineration
Infectious ~~S~~ should

incinerated. Availability and operation of incinerators is a hurdle as it is an expensive equipment that requires specific skills for operationalisation.

③ Segregation of solid waste.

Segregation of solid waste is an issue. Categorising should be properly done for recycling.

④ Disposal issues of Solid waste:

Municipal solid waste disposed of in public waste acts as a source of spread of multiple disease.

⑤ Recycling process technique sensitive.

The whole recycling process is technique sensitive which requires proper awareness and utilisation of recycling equipment.

PART (C):

DENGUE FEVER:

(1) Type of disease:

Viral born disease

(2) Effected organs:

Spleen is mainly affected

(3) Vector / cause of spread of dengue fever

(i) Due to mosquito bite.

(ii) Stagnant water breeding ground for aedis anopheles

mosquito

(iii) Increase in temperature

favourable for spread of dengue

SYMPTOMS OF DENGUE FEVER:

Symptoms faced during dengue
Fever includes:

- (i) High temperature
- (ii) Bleeding from gums
- (iii) Bruising
- (iv) Low appetite
- (v) Malaise
- (vi) Dehydration

PART (D):

PLATE TECTONICS IN TSUNAMI:

The role of plate tectonics
in Tsunami is as following:

Plate tectonics

mesosphere



Conduction of heat

↓
Slippage of plate
tectonics on one
and other

↓
Creation of disruption
in ocean body

↓
Production of huge
waves

↓
Tsunami formation

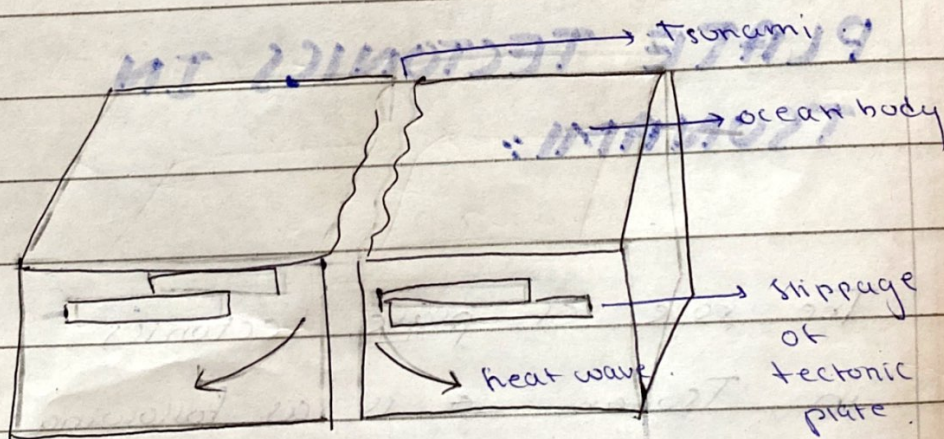


Figure 1: Tectonic Plates
in Tsunami.

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RICHTER MAGNITUDE SCALE VS VOLCANIC EXPLOSIVITY INDEX:

Richter

Magnitude Scale

Measures

intensity of
earthquake

• Logarithmic
values (0-10)

Measuring unit
Energy (ergs)

Volcanic

Explosivity Index

• Measure intensity
of a volcanic
eruption.

Logarithmic values
from (0-8)

• Volume, height
and distance of
thrown lava measured.

PART-B

QUESTION NO: 06

PART (A):

$$\text{Population at start} = 18,000$$

$$\text{Population at end of decade} = 22,500$$

Total population increase in

$$\text{decade} = 4 \times (22,500 - 18,000)$$

$$= 4,500$$

$$\% \text{ Increase} = \frac{\text{Increase in population}}{\text{population at start of decade}} \times 100\%$$

$$= \frac{4,500}{18,000} \times 100\%$$

$$= 25\%$$

$$\text{Average per year} = \frac{25\%}{10} = 2.5\%$$

PART(B):

9 day production with help of
20 machines = 600 units

12 day production with help of
18 machines = x

With the equivalence method

$$D_1 \times M_1 \times W_1 = D_2 \times M_2 \times W_2$$

$$D_1 = 9 \text{ days}$$

$$M_1 = 20$$

$$W_1 = 600 \text{ units}$$

$$D_2 = 12 \text{ days}$$

$$M_2 = 18$$

$$W_2 = x$$

Putting values in formula.

$$9 \times 20 \times 600 = 12 \times 18 \times x$$

$$x = \frac{9 \times 20 \times 600}{12 \times 18} \therefore (A) 7999$$

$$= \frac{1 \times 20 \times 600}{12 \times 2}$$

$$= \frac{10 \times 600}{12}$$

$$= 10 \times 100$$

$$= 500$$

Hence they will be able to produce 500 units.

PART(C):

Speed of car = Distance / Time

$$= 450 / 60 \text{ m/sec}$$

$$= 15/2 \times 18/5 \text{ km/hr}$$

Distance / cov

Distance covered by train = 69 km

Time taken = 45 min

$$= 45/60 \text{ hr.}$$

$$= 3/4 \text{ hr.}$$

Therefore, speed of train = $69 \div \frac{3}{4}$ km/hr

$$= \frac{69}{1} \times \frac{4}{3}$$

$$= 92 \text{ km/hr}$$

Ratio of their speed:-

Speed of car : speed of train

$$= 27 : 92$$

PART (D):

Paragon parameter = 5x length of
sides

$$= 5 \times 15 \text{ cm}$$

$$= 75 \text{ cm.}$$

Parameter of pentagon with each side equal of 15 cm is 75 cm.

QUESTION NO:07

PART(A):

I.Q is Intelligent Quotient is a measure of your ability to reason and solve problem.

Affected by:

(i) Hereditary.

(ii) Environment

(iii) Parenting method.

PART (B):

$$\begin{aligned}\text{Circumference} &= 2 \times \pi \times r \\ &= 2 \times 3.14 \times 4 \\ &= 25.13 \text{ cm.}\end{aligned}$$

PART (C):

$$\begin{aligned}\text{Mean} &= \frac{20 + 22 + 21 + 21 + 23}{5} \\ &= 21.4\end{aligned}$$

$$\text{Median} = 21$$

$$\text{Mode} = 21$$

$$\text{Range} = 20 - 23 / 5$$