

## PART-II

### SECTION-I

#### QUESTION NO:03

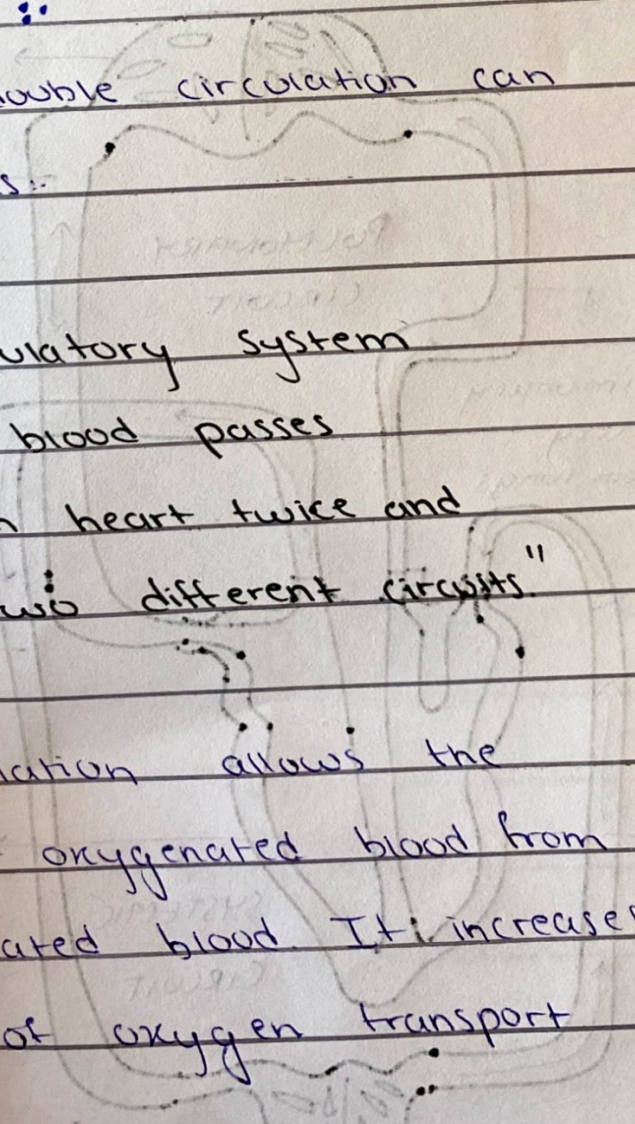
(PART-A)

## **DOUBLE CIRCULATION OF HEART:**

The term double circulation can be defined as:-

" A circulatory system where blood passes through heart twice and has two different circuits "

Double circulation allows the separation of oxygenated blood from the deoxygenated blood. It increases efficiency of oxygen transport



and production of energy in the body. Hence, double circulation is an important part of circulatory system of human body.

## ADAPTATION OF HEART TO KEEP THE BLOOD FLOW IN DOUBLE CIRCULATION:

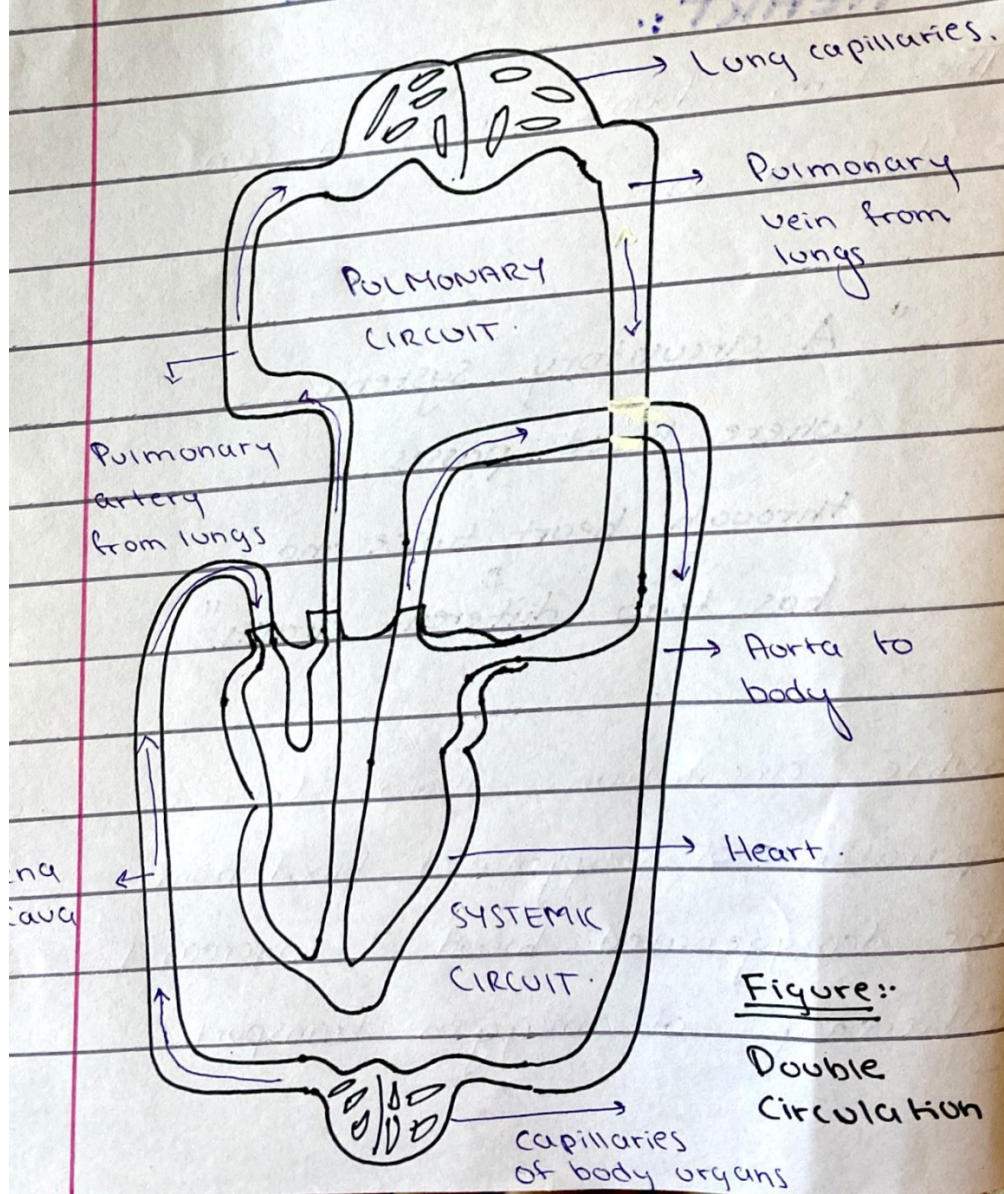


Figure:

Double Circulation

Heart is adapted to double circulation in the following way:

## ① SYSTEMIC CIRCULATION:

Systemic circulation carries oxygenated blood from left ventricle to the tissue capillaries in the following way:

- (i) Oxygen rich blood is transferred to the aorta for circulating into various parts of body from left ventricle.
- (ii) Veins and venules carry carbon-dioxide rich deoxygenated blood.
- (iii) Deoxygenated blood is pumped back into superior vena cava and then to right atrium.
- (iv) From right atrium blood enters right ventricle for pulmonary circulation.

## ② PULMONARY CIRCULATION:

The blood circulation starts from right atrium to the

left ventricle ~~the~~ atrium in the following way:-

- (i) Pulmonary artery collects the blood from right ventricle and carries to lung for oxygenation.
- (ii) After oxygenation blood is pumped back to the left atrium through pulmonary vein which is carried.
- (iii) ~~From~~ From right atrium left atrium blood is carried to left ventricle and into aorta for systemic circulation of oxygenated blood.

Hence, while keeping oxygenated and deoxygenated blood separate, blood passes twice through heart in one cycle with right half involvement in pulmonary circulation and left half involvement in systemic circulation, heart is adapted to double circulation.

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Part (b):

## LIVER AS A CHIEF CHEMIST:

Liver as part of Gastro-intestinal tract (GIT) is ~~acted in~~ a chief chemist due to production of multiple and metabolites in the following way:

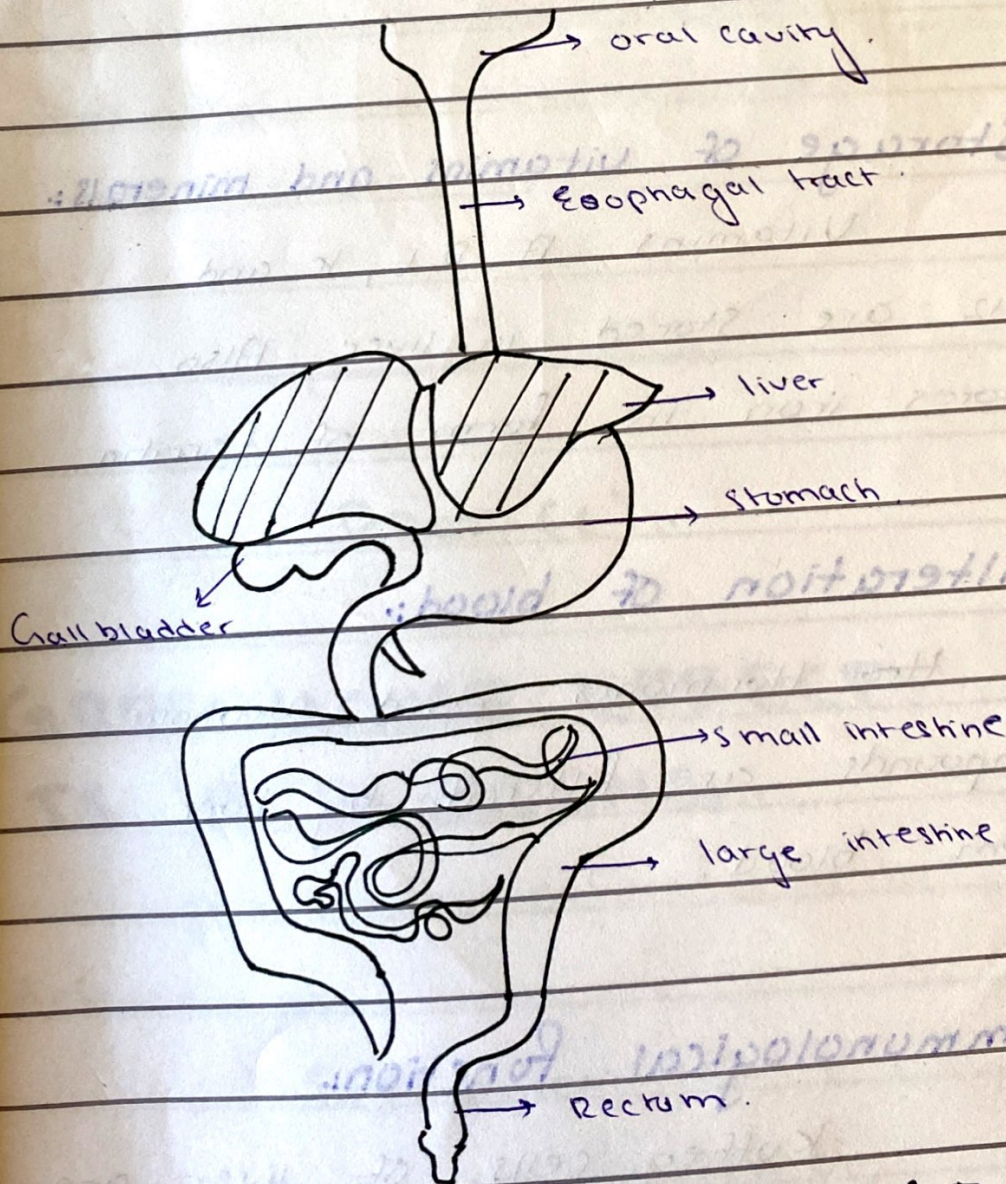


Figure: Liver as part of GIT

(i) **Production of bile:**

Liver produces bile which helps in digestion of fats, vitamins and cholesterol.

(ii) **Carbohydrate metabolism:**

Carbohydrates stored in liver as glycogen are broken down into glucose and released into blood to maintain glucose level.

(iii) **Storage of vitamins and minerals:**

Vitamins A, D, E, K and B<sub>12</sub> are stored in liver. Also stores iron in form of ferritin.

(iv) **Filteration of blood:**

H<sub>2</sub>O, Hormones and Alcoholic compounds are filtered by liver from blood.

(v) **Immunological function:**

Kuffer cells of liver are

involved in immune activity.

### (vi) Albumin production:

Produces albumin that transports fatty acids and steroids to maintain pressure and prevent leakage of blood vessels.

### (vii) Angiotensinogen Synthesis:

Hormone responsible for narrowing of blood vessels resulting in increase of blood pressure.

## PART (C):

# GREENHOUSE EFFECT IS A BLESSING:

Green-house effect can be defined as

"Entrapment of longer wavelength of

infrared radiations by  
the  $\text{CO}_2$  molecules  
present in the Earth's  
atmosphere."

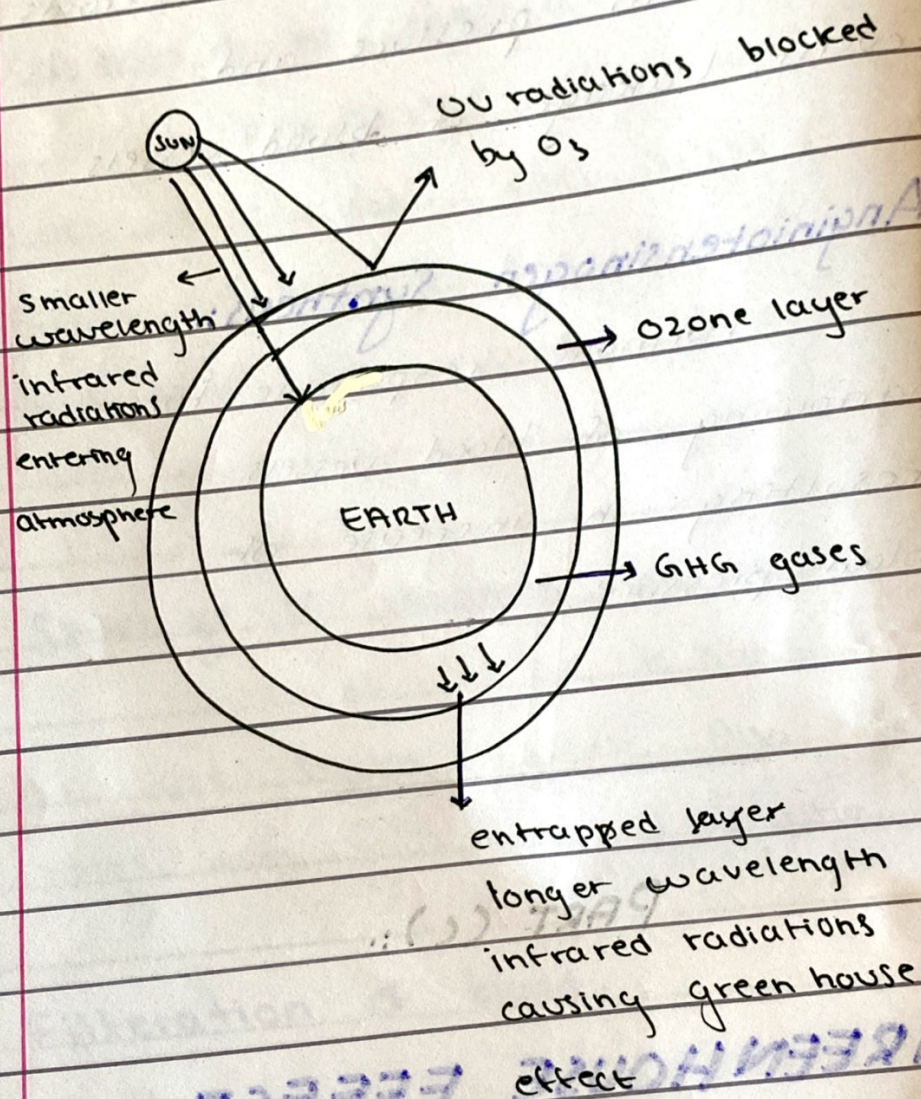


Figure: Representing  
the greenhouse effect

Greenhouse effect is  
a blessing in the following



way: 20107 at 11:00 20. 11. 2019 (vi)

(i) Maintenance of habitable temperature:

Through entrapment of gases within a limit, it increases the Earth's temperature from  $-20^{\circ}\text{C}$  to  $15^{\circ}\text{C}$  that is conducive for living. (v)

(ii) Reduction in amount of heat that escapes earth:

Tropospheric Ozone ( $\text{O}_3$ ) absorbs infrared radiations and helps to reduce the amount of radiation that escapes into space.

(iii) Milder climate in frozen region:

Through increase of temperature, greenhouse effect makes milder climate for habitation in Siberia, Antarctica and Arctic. (i)

(iv) Growth of plants in frozen regions:

Helps in growth of plants in Antarctica and Arctic.

(v) Cooling of stratosphere:

Cooling of stratosphere as thermal infrared absorbed at low altitude.

## ENHANCED GREENHOUSE EFFECT AND ITS RELATION WITH GLOBAL WARMING:

Enhanced effect of greenhouse gas due to anthropogenic activity results in phenomenon of global warming in the following ways:

(i) Increasing temperature of Earth's atmosphere:

$\text{CO}_2$  as a part of GreenHouse Gas (GHG) has the highest

Radiative Force: (b) that is the measurement of heat capture by gases as proposed by International Panel on Climate Change (IPCC). Increased amount of  $\text{CO}_2$  ~~with~~ results in global warming.

(ii) Long term presence of GHG ~~prol~~ enhances global warming.

$\text{CH}_4$ , a greenhouse gas takes ~~air~~ converts into  $\text{CO}_2$  in the atmosphere. 40%  $\text{CO}_2$  will remain in atmosphere for 100 years.

(iii) Acidification of ocean

leading Global warming:

Increased absorption of  $\text{CO}_2$  by water resource leads to ~~sea~~ changes in pattern of precipitation resulting in global

warming.

PART (d):

## (a) WORKING OF GLOBAL POSITIONING SYSTEM:

System GPS can be defined as,

"Radio navigation system on land, sea and air to determine exact location, time and velocity irrespective of weather conditions."

## (i) Components of GPS System:

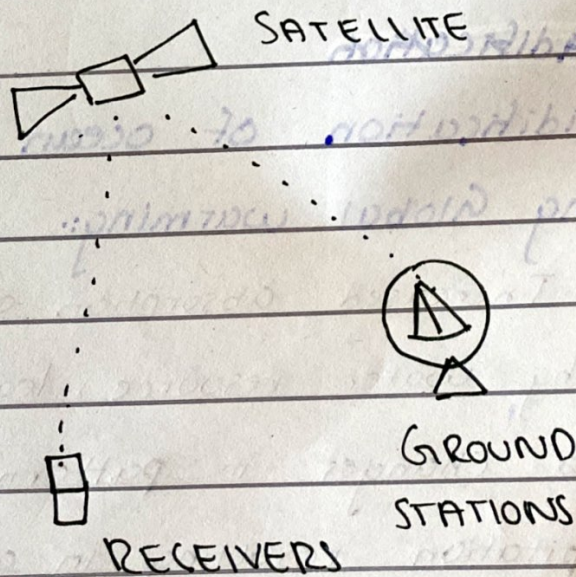


Figure :: GPS signalling communication

Satellites send out the signals which are received by the receivers and calculate distance from satellite. The ground station uses radar to make sure satellite works.

## (ii) Application of GPS:

GPS applications include the following:

- Location - determining position.
- Navigation - getting from one location to another.
- Tracking - monitoring object or persons.
- Mapping - creating maps.
- Timing - measuring of precise time.

## (b) WORKING OF MOBILE PHONE:

(i) The phenomenon involved:

The working of mobile phone depends on conduction of radio waves using electric signals.

### ii) Communication of radio signals:

Radiowaves travels through air to cell tower. Tower sends your voice to the person who is calling. The process is reversed when the other so the receiver can hear the voice.

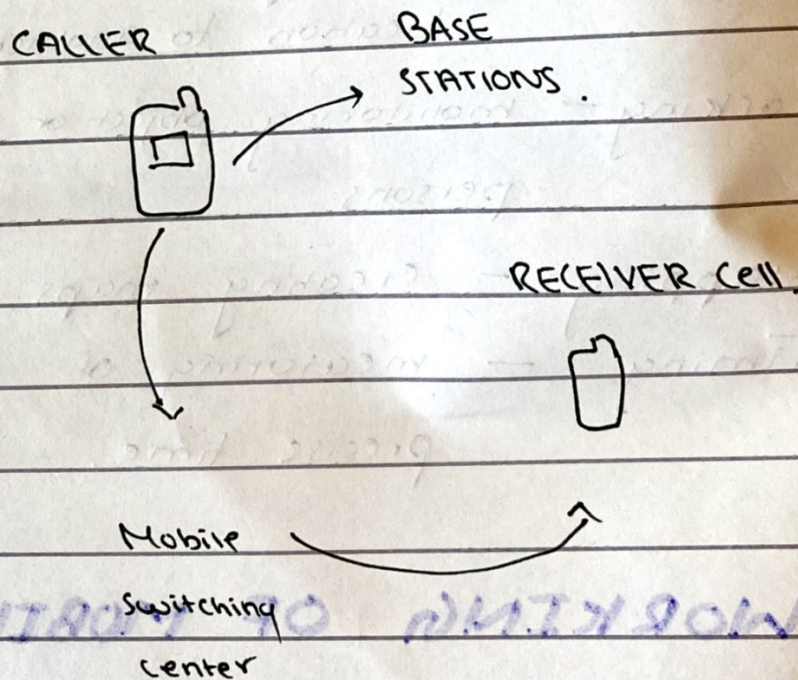


Figure: Mobile Networking

## QUESTION NO: 05

### PART (A):

## RADIO ACTIVITY :

"Radioactivity is the phenomenon exhibited by an atom's nuclei due to nuclear instability, by which nucleus of an unstable atom loses energy by emitting radiations."

## DIFFERENCE BETWEEN ARTIFICIAL AND NATURAL RADIOACTIVITY:

Natural radioactivity	Artificial radioactivity
(i) Process that	Man made

## Natural Radioactivity

## Artificial radio-activity

takes place naturally

Induced phenomena

(ii) Occurs

Spontaneously:

Occurs in presence of external influence.

(iii)

Unstable

initial material in initial material. Stable

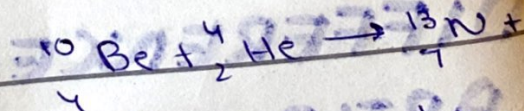
(iv)

Cannot be controlled

Process can be controlled.

(v)

Isotopes of Uranium, Thorium.





## PART (B):

### THE DISEASE OF POLIO:

Polymelitis can be defined as,

"Inability to move

or, walk or muscle

weakening due to

the affect of

polio virus on the

central nervous

System"

#### (i) Symptoms of polio:

- (a) Headache, fever, vomiting
- (b) Abnormal reflexes
- (c) Back pain
- (d) Muscle pain

#### (ii) Cause of polio:

Due to the virus spreading

through following ways:

- (a) Feco-oral route
- (b) Water body contamination
- (c) Saliva contaminated

### (iii) Prevention of polio:

Prevention of polio involves

- (a) Vaccination
- (b) Water resource prevention from contamination
- (c) Hygiene care

### (iv) Vaccination of polio disease.

Two types of polio vaccination

- (a) Inactivated polio virus (IPV) by injection
- (b) Weakened Polio Virus (OPV) by mouth

## PART (C):

# STEPS IN SOLID WASTE MANAGEMENT:

"Solid waste management is proper collection, segregation and disposal of solid waste"

### (i) Collection of solid waste, and Segregation:

Prop First step is the collection of solid waste from multiple positions and segregation of hazardous, non-hazardous and reusable.

### (ii) Re Recycling of solid waste:

Reusable solid waste is recycled.

### (iii) Incineration of the solid waste.

Hazardous solid waste such as of hospital is burned in incinerator.

(iv) Land disposal of solid waste.

Solid waste is also dumped in land known as land disposal through careful selection of resource away from water body source.

## PROBLEMS WITH SOLID WASTE MANAGEMENT

Following are the problems with solid waste management:

- (i) Problem in selection of land for land disposal to avoid contamination of water resource.
- (ii) Non-availability of equipment for incineration.

(iii) Wrong Segregation of Solid waste material can also occur.

(iv) Recycling process technique is technique sensitive.

### PART (D):

## THE TERM POPULATION PLANNING:

"Population planning means to control the growing number of population through <sup>ing</sup> control and preventive measures."

## BENEFITS OF POPULATION PLANNING:

(i) Prevention of depletion of

- (ii) resources.
- (iii) Control of Socio-economic crisis such as poverty.
- (iii) Decreasing infant mortality rate.
- (iv) Prevent the To provide proper nutritional resources to limited number of population.

## SECTION - II

### QUESTION NO. 06

PART (A):

Enrollment in 2023 = 850 pupils

Enrollment in 2024 = 1120 pupils

$$\% \text{ increase} = \frac{(1120 - 850)}{850} \times 100$$

$$= \frac{270}{850} \times 100$$

$$= 31.76\%$$

Hence, percentage increase in enrollment is 31.76%.

### PART (B):

Man is 5 times old as his son

Two years ago sum of age was = 114.

Present age of son =  $x$

Present age of man =  $y$

Given  $y = 5x$

Two years ago,

$$(x-2)^2 + (y-2)^2 = 114$$

$$x^2 - 4x + 4 + y^2 - 4y + 4 = 114$$

$$x^2 + y^2 - 4(x+y) + 8 = 114$$

$$x^2 + 25x^2 - 4x - 20x + 8 = 114$$

$$26x^2 - 24x = 108$$

using factorisation value of  
 $x$  is 2.5.

Son's present age = 2 and a half year

Man's present age = 12 and half  
year

**PART (D)**

Suppose total distance =  $2x$  km.

First Distance time taken =  $t_1 = \frac{x}{40}$

Second Distance time taken =  $t_2 = \frac{x}{60}$

Average velocity =  $v = \frac{\text{total distance}}{\text{total time}}$

$$v = \frac{2x}{\frac{x}{40} + \frac{x}{60}} = \frac{2x \times 40 \times 60}{40 + 60}$$

$$= 48 \text{ km/h.}$$

Hence, average velocity is

48 km/hr.



# QUESTION NO:07

PART(A):

$$\text{Let no} = x$$

According to problem

$$x/6 = x - 50$$

$$x = 6(x - 50)$$

$$x = 6x - 300$$

$$6x - x = 300$$

$$5x = 300$$

$$x = \frac{300}{5}$$

$$= 60$$

No. is 60.

## PART (B)

Tower height = 15 m

Distance from base = 20 m

Pythagorean theorem:

$$\text{Aerial distance} = \sqrt{\text{Height}^2 + \text{Base}^2}$$

$$= \sqrt{15^2 + 20^2}$$

$$= \sqrt{225 + 400}$$

$$= \sqrt{625}$$

$$= 25 \text{ m}$$

Therefore, the distance is 25 m.

PART (B):

Tower height = 15 m

Distance from base = 20 m

Pythagorean theorem:

$$\text{Aerial distance} = \sqrt{\text{Height}^2 + \text{Base}^2}$$

$$= \sqrt{15^2 + 20^2}$$

$$= \sqrt{225 + 400}$$

$$= \sqrt{625}$$

$$= 25 \text{ m}$$

Therefore, the distance is 25 m.

PART (D):

Total Tariff = 30000.

Odd dates = 5<sup>th</sup>, 7<sup>th</sup> so on

= 10000.

Even dates = 6<sup>th</sup>, 8<sup>th</sup> ...

= 20000

Avg money for 2 days = 15000

No. of days of stay =  $\frac{30000}{15000}$

= 20.