

General Science and Ability

Section - I

Qno. 3, a) Double Circulation

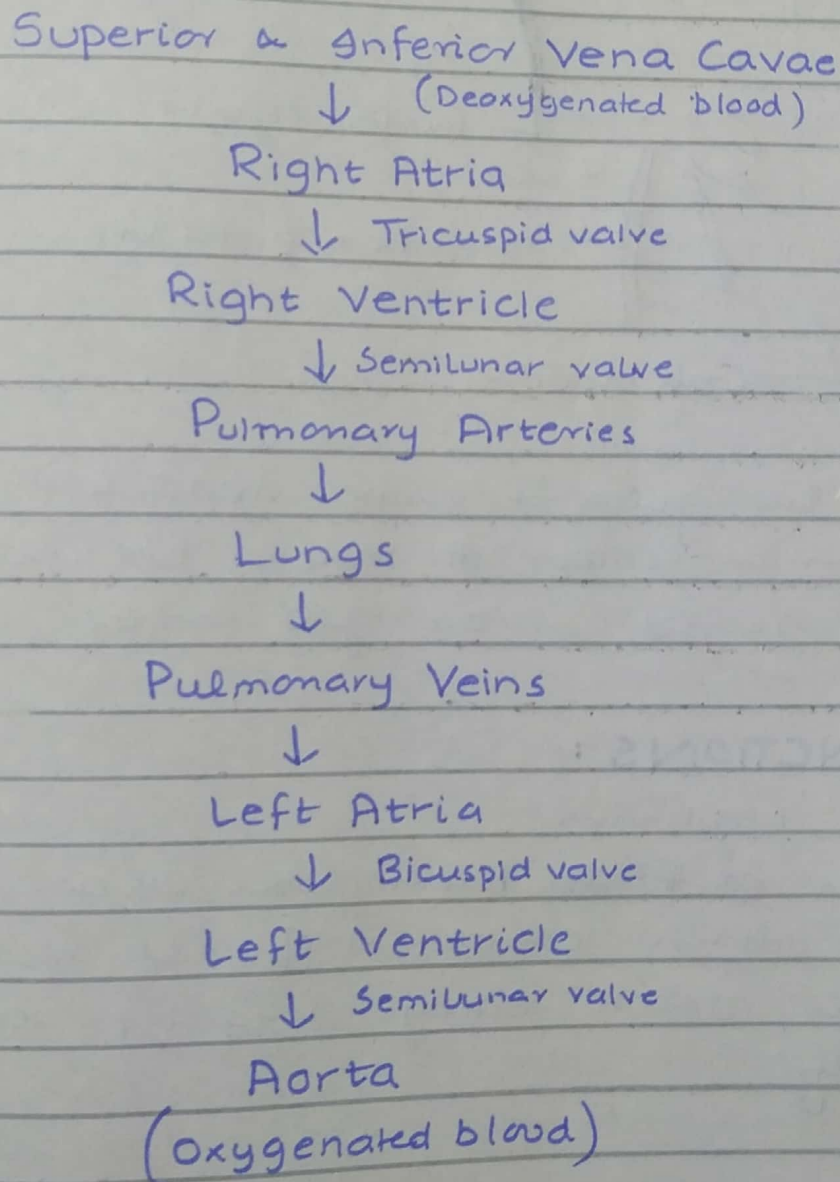
Definition.

Double circulation means pulmonary and systemic circulation in our body. Pulmonary circulation is passage of blood from heart to lungs and back from lungs to heart and systemic circulation ~~means~~ includes the ~~for~~ deoxygenated blood from the body going towards the heart & oxygenated blood being pumped back to body.

Explanation

Superior and inferior Vena Cava bring back the deoxygenated blood to the right chamber of the heart (Right Atria). Blood is pumped from Right Atria to Right Ventricle via Tricuspid valve. Then it is pumped via Semilunar valve to the pulmonary arteries that carry blood to the Lungs. Here the blood is oxygenated and via pulmonary veins is carried back to the Heart (Left Atria). Blood

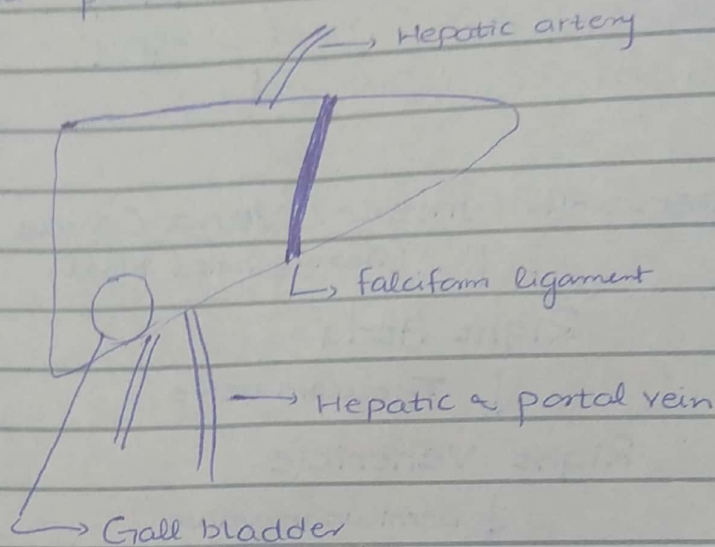
is pumped via ^{Atria} left Ventricle to left Ventricle and then via Semilunar valve, the Aorta carries the oxygenated blood back to the body. It can be described via Flowchart as:



Qno. 3. (b) Liver

Liver is the largest internal organ of our body. It's left and right

Sides are separated by falciform ligament. It's supplied by Hepatic arteries and drained by Hepatic and portal veins.



It's triangular in shape, reddish brown in colour. It secretes bile which is stored in the gall bladder.

FUNCTIONS:

1) Liver ^{breaks down} ~~breaks down~~ haemoglobin which is the main component of red blood cells which carry oxygen to our body.

2) Liver secretes bile which is stored in the gall bladder. Bile is responsible for breaking down of fats. When food reaches the intestine, gall bladder contracts and bile is ~~ACase~~ released to the duodenum.

(via bile duct). Bile is composed of bile acids & salts.

The inflammation of Liver is known as Hepatitis, which can be of 5 types A, B, C, D, E. Hep A & E spread by contaminated water & food. Hep B & C are more dangerous and spread via contaminated needles & blood.

Hepatitis symptoms include Nausea, Vomiting, fatigue, jaundice (yellowing of sclera, tongue, skin). Which occurs due to accumulation of bilirubin our body.

Haemoglobin breaks down into bilirubin and further into stercobilin and urobilinogen, which are released via urine & faeces. If they accumulate in body it is called jaundice which may occur due to hepatitis.

Liver is also a major storage site of fat soluble vitamins Vit A, D, E & K. It also removes toxic substances from our body.

Q no. 3. (C)

Green house Effects

Due to accumulation of green house gases (CO_2 , SO_2 ,

So, ...) in our environment, heat energy is trapped & unable to escape, which raises the temperature.

This is known as the green house Effect. Sunlight via heat energy can enter the Earth but is unable to escape.

Benefits

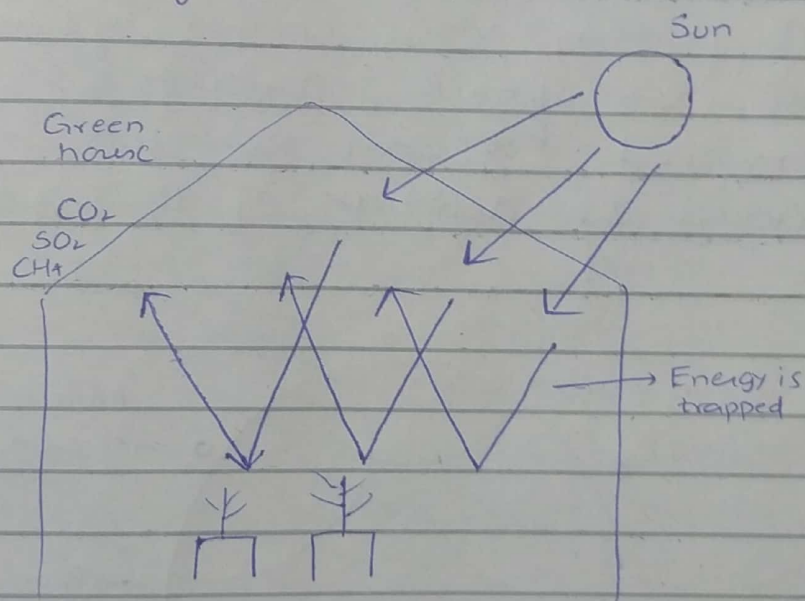
Benefits of Green house Effect

If there had been no green house gases, Earth's temp would've been very low, -10 - -15°C instead of the average 15°C . So, due to this, the temperature is warm and living beings (humans, animals, plants) are able to survive.

Global Warming :

During the twentieth century, due to new industries, the emission of green house gases has increased a great deal. It has happened due to increased use of automobiles, refrigerators, A.Cs etc. Thus due to increased gases, the temperature of Earth is averagely rising more than usual.

- Due to global warming
- 1) Polar ice caps are melting
 - 2) More water in rivers which leads to floods
 - 3) The weather pattern is changed which leads to increase in rainfall in certain areas and decreased in others.
 - 4) The increase in temperature leads to difficulties for people already living in hot areas.
 - 5) The biodiversity of certain areas is changed as well.



Q no. 3. (d) Note

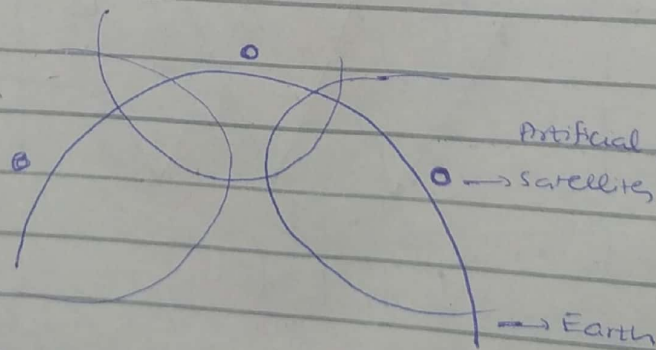
a) Working of GPS

GPS stands for Global Positioning System. It's a way of knowing our longitude, latitude, even

speed and altitude of our place can be known.

Working -

It generally involves the user, control system and satellite. There are around 24 artificial satellites orbiting in space, few more in case of any problem. Whenever the user sends signals to know the location, three satellites work together to pinpoint the location (longitude & latitude) of person via control system. If the fourth satellite is involved it can even tell about the altitude of the person.



b) Working Of Mobile Phone

Mobile phones are now used for various purposes i.e. communication (via texting, calls), internet can be used for GPS.

Calculator, Information, Can even pay money via Applications.

Mobile phones communicate via radiowaves, they were made by US Defence forces. It consists of software, hardware, electronic board, enclosed in a case made of screen & buttons. Various type of application include iOS, Android, blackberry etc.

Qno. 5.

b) Polio

Polio spreads via polio virus and it affects the nervous system causing disability for life. It affects the legs, the person is unable to walk and in severe cases, may even cause death.

Symptoms:

Fatigue

fever

Affects the movement of legs

Respiratory Depression (in severe cases)

Causes of Spreading:

It spreads via polio virus, via contaminated water, through feces.

Prevention:

The main prevention is via vaccine (oral & injectable).

It's wild virus cannot survive long outside the human body, so it's completely preventable / can be eliminated from the world if people can get vaccinated completely. Only Afghanistan, Pakistan, Gaza have a few reported cases.

Boiling water, using completely cooked food may play a part as well.

Vaccine

It's a live attenuated vaccine. Can be oral and injectable.

It's given at 0, 6, 10, 14 weeks in kids. It's a part of EPI ~~schedule~~ schedule of Pakistan.

The names are OPV & IPV (Sabin & Salk).

Qno. 5.(d) Population Planning

Population planning means limiting / controlling ^{number of} the kids, taking adequate gap years to restore maternal health.

Population planning can be achieved by

- 1 Awareness
- 2 Physical barrier methods (condoms)
- 3 Injunctibles or insertion of Copper Intrauterine Device
- 4 Emergency Contraceptive pills.
- 5 Permanent solutions include fallopian tube ligation and Vasectomy
- 6 Contraceptive pills containing estrogen and progestin.

Benefits :

It helps to maintain Maternal Health. In Pakistan, most women suffer from Malnutrition and Iron deficiency Anemia already, it allows them to limit the number of children and focus on regaining their health.

Limiting the number of kids improves their quality of life. Parents would be able to care about their education, health.

It decreases the pressure on country's environment resources.

It leads to better quality of life for the whole Nation.

In Pakistan, sadly due to religious reasons or lack of education, people weren't able to access the controlling methods which lead to population explosion.

~~the~~ ^{New} Pakistan is the fifth most populous country in the world. Due to lack of planning in urban infrastructure and energy and education sector, even the basic needs of 37.2%^{of} people is not met.

Steps should be taken to improve population planning so that the quality of life of the whole nation improves.

Q no - 5 (c)

Steps involved in solid waste management.

The steps involved in solid waste management are

Production of waste

Sorting out the waste

The waste material is sorted; paper, plastic, glass, kitchen waste is separated

Collection of waste

In primary collection, waste is collected from houses - In secondary collection, wastes material of several home is collected in area/place, which is then taken by trucks

Transport of waste

The waste material is transported via trucks to the areas of waste disposal.

Use of Landfills.

The waste material is later on dumped in landfills, which are made in particular areas, lined with specific material to stop its leakage to ground water.

It's covered by soil & has specific tube to transport methane in case of decomposition via bacteria.

Issues in Pakistan:

In Pakistan, the issue is even in big cities like Lahore & Karachi, there is no proper method of solid waste management. The material is never sorted out to be placed in particular landfills.

In Lahore, the waste is collected but there is no particular areas designed for landfills so either they are dumped in the open or waste material is burned which leads to air pollution.

In Karachi, even the collection of material is negligible which leads to increased land pollution as well.

Qno. 5(a) Radioactivity

Certain metals/elements e.g. Uranium, polonium have release of radiations (α , β , γ) particles by them. This is known as Radioactivity.

Artificial Radioactivity.

When the mass number of elements is changed to

increase the radiations, it's called Artificial Radioactivity. It can be used in experiments, medical purposes.

Natural Radioactivity

Some elements are naturally (named mass & atomic number) cause radiations, that's natural radioactivity. It's generally in negligible amounts and is not harmful.

Section - II

Qno. 7.

(a)

Let the number be x

The equation will be

$$\frac{x}{6} + 50 = 60$$

$$\frac{x}{6} = 60 - 50$$

$$x = 10 \times 6$$

$$x = 60$$

Thus the number is 60.

(b) Find the odd one out.

8, 16, 24, 34, 40, 48
+8 +8 +8

The odd ~~one~~ one out is 34.

Because of all them are multiples of 8, except that one

(c)

Height of tower = $h = 15\text{m}$

Base of tower = $b = 20\text{m}$

Aerial distance = ~~?~~ $x = ?$

By the pythagoras theorem

$$(\text{HYP})^2 = (\text{base})^2 + (\text{length})^2$$

$$x^2 = (20)^2 + (15)^2$$

$$x^2 = 400 + 225$$

$$x = \sqrt{625}$$

$$x = 25\text{m}$$

Thus the aerial distance is 25m.

Q no. 7, (d)

Tariff for odd ^{date} day = x = Rs 1000
Tariff for even dates = y = Rs 2000

Total sum = 30,000

As y is double of x

$$y = 2x$$

$$x + 2x = 30,000$$

$$3x = 30,000$$

$$x = 10,000$$

So, the man spent 10,000 on odd dates, thus spent 10 days on odd dates.

And spent 10 days on even dates and spent 20,000 Rs.

He stayed a total of 20 days.

Qno. 6.

(a)

Enrollment in Jan'22 = 850 pupils

Enrollment in Jan'23 = 1120 pupils

So, An increase of pupils = 270 pupils

$$\begin{array}{r} 1120 \\ - 850 \\ \hline 270 \end{array}$$

$$\text{Increase in percentage} = \frac{\text{Inc}}{\text{Original value}} \times 100$$

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

$$= \frac{270}{850} \times \frac{100}{1}$$

$$= \frac{540}{17} = \frac{540}{17} = 31.7\%$$

Almost 31.7% increase in the number of students

Qnc. 6. (d)

Speed in 1st half = 40 kmh^{-1}

Speed in 2nd half = 60 kmh^{-1}

Thus mean = $\frac{\text{sum of obs}}{2}$

$$\begin{aligned} \text{Mean} &= \frac{60 + 40}{2} = \frac{100}{2} \\ &= 50 \text{ kmh}^{-1} \end{aligned}$$

Thus the average speed is 50 kmh^{-1}

Qno. 6. (C)

No. of heads = 48

No. of feet = 140

No. of hens = x = ?

No. of cows = y = ?

The two formulas would be

$$x + y = 48 \quad \text{--- (1)}$$

$$2x + 4y = 140$$

$$2(x + 2y) = 140$$

$$x + 2y = 70 \quad \text{--- (2)}$$

Subtracting (1) from (2)

$$x + 2y = 70$$

$$x + y = 48$$

$$y = 22$$

Thus there are hens = $48 - 22$
= 26 hens

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