

Paper: GSA

General Instructions

Q2

What is circulatory system? Describe the role of human heart in circulation of blood.

1. Give numbering to headings

2. Do not write lengthy paragraphs. Write medium sized paragraphs with headings.

3. Do not use table for comparison and contrast questions.

4. Draw figures/diagram/flowchart where needed.

5. Start new question from fresh page.

6. Write unit of the answer in ability section.

7. Explain mathematical steps and the reasoning for better score.

8. Change colour scheme for references to give them more visibility.

9. Manage time well.

10. Wide page borders are discouraged.

Should be reasonable.

11. Avoid writing wrong references.

12. Give more weightage to expressedly asked parts of the question.

Heart:

It is a pumping organ and enclosed in a double membrane Pericardium membrane. This membrane protects to anchor in its place and also protects it from over pilling. The heart composed of specialized cells/muscles called Cardiac muscles. The heart located in between the lungs and slightly tilted to the left lung.

Structure:-

Heart consists of four chambers Left and Right Ventricle; and Left and Right auricles. The right part of the heart carries deoxygenated blood whereas the left carries oxygenated blood. The right atrium receiver chamber/ receives the blood and ventricles called Discharging chambers. In the right and left chamber present Cardiac Septum which prevent mixing of oxygenated

deoxygenated blood.

Valves:

There are four types of valve

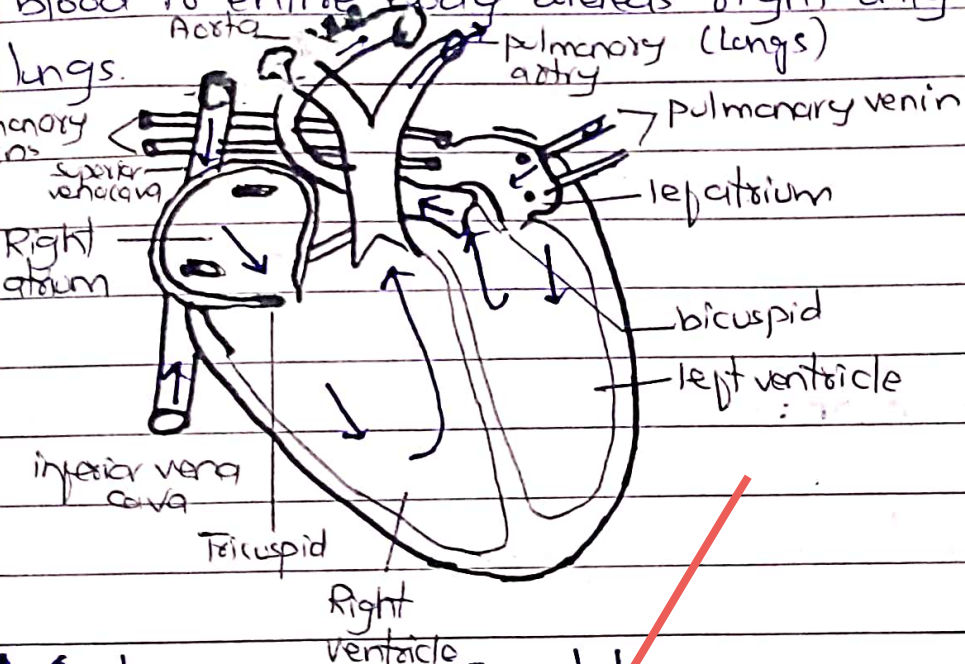
Tricuspid: between **Right** atrium & **Right** ventricle

Bicuspid: between left atrium and left ventricle

Pulmonary valve: between right ventricle and pulmonary artery

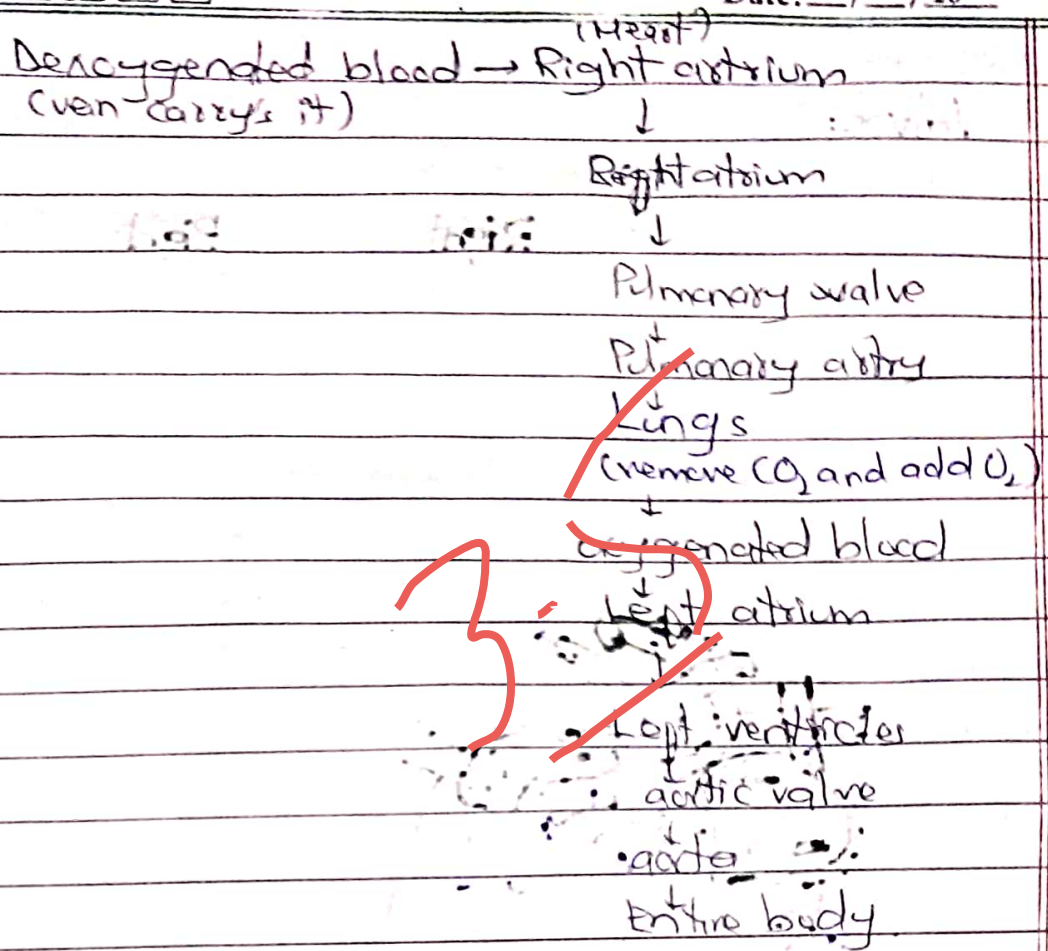
Aortic Valve: between left ventricle and aorta

The left ventricle walls are more thicker than Right ventricle because left ventricle pumps the blood to entire body whereas right only to the



Mechanism of Circulation:

Deoxygenated blood through out the body is carried superior & inferior venacava to the right atrium through right atrium it flows to Right ventricle, from there deoxygenated blood goes to lungs via pulmonary artery through pulmonary valve. The lungs converts deoxygenated blood to oxygenated blood. This oxygenated blood enters to the heart by left atrium and blood flows to ~~right~~ ^{Left} ventricle and goes to aorta through aortic valve and aorta distributes the oxygenated blood to entire body.



Conclusion:-

The heart plays an important role to distribute blood to entire body. Heart is an important organ; without heart none of the organ in our body can do its ^{function} properly.

b- What are the carbohydrates? Give its classification

Introduction:

Carbohydrates is a most important biomolecule because it is a source of energy and every living cells need energy to survive.

Carbohydrates:-

The word carbohydrates also called saccharide in greek word which means "sugar". It is the source of energy. and moreover plants and animals needs carbohydrates to perform their regular functions.

These are organic compounds, these comprises of only carbon, hydrogen and oxygen. The empirical formula of carbohydrates is $(C_6H_{12}O_6)_n$

Classification:

Carbohydrates

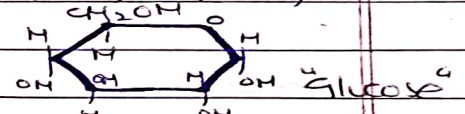
↓
Monosaccharide

↓
Oligosaccharide

↓
Polysaccharide

Monosaccharide: mono = one, saccharide = sugar
Monosaccharide is the simplest form of sugar which cannot be further hydrolyzed. The general formula is $C_n(H_2O)_n$. The monosaccharides are further divided into trioses, tetroses, pentoses, hexoses, heptoses etc.

Example:



- i - Glucose: The immediate source of energy for cellular respiration and "blood sugar".
 - ii - Fructose: A sugar found in honey
 - iii - Galactose: A sugar found in milk and yogurt.
- The fructose is 3 times more sweet than glucose.

Oligosaccharides:

Oligosaccharides are compound sugars that yields 2-10 molecules of the same or different monosaccharides on hydrolysis. Oligosaccharides yielding to ^{two} monosaccharide units upon hydrolysis is called Disaccharide, and the one yielding 3 or 4 molecules of monosaccharide upon hydrolysis is called trisaccharide or tetrasaccharide respectively. and so on. The general formula of disaccharide is $C_{12}(H_{22}O_{11})$. Two monosaccharides can be linked

to form "double sugars"

Example:

- a- Sucrose: It is a common table sugar and made up of two disaccharide sugar.
Fructose + Glucose \rightarrow Sucrose
- b- Lactose: major sugar in milk. It is also made up of two sugars.
Glucose + Galactose \rightarrow Lactose
- c- Maltose: product of starch digestion; formed by two sugars.
glucose + glucose \rightarrow Maltose

Polysaccharide:

These are also compound sugars and yield more than 10 molecules of monosaccharide sugar upon hydrolysis. They are further classified depending on the type of molecule produced on hydrolysis.

They may be homopolysaccharide and heteropolysaccharide. Homopolysaccharide include Pectin, glycogen, starch

Homopolysaccharide; monosaccharide of same type

Heteropolysaccharide; monosaccharides of different type (Hyaluronic)

The general formula is $(C_6H_{10}O_5)_n$.

Example:

- 1- Starch: a polymer made up of many glucose units bonded together. Glucose is formed by plants through photosynthesis and stored as starch.
- 2- Glycogen: It is also made up of many glucose molecules and is a polymer. Glucose is stored in animal cell in the form of glycogen.
- 3- Cellulose: It is a polymer made up of many glucose units through unbranched chains. It is a building material of green plants cell wall and probably most abundant

carbohydrate. It is not digested by human digestive system. because cellulase an enzyme for the digestion of cellulose is absent in animal cell.

Functions:-

- Source of energy
- Source of storage
- It also aids in regulation of nerve tissue and its the energy source of brain.
- They formed a structural component and protective component of plant cell wall.
- In animals they are important constituent of connective tissue
- Sources: wide variety of foods i.e cereals, fruits, honey, pasta etc.

Conclusion:

Carbohydrates are: the most essential part or biomolecules because it performs important function to sustain life. Carbohydrate also called 'Fuel' of the living cells because it is the source of energy.

Q What is water pollution? Describe its types and causes.

Introduction:

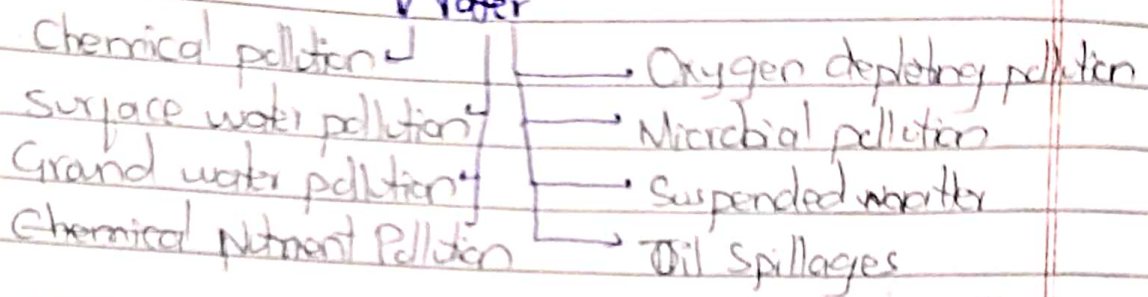
Water pollution is most serious threat to mankind. Through water pollution marine ecosystem is affected as well as human health. It can cause serious problem to human health. Thousands of marine organism is dying because of water pollution. The cause of water pollution is sometime natural and mostly because of man made activities due to which whole ecosystem is affected.

WATER POLLUTION:-

"Any undesirable change in the physical appearance & chemical and biological properties of water that may harmfully affect living organism" is water pollution.

It is the contamination of water caused by man-made activities which directly or indirectly affects the water bodies.

TYPES OF WATER POLLUTION:-



CHEMICAL POLLUTION:

Chemicals are most important type of pollution water contaminants. They affect both surface & ground water bodies. Solvents from industries and metals as well it pollutes the water bodies i.e. lakes, river etc.

Surface water Pollution:

Surface water includes: water that is formed naturally on the earth's surface. They include lagoons, rivers, oceans and lakes. Contamination of such water features results from the discharging or mixing of the water with pollutants. It can be oil spillage or even industrial wastes.

Ground water Pollution:

It occurs when hazardous chemicals and particles applied on the surface by humans, seep

into the ground by rainwater. The contaminants pollute underground water features such as underground rivers and water beds.

Nutrient Pollution:

Even though nutrients are essential for plants and animals but its excess can be fatal. Waste water and fertilizers have a high content of nutrients required for plant growth. These nutrients when percolates and reaches the water bodies and it is the cause of eutrophication. (growth of algal bloom etc)

Oxygen depleting pollution:

Aquatic micro-organisms thrive on biodegradable substances. When many of these materials get into the water, the number of micro-organisms increases. They use up all the oxygen and depleting the oxygen level leads to the death of anaerobic organisms.

Microbial Pollution:

It is a natural type of pollution, natural existing micro-organisms such as protozoa, viruses and bacteria. Water containing some of these micro-organisms can cause diseases such as cholera and bilharzia.

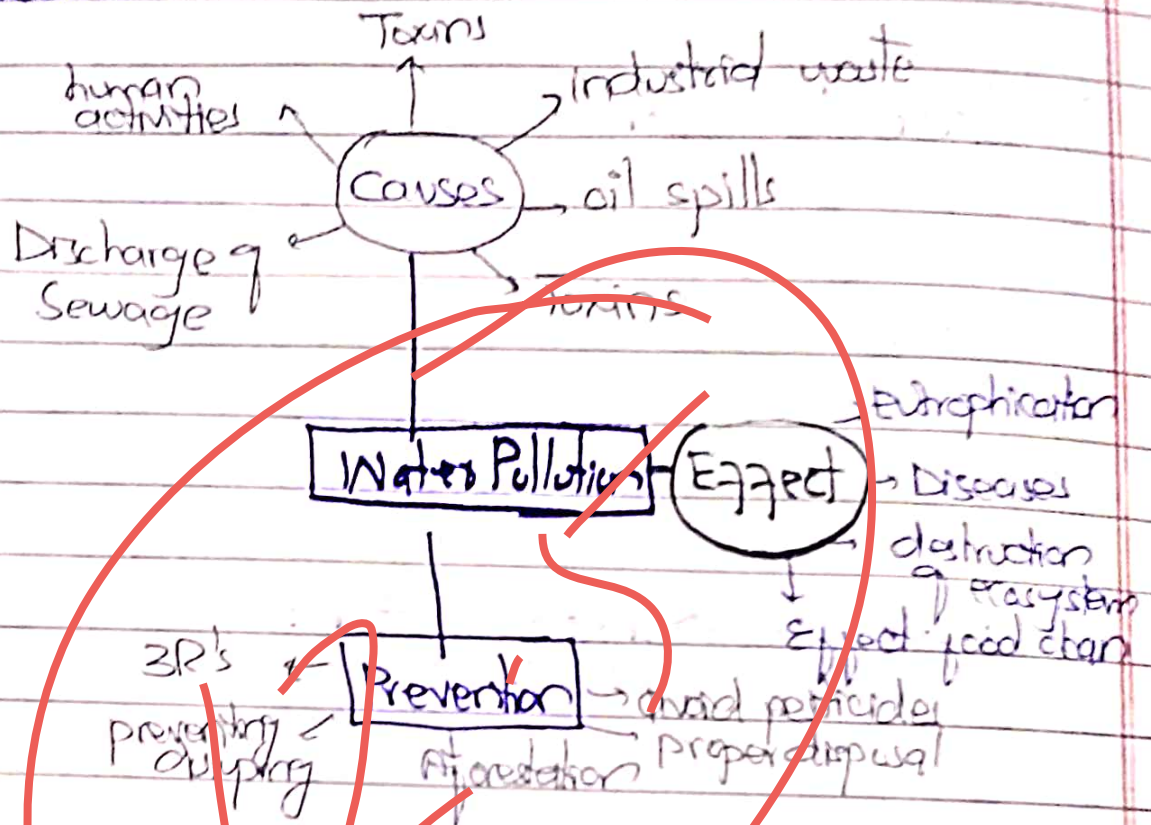
Suspended Matter:

Some contaminants do not dissolve in water and are too large to mix with water molecules. They include cans, straws, other large objects. They form a layer in the water and preventing oxygen penetration leading to depletion of oxygen.

Oil Spillages:

The oil spills from ships and other objects in the water causes many problems to the marine organisms and it leads to water pollution.

Causes:



d- Liver is the chief chemical of the body. Elaborate Introduction:

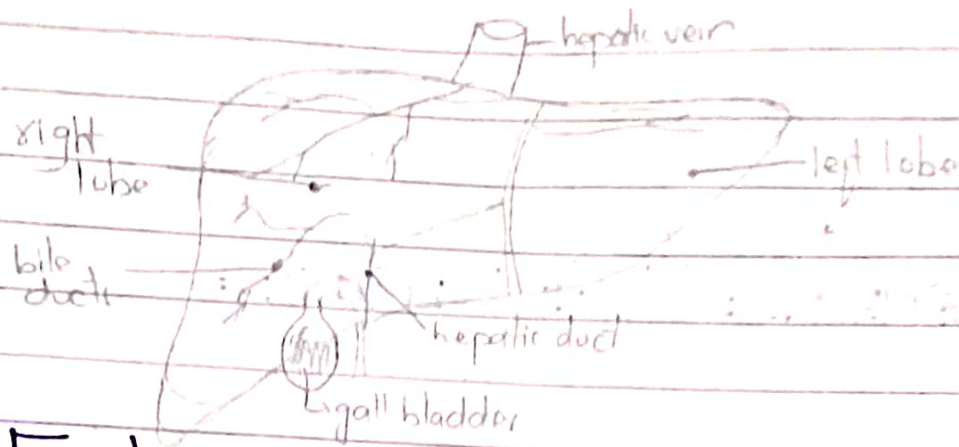
Liver is the most vital organ in the body and because of its function is also called as chief chemist of the body.

LIVER:-

The liver is a vital organ that supports nearly every other organ to some capacity. It is the body's second largest organ.

Structure:-

It has two lobes and is very soft, pinkish brown organ. The larger is right lobe and left lobe and the smaller caudate and quadrate lobe. The left and right lobe are divided by "falciform" ligament, which connects liver to abdominal wall. The liver secrete "bile"



Functions:

- Destroys old RBC's
- Detoxification
- Regulates blood composition
- Produce bile
- Produce proteins and cholesterol
- Storage of Glycogen
- helps in vitamins absorption
- Controls metabolic processes

Q2: Describe role of kidney in the urine formation

Introduction:

Kidney has important role in urine formation because it excretes the toxic wastes from our body in the form of urine.

Kidney:

It is bean shaped structure. Its weight is less than 1%. In each human pair of kidneys are present. The right kidney slightly lower because of liver lobe.

Structure:

- It is surrounded by a tough membrane Renal peritoneum.
- Cortex - outer region
- Medulla - inner region

It consist (medull) small projections pyramids
 It leads to pelvis which leads into ureter and
 a ballen shapped structure urinary bladder and
 urethra.

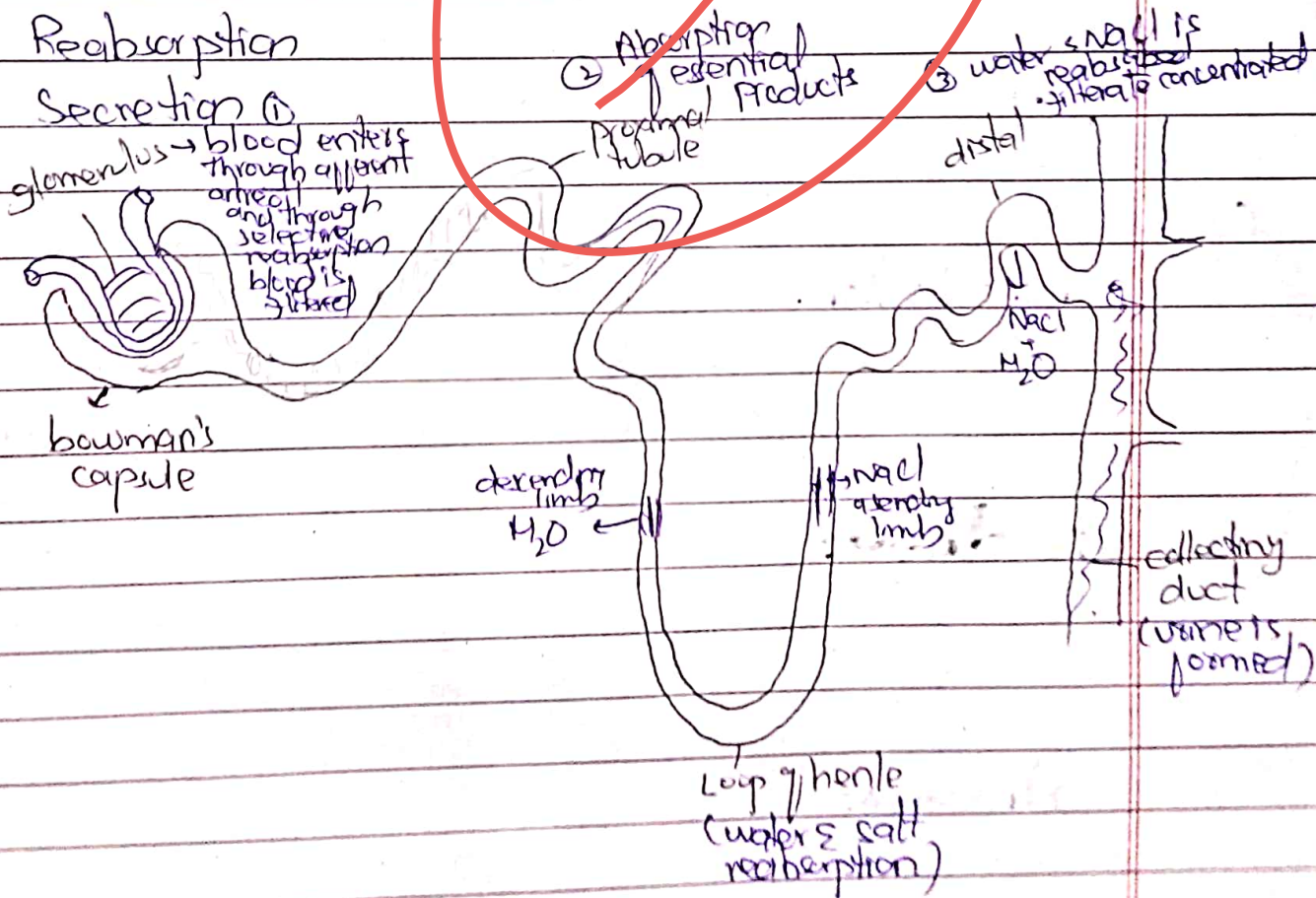
NEPHRONS: URINE FORMATION:

It is the structural unit of kidney
 Structure of nephron:

- Bowman capsule → Renal corpuscles
- Glomerulus
- Proximal tubule
- Distal tubule
- Collecting duct
- Renal tubules

MECHANISM:

- Filtration
- Reabsorption
- Secretion



Q6-

$$\text{Father age} = 3x$$

$$\text{son's age} = x$$

Given that,

$$\text{son's age is 30 year} = 30$$

$$\text{let father age} = x$$

then

$$\text{Five year ago of father age}$$

$$= x - 5$$

$$\text{and son age}$$

$$= 30 - 5$$

$$= 25$$

Father age was thrice of son's age

$$x - 5 = 3(25)$$

$$x - 5 = 75$$

$$x = 75 + 5$$

$$x = 80$$

Explain steps

So current age of father is 80 years.

80

b)

$$\text{Income tax amount} = 1500$$

So % = pay income tax

$$10\% = 1500$$

$$\frac{10}{100} = 1500$$

$$\frac{10}{100}$$

$$\text{or } 1500 \times \frac{100}{10}$$

$$\text{his income} = \text{Rs } 15000$$

c

$$\begin{aligned} \text{Sum of six number} &= \text{Average} \times \text{number} \\ &= 20 \times 6 \\ &= 120 \end{aligned}$$

$$\begin{aligned} \text{After removing 1 number average of 5} \\ &= 15 \end{aligned}$$

$$\begin{aligned} \text{Sum of 5 number} &= 15 \times 5 \\ &= 75 \end{aligned}$$

$$\begin{aligned} \text{So when we remove one number} \\ &= 120 - 75 \\ &= \boxed{45} \end{aligned}$$

$$\text{d) (i) } 8, 4, 32, 7, 5, \underline{\quad}$$

$$\text{(ii) } 17, 19, 23, \underline{\quad}, 31, 37$$

$$\begin{aligned} \text{(So) } 17, 19, 23, 29, 31, 37 \\ \text{It is a series of prime number} \end{aligned}$$

Q7

$$\text{a) Diameter} = 7 \text{ m}$$

$$\text{Radius} = \frac{7}{2}$$

$$\text{Formula} = 2\pi r$$

Now putting values

$$\begin{aligned} 2\pi r &= \pi = 3.14 \\ &= 2(3.14)\left(\frac{7}{2}\right) \\ &= \boxed{22 \text{ m}} \end{aligned}$$

b) Let the number of boy = x

then, $(\frac{3}{4})x = 18$

$$\text{or, } x = 18 \times (\frac{4}{3})$$

$$x = 24$$

Let the total number of student = y

$$(\frac{2}{3})y = 24$$

or,

$$y = 24 \times (\frac{3}{2})$$

$$y = 36$$

therefore the number of girls in class

$$= 36 - 24$$

$$= 12$$

c Distinguish IQ and EQ

IQ: Intelligence Quotient is commonly known as IQ. IQ measures person academic and reasoning ability. It also measures person level of comprehension. IQ is usually assessed through IQ test and person ability to solve mathematic equation, memorize things, recall lessons and identifying patterns.

The concept of IQ given by William Terman

$$IQ = \frac{\text{Mental age}}{\text{Chronological age}} \times 100$$

EQ: Emotional Quotient

"This includes ability to understand and self-image their own feelings in positive ways to communicate effectively, empathize with others, overcome challenges, manage conflict & resolve stress"

M T W T F S

EQ is emotional quotient. EQ is based on social intelligence. It measures an individual's social and emotional competencies or one's ability to recognize their and other persons' emotional expression. It is assessed through different projective and non-projective tests.

Factors of Effect IQ:-

- 1- Biological → It includes premature birth, alcohol abuse during pregnancy, malnutrition, injury to head.
 - 2- Environmental → include poverty, malnutrition, peer group influence.
 - 3- Psychological → stress, anxiety, domestic issues, strict parent, trauma, inferiority complex.
- All these factors affect intelligence

d-

