

Q:- What is meant by the term 'double circulation'? Briefly, describe how heart is adapted to keep blood flowing in double circulation.

→ Double circulation:-

Double circulation of heart means blood passes through the heart twice per circuit. The right pump sends the deoxygenated blood to lungs where it becomes oxygenated and returns back to heart. The left pump sends the oxygenated blood around body.

→ Process:-

The circulation of heart can be divided into two circuits:-

- i) Systemic circulation
- ii) Pulmonary circulation

## 1) Systemic circulation:-

This circuit takes oxygenated blood from left side of heart to body. When the blood returns to right side of heart, it is deoxygenated, as the oxygen has been mostly used by muscles and organs in order to make energy.

## 2) Pulmonary circulation:-

This circulation takes deoxygenated blood from right side of the heart to the lungs where it is oxygenated. It then returns this side of the

heart where the cycle begins again.

Q :- Comment, "Liver is the chief chemist in human body."

Answer:-

Liver is the body's second-largest organ, according to American Liver Foundation, weighing about 3 pounds. It is an abdominal glandular organ in the digestive system.

It is the chief chemist in human body because it performs more than 500 functions in our body. It is a vital organ that supports nearly every other organ to some capacity.

Following are some functions performed by liver:-

## 1) Detoxification:-

The cells of liver contains thousands of enzymes for use in chemical reactions of metabolism, according to University of Nottingham. A healthy liver is capable of transforming potentially harmful substances, such as drugs, alcohol, into harmless products to be eliminated in the bile or urine.

## 2) Nutrient Processing:-

Nutrients consumed in the diet travel from intestine to liver and are processed into substances that the body's tissues can use, the Gastroenterological Society

of **Australia** reports. The liver synthesizes, stores and releases nutrients into body blood based on body's needs.

### 3) Bile Production:-

The liver produces bile, which is stored in the gall bladder. Bile aids in the digestion of fats and assists with elimination of toxins from the body.

### 4) Protein Synthesis:-

The liver makes certain proteins necessary for blood clotting and for transporting nutrients such as iron, according to **Brown**

University.

### 5) Storage:-

Many nutrients are stored in the liver, including certain fats, vitamin B12, iron, copper and the fat-soluble vitamins A, D and K, according to Brown University. The liver also stores glycogen, the storage form of glucose.

### 6) Mechanism:-

It metabolizes carbohydrates, lipids and proteins into useful substances such as glucose, cholesterol, phospholipids, lipoproteins.

Q:- How the urine is formed?  
Discuss role of kidney in excretion.

Answer:-

Urine formation is a crucial process in the body, primarily carried out by kidneys. The kidneys filter blood to remove waste products and excess substances which are then excreted as urine.

Kidneys perform their function and urine is performed by following steps:-

### 1) Filtration:-

Blood enters the kidneys through the renal arteries and flows



into nephrons. Each nephron contains a glomerulus, a network of capillaries surrounded by Bowman's capsule.

Blood pressure forces water, ions, and small molecules from blood into Bowman's capsule forming the glomerular filtrate.

## 2) Re-absorption:-

As the filtrate moves through the renal tubule (which consists of the proximal convoluted tubule, a loop of Henle, the distal convoluted tubule and collecting ducts), essential substances such as glucose, amino acids and ions are reabsorbed

back into bloodstream. This process ensures that vital nutrients and a balanced concentration of electrolytes are maintained.

### **3) Secretion:-**

In addition to reabsorption, the renal tubules also actively secrete additional waste products and excess ions from blood into filtrate. This helps in fine-tuning of body's chemical balance and removing un-wanted substances that were not filtered initially.

### **4) Excretion:-**

The final step is excretion. The

final filtrate, now called urine, is collected in the collecting ducts and passes through the renal pelvis to the ureters, which transport it to bladder. The bladder stores urine until it is excreted from body through urethra.