

Q NO: 01

Comment "LIVER is the chief chemist in human body"

ANSWER

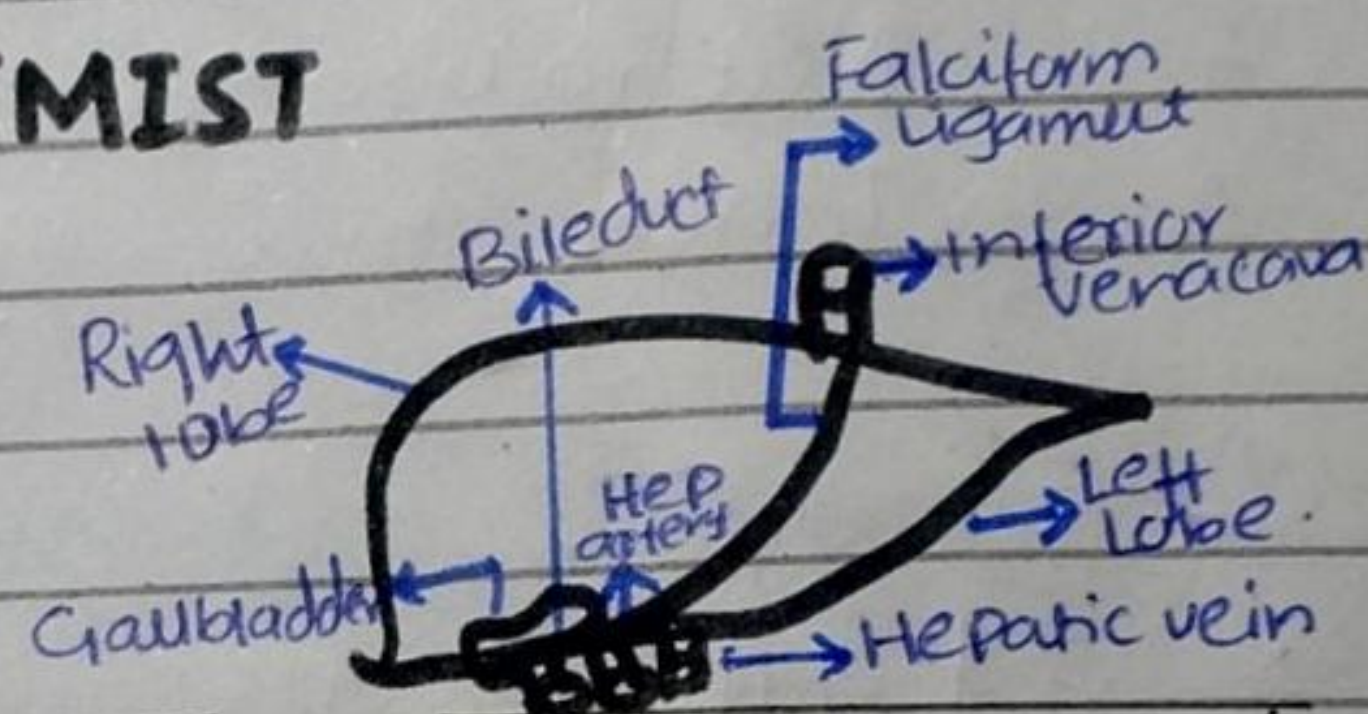
INTRODUCTION

The liver performs hundreds of biochemical functions in the body. From regulating metabolism to storing nutrients or detoxifying harmful substances, liver plays central role in maintaining body's chemical balance and refer as 'Chief Chemist'.

LIVER: THE CHIEF CHEMIST

Largest internal glandular organ
= weigh: 1.5kg

LIVER



1 Metabolism

2 Synthetic function

3 Storage function

4 Detoxification

5 Immune function

6 Developmental

7 Digestive + Excretory

(i) Metabolic Functions

- Regulation of Carbs, Proteins and fats metabolism
- Regulation of gluconeogenesis, glycogenolysis, glycogenesis
- Synthesis of cholesterol, phospholipids and lipoproteins
- Deamination of amino acids.
- Conversion of ammonia to urea.

(ii) Synthetic Functions

- Production of proteins (Albumins, Globulins)
- Production of clotting factors (II, VII, IX)
- Synthesis of bile and bile salts
- Activation of various enzymes

(iii) Storage functions

- Storage of vitamins A, D, E, K, B₁₂.
- Storage of minerals like Fe (iron), Cu (Copper)
- Reservoir of blood for emergency use

(iv) Detoxification

- Breakdown of drugs, alcohol, and chemicals
- Neutralization of toxins and metabolic wastes
- Inactivation of excess hormones

(v) Immune and Protective Function

- Kupffer cells remove bacteria, old RBCs, and foreign particles.
- Support Immunity and defense mechanism

(vi) Developmental and Supportive Functions

- Hemato-poiesis (blood formation) in the fetus
- Maintenance of blood volume + Homeostasis.

(vii) Digestive + Excretory Functions

- Production of bile for fat emulsification
- Excretion of bilirubin and other waste products.

CONCLUSION:

The liver's vast metabolic, detoxifying, and regulatory functions make it center of chemical activities of the body, rightly earning the title of 'chief chemist'.

Explain in detail the Common Causes of heart attack

(ANSWER)

INTRODUCTION

A heart attack happens when the blood flow to the heart muscles is suddenly blocked, mainly due to obstruction of arteries (coronary). This usually causes shortage of oxygen and damage to the heart tissues. It commonly results from the long term artery damage and sudden clot formation.

CAUSES OF HEART ATTACK

(i) Primary Causes

(i) Coronary Artery Disease (CAD) / Atherosclerosis

- The most common cause of myocardial infarction
- Cholesterol, fats, calcium, and cellular wastes buildup inside coronary arteries, forming plaque.
- These plaques narrow the arteries and limit the blood flow.

(ii) Coronary Thrombosis (Blood Clot formation)

- when plaque (atherosclerotic) ruptures, platelets gather and form a clot.
- This clot blocks blood flow completely.
- Blood flow stops abruptly, triggering ~~sudden~~ a heart attack.

(iii) Coronary Artery Spasm

= A temporary but severe spasm (tightening) of a coronary artery reduces blood flow.

Causes include:

- = Smoking = Stress = drugs abuse = Extreme cold.
- = Even without clot / plaque, a strong spasm can cause a heart attack.

Coronary heart disease (CAD)

Coronary Thrombosis

Coronary artery Spasm

Primary Causes of Heart Attack

CONTRIBUTING CAUSES OF MYOCARDIAL INFARCTION

(i) Hyper-tension

- = Chronically high blood pressure:
- = Damage artery walls = Accelerate plaque formation
- = Increases the heart's oxygen demand.
- = This increase the risk of coronary artery narrowing and heart attack.

(ii) High Cholesterol Levels

Elevated LDL (bad cholesterol) promote:

- = Plaque buildup = Artery hardening = Increase chances of plaque rupture.
- = Low HDL levels.

(iii) Smoking

Smoking damage blood vessels and reduces oxygen delivery. It causes

- = vessels inflammation = Increased blood clotting tendency
- = Lower HDL Cholesterol.

This makes smokers far more likely to experience a heart attack.

(iv) Diabetes Mellitus

- High blood glucose levels damage arteries and atherosclerosis acceleration.

Diabetic Patients often have:

- High TGs • Obesity • High BP

These combined factors greatly increase heart attack risk.

(v) Obesity

Excess body fat leads to

- High cholesterol • High BP • Insulin resistance

(vi) Sedentary Lifestyle

Lack of physical activity.

- Poor circulation • weight gain.

(vii) Stress and Shock

- Increase adrenaline and cortisol • Raise BP

(viii) Family and Genetics

High cholesterol, heart disease, Early heart attack.

(ix) Unhealthy Diet

Diets high in: Saturated fats, trans fats, Excess sugar.

(x) Age and Gender

- Risk increases after age 45 Men, 55 women.
- After menopause, women risk rises due to low estrogen levels.

(xi) Inflammation and Autoimmune diseases

Conditions like:- Rheumatoid arthritis, Lupus, Chronic infections

CONCLUSION

Heart attacks occurs due to artery damage,

Plaque buildup, and clots, worsened by cholesterol,

diabetes, Smoking, Obesity, Stress & genetics. Prevention require a healthy lifestyle and medical management

Q(C)80

Draw the structure of Human ear and briefly explain its functions

Q(ANSWER)80

I: INTRODUCTION

The human ear is a sensory organ that enables ~~the~~ hearing and balance by detecting sound waves, converting them into electrical signals, and sending them to brain.

II: STRUCTURE OF EAR

The ear is divided into three main parts

∴ External Ear ∴ Middle Ear ∴ Inner Ear.

(i) Outer Ear / External Ear

(a) Pinna / Auricle: visible part; collects sound waves.

(b) External Auditory canal: leads sound to the ear drum

Function: Capture and directs sound waves into the ear

(ii) Middle Ear / Tympanic Cavity

(a) Tympanic membrane (Eardrum): vibrates with sound waves

(b) Ossicles: Malleus, Incus, Stapes: Amplify and transmit vibrations

(c) Eustachian Tube: Equalizes air pressure b/w ear and throat

Function: Amplify sound and transmit to inner ear.

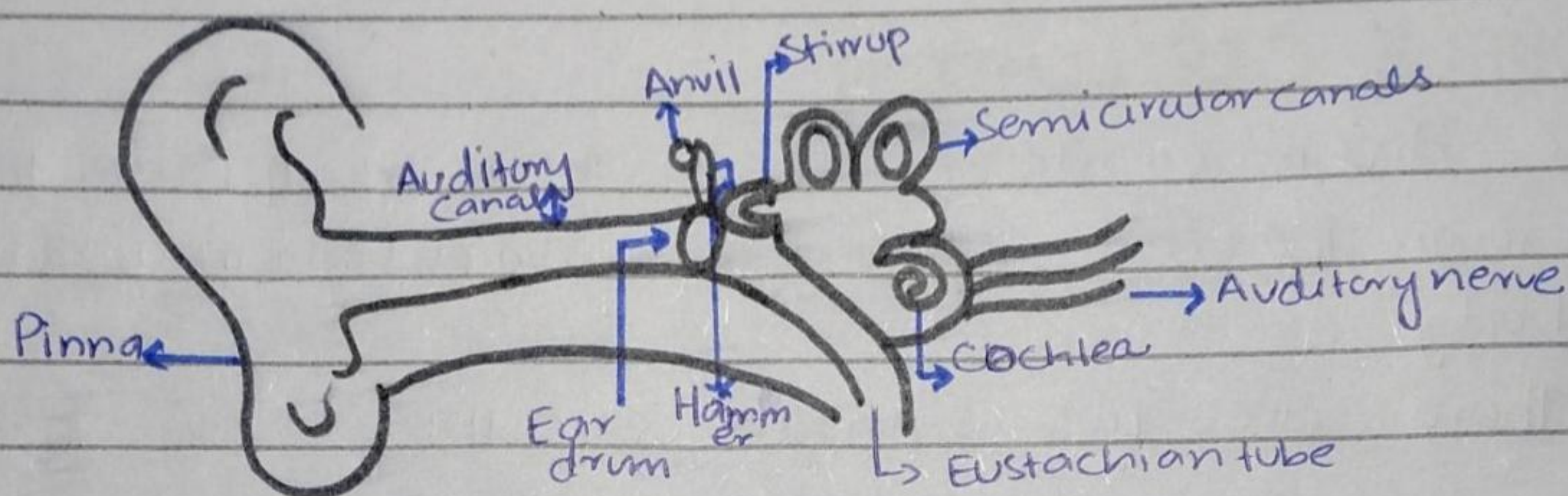
(iii) Inner Ear / Labyrinth

(a) Cochlea: Spiral shaped; converts vibration into nerve impulses.

(b) Semicircular canal and vestibule: Maintain balance & detect movement

(c) Auditory Nerve: Carries Impulses to the brain.

Function: Enables hearing and helps maintain equilibrium / balance.



HUMAN EAR

EAR

Outer ear	Middle ear	Inner ear.
- Pinna - Auditory canal	- Ear drum - Ossicles: Malleus, Incus, Stapes - Eustachian tube	- Cochlea - vestibule - Auditory nerves

III FUNCTIONS OF HUMAN EAR

(i) Hearing

Sound waves are captured, amplified, and converted into electrical signals for the brain

(ii) Balance

Inner ear structures detect head and body movements to maintain posture and orientation

IV: CONCLUSION

The ear enables hearing and balance by capturing sound, converting it into nerve signals, and helping maintain balance

Q(D)

What is meant by term double circulation?
Briefly describe how the heart is adapted to keep blood flowing in a double circulation.

ANSWER

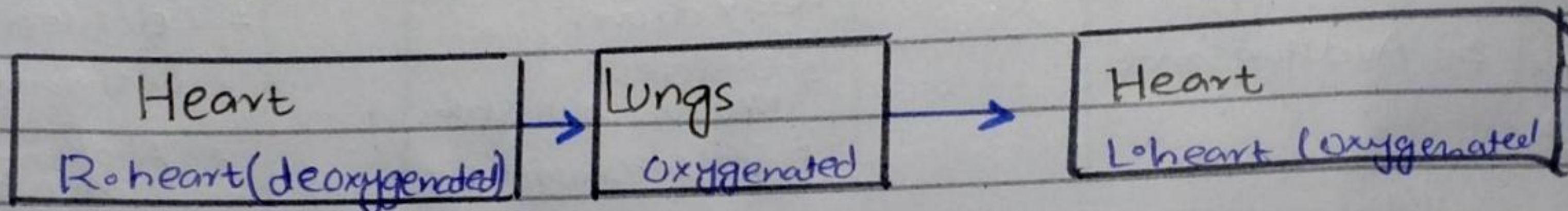
DOUBLE CIRCULATION

The double circulation means that blood passes twice through the heart during one complete circulation of the body.

There are two separate circuits:

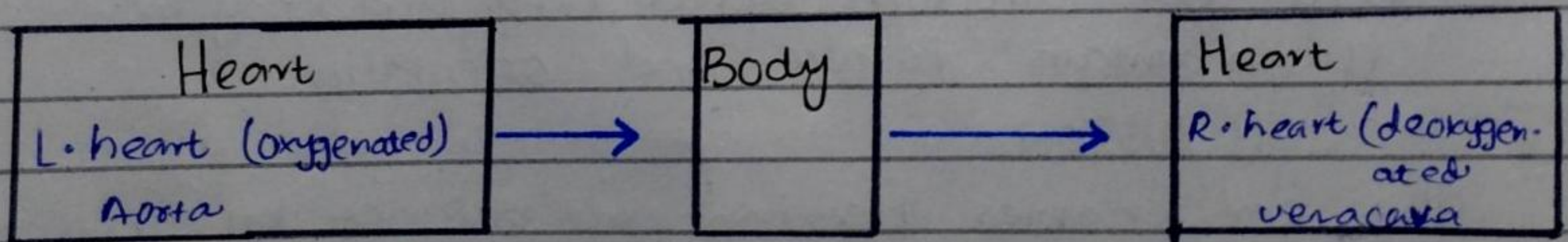
(i) Pulmonary Circulation

- = Carries deoxygenated blood from the right ^{side} heart to the lungs for oxygenation (via pulmonary artery)
- = Carries oxygenated blood from the lungs to the left side of the heart (via pulmonary veins)



(ii) Systemic Circulation

- = Carries oxygenated blood from the left side of the heart to the whole body (via Aorta)
- = Carries deoxygenated blood from body to the right side of the heart (via venacava).



HOW THE HEART IS ADAPTED FOR DOUBLE CIRCULATION

(i) Four Chambered Heart

The heart has two atria and two ventricles keeping oxygenated and deoxygenated blood completely separate.

(ii) Thick Left Ventricle

The left ventricle has thick walls to pump oxygenated blood with high pressure to the entire body.

(iii) Right ventricle Adaptation

The right ventricle pumps blood to the lungs with lower pressure to protect lung tissues.

(iv) Valves maintain One-way flow

Arterioventricular valves (tricuspid, bicuspid) and semilunar valves prevent backflow and keep blood moving forward.

(v) Septum Separates Blood

A thick interventricular septum prevents mixing of oxygenated and deoxygenated blood.

(vi) Coordinated Conduction System

SANode, AVnode, Bundle of His, and Purkinje fibres ensure rhythmic contraction for efficient blood flow in both circuits.

(vii) Elastic Arteries and Veins

Arteries and veins connected to the heart are adapted to handle pressure differences in the two circulations.

