

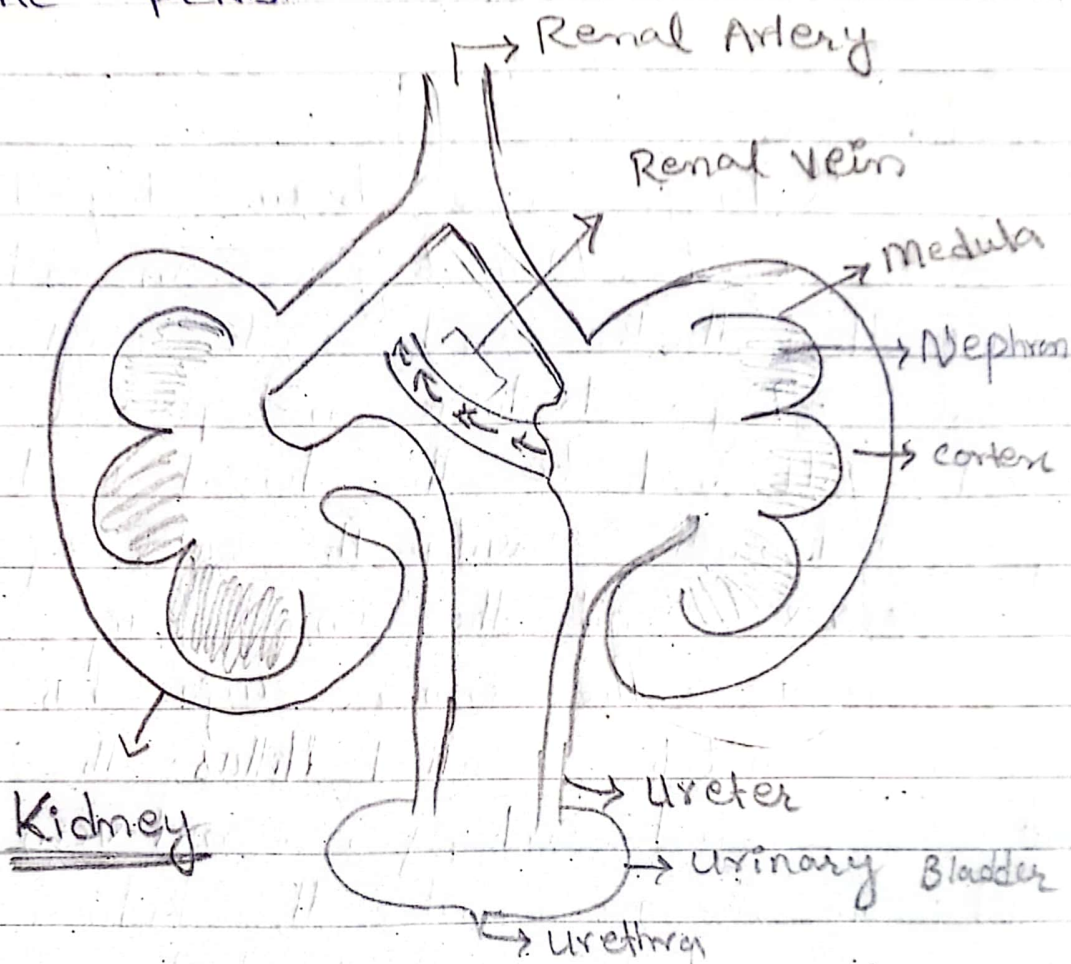
QUESTION NO. 3

(b) How does a kidney work?
Explain with diagram.

Kidney:

Kidney is a bean shaped organ about 10cm long, 5cm wide and 4cm thick and each weighing about 230g. Kidneys are present and attached to the dorsal wall of abdominal cavity. The outer surface is convex and the inner surface is concave. The inner surface has a deep notch called Hilus. The ureter, renal artery, renal vein and the nerves enter the kidney through the hilus. Each kidney is composed of microscopic Nephrons. The kidney is divided into two regions; the outer region is called renal cortex and the inner region termed as renal medulla. The medulla is sub-divided into

conical masses, renal pyramids, each having a broad base towards the cortex and a narrow end called renal papilla towards the pelvis.



Components of Kidney:

i) Renal Artery:

It carries oxygenated blood towards kidneys.

ii) Renal Vein:

It carries deoxygenated blood

blood away from the kidneys.

iii) Ureters:

Ureters conduct urine from the kidneys to the urinary bladder.

iv) Urinary Bladder:

It is a pear shaped sac situated in the pelvic region of the abdominal cavity. It can store about 400-500 ml of urine.

v) Urethra:

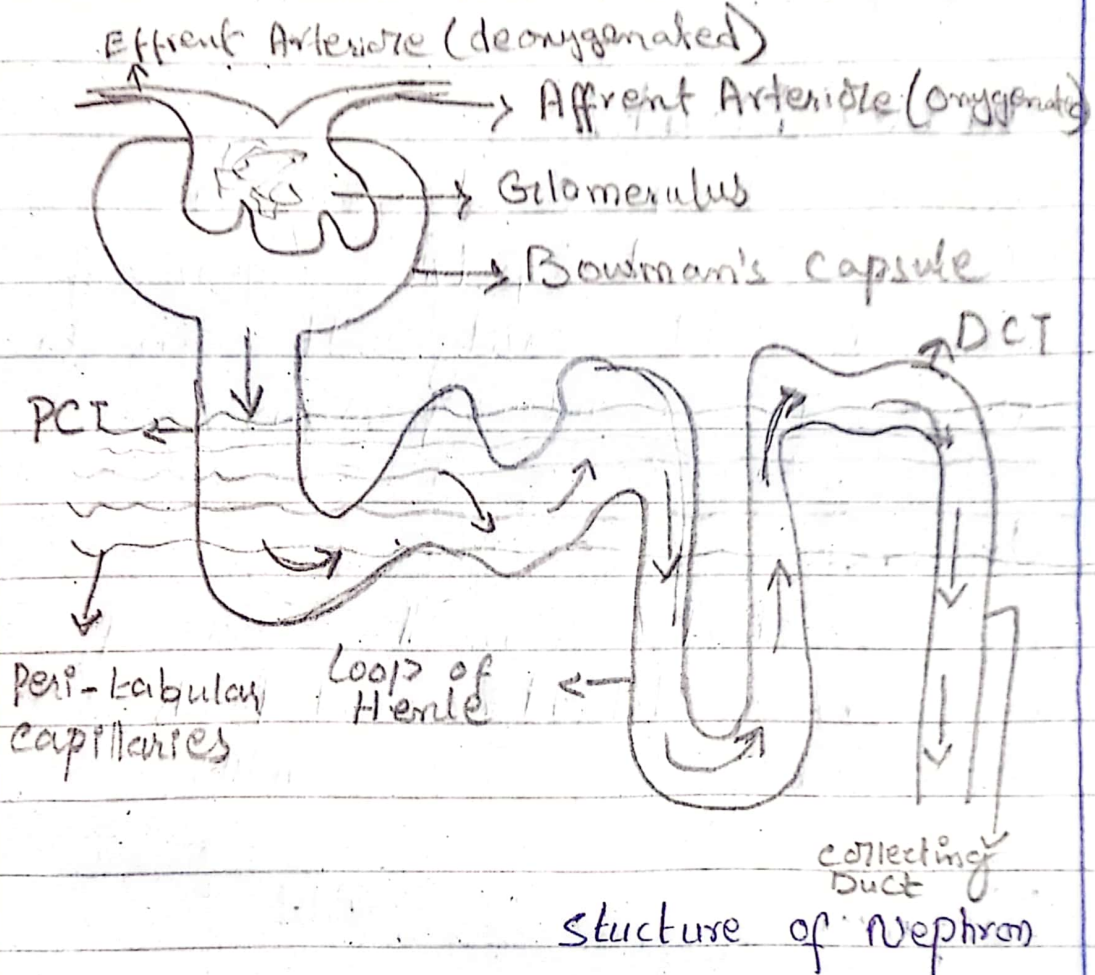
Urethra starts from the neck of the urinary bladder and leads to the exterior.

vi) Nephron

Nephron is basic, functional and structural unit of kidney. There are 20 million nephrons present in both kidneys. Each nephron has a length of about 3cm. It is differentiate into four regions having different anatomical features and different physiological

roles. Following are the regions:

- Bowman's Capsule
- Proximal Convoluted Tubule (PCT)
- Loop of Henle
- Distal Convoluted Tubule (DCT)



How Kidneys Work:

The main function of kidney is the urine formation which takes place into three steps. All the steps takes place in the nephron.

Step-1 (Filteration)

This process takes place in the

Glomerulus • Due to high blood pressure in the glomerulus the blood (except RBCs and plasma) is filtered into Bowman's capsule.

This filtrate is called Bowman's filtrate. It usually contains urea, acid, glucose, salts. From glomerulus, it is collected into renal corpuscle and then sent down into renal tubule.

Step-2 (Re-absorption)

Selective reabsorption takes place, by the network of capillaries which surrounds the tubules.

Firstly, glucose with much of water is absorbed and then some salts are also sent back to blood.

Step-3 (Excretion)

Unnecessary salts, urea, uric acid with excess of water (urine) in the tubule travels down to pelvis of the kidney; from where bladder is moved through ureter.