5. Describe the role of liver, lungs and skin in excretion.
Solution: Other than the kidneys, lungs, liver and skin also help in the elimination of excretory wastes. Lungs remove large amounts of CO_2 (18 litres/day) and also significant quantities of water every day. Liver secretes bile which contains substances like bilirubin, biliverdin, cholesterol, degraded steroid hormones, vitamins and drugs. Most of these substances ultimately pass out along with digestive wastes. The sweat and sebaceous glands in the skin can eliminate certain substances through their secretions. Sweat produced by the sweat glands is a watery fluid containing NaCl, small amounts of urea, lactic acid etc. Sebaceous glands eliminate certain substances like sterols, hydrocarbons and waxes through sebum.

6. Explain micturition.
Solution: The process of passing out urine from the urinary bladder is called micturition. Urine formed by the nephrons is ultimately carried to the urinary bladder where it is stored. This causes stretching of the wall of bladder that leads to the stimulation of stretch receptors on the walls of the bladder. This sends signal to the CNS. The CNS passes on motor messages to initiate the contraction of smooth muscles of the bladder and simultaneous relaxation of the urethral sphincter causing the release of urine.

7. Match the items of column I with those of column II.

Column I		Column II	
(a)	Ammonotelism	(i)	Birds
(b)	Bowman's capsule	(ii)	Water reabsorption
(c)	Micturition	(iii)	Bony fish
(d)	Uricotelism	(iv)	Urinary bladder
(d)	ADH	(v)	Renal tubule

Solution:
(a) - (iii), (b) - (v), (c) - (iv), (d) - (i), (e) - (ii)

8. What is meant by the term osmoregulation?
Solution: The regulation of water and solute contents of the body fluids by the kidney is called osmoregualtion.

9.Terrestrialanimalsaregenerallyeitherureotelic or uricotelic, not ammonotelic, why?
Solution: Ammonotelic animals are aquatic animals that excrete ammonia which is highly soluble in water, thus large amount of water is also excreted. Terrestrial animals cannot afford to lose such large quantities of water from their bodies as they live in environment having water scarcity. They, therefore, excrete either urea (ureotelic) or uric acid (uricotelic) as these are less soluble in water.

10. What is the significance of juxta glomerular apparatus (JGA) in kidney function?
Solution: Juxta glomerular apparatus (JGA) is a special sensitive region formed by cellular modifications in the distal convoluted tubule and the afferent arteriole at the location of their contact. The JGA plays a complex regulatory role. A fall in glomerular blood flow/ glomerular blood pressure/GFR can activate the JG cells to release renin which converts angiotensinogen in blood to angiotensin I and further to angiotensin II. Angiotensin II, being a powerful vasoconstrictor, increases the glomerular blood pressure and thereby GFR. Angiotensin II also activates the adrenal cortex to release aldosterone. Aldosterone causes reabsorption of Na^+ and water from the distal parts of the tubule. This also leads to an increase in blood pressure and GFR.

11. Name the following.
(a) A chordate animal having flame cells as excretory structures.
(b) Cortical portions projecting between the medullary pyramids in the human kidney.
(c) A loop of capillary running parallel to the Henle's loop.
Solution:
(a) Cephalochordate - Amphioxus
(b) Columns of Bertini
(c) Vasa recta

12. Fill in the gaps.
(a) Ascending limb of Henle's loop is_____to water whereas the descending limb is_____to it.
(b) Reabsorption of water from distal parts of the tubules is facilitated by hormone_____
(c) Dialysis fluid contains all the constituents as in plasma except_____
(d) A healthy adult human excretes (on an average)_____gm of urea/day.
Solution:
(a) Ascending limb of Henle's loop is impermeable to water whereas the descending limb is permeable to it.
(b) Reabsorption of water from distal parts of the tubules is facilitated by hormone ADH.
(c) Dialysis fluid contains all the constituents as in plasma except nitrogenous wastes.
(d) A healthy adult human excretes (on an average) 25 - 30 gm of urea/day.

********** END **********