

EXCRETORY PRODUCTS AND THEIR ELIMINATION

BIOLOGY

Single Correct Answer Type

- Which of the following is correct with reference to haemodialysis?
 - Absorbs and resends excess of ions
 - The dialysis unit has a coiled cellophane tube
 - Blood is pumped back through a suitable artery after haemodialysis
 - Anti-heparin is added prior to haemodialysis
- Polyuria is a condition in which
 - Amount of urine pass out is more
 - Amount of urine pass out is less
 - No urine pass out
 - No urine formation
- Glucose, Na, and amino acid are actively transported substances, because
 - Their movement occurs according to concentration gradient
 - Their movement occurs against concentration gradient
 - ATP is not needed for transportation
 - They are transported by simple diffusion
- Which of the following is both osmoregulator as well as nitrogenous product?
 - NH₃
 - Urea
 - Uric acid
 - All of these
- With respect to mode of excretion bony fishes are?
 - Osmoconformers
 - Ammonotelic
 - Uricotelic
 - Uriotelic
- Identify the true statements and choose the correct option accordingly
 - Blood vessel leading to the glomerulus is called efferent arteriole
 - Vasa-recta, peritubular capillaries and glomerulus, all have blood
 - Cortical nephrons have highly reduced vasa-recta
 - Vasa-recta runs parallel to the Henle's loop in the juaxta-medullary nephron
 - I, II and III
 - I, II and IV
 - I, III and IV
 - II, III and IV
- The yellow colour of urine is due to the presence of
 - Urea
 - Uric acid
 - Urochrome
 - Bilirubin
- Choose the correct option for A, B, C from given option

Excessive loss of fluid from body
Activate receptors which stimulate

↓

A

↓

To release the

B

↓

From neurohypophysis

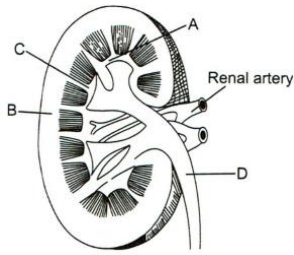
↓

Facilitate water reabsorption
from latter parts of the

↓

C

 - A-Adrenal cortex, B-ADH, C-PCT
 - A-Adrenal medulla, B-ADH, C-PCT
 - A-Hypothalamus, B-ADH, C-Distal tubules
 - A-Lungs, B-ADH, C-Distal tubules
- Structural and functional unit of the kidney is
 - Medulla
 - Nephridia
 - Nephron
 - Hilum
- Marine teleost fishes excrete
 - Uric acid
 - Ammonia
 - Urea
 - None of these
- Identify A to D in the given structure and choose the correct option accordingly



- a) A-Calyx, B-Cortex, C-Renal column, D-Ureter
 b) A-Calyx, B-Cortex, C-Renal column, D-Urethra
 c) A-Urethra, B-Cortex, C-Renal column, D-Calyx
 d) A-Urethra, B-Calyx, C-Renal column, D-Cortex
12. The net filtration pressure in the glomerulus of the kidney is
 a) 70 mm Hg b) 35 mm Hg c) 25 mm Hg d) 10 mm Hg
13. Loop of Henle is meant for the absorption of
 a) Potassium b) Glucose c) Water d) Carbon dioxide
14. Functioning of kidney is efficiently regulated by
 a) ANF b) JGA c) Both (a) and (b) d) Lungs
15. Select the correct pathway for the passage of urine in humans
 a) Renal vein → Renal ureter → Bladder → Urethra
 b) Collecting tubule → Ureter → bladder → Urethra
 c) Pelvis → Medulla → Bladder → Urethra
 d) Cortex → Medulla → Bladder → Ureter
16. The waste products produced in man which need excretion are?
 a) Carbon dioxide b) Urea and salts c) Excess of water d) All of these
17. Excretion of nitrogenous waste product in semisolid form occurs in
 a) Ureotelic animals b) Ammonotelic animals
 c) Uricotelic animals d) Amniotes
18. Juxta glomerular apparatus is modification in the
 a) Afferent arteriole and PCT b) Afferent arteriole and DCT
 c) Efferent arteriole and DCT d) Efferent arteriole and PCT
19. A large quantity of fluid is filtered every day by the nephrons in the kidneys. Only about 1% of it is excreted as urine. The remaining 99% of the filtrate
 a) Gets collected in the renal pelvis b) Is lost as sweat
 c) Is stored in the urinary bladder d) Is reabsorbed into the blood
20. Autoregulation of GFR (Glomerulus Filtration Rate) is takes place by
 a) Renin angiotensin mechanism b) Juxtaglomerulus apparatus
 c) Vasopressin d) All of the above
21. Physiologically urea is produced by the action of an enzyme
 a) Arginase b) Urease c) Uricase d) None of these
22. Malpighian body or renal corpuscle is/are
 a) Bowman's capsule b) Glomerulus
 c) Both (a) and (b) d) Proximal convoluted tubule
23. Among ammonia, uric acid and urea, which one is the most soluble?
 a) Ammonia b) Uric acid c) Both (a) and (b) d) Urea
24. The living steady state has a self-regulatory mechanism which is known as
 a) Feed back mechanism b) Homeotherms
 c) Homozygous d) Homeostasis
25. Uricotelism is found in
 a) Mammals and birds b) Fishes and freshwater protozoans
 c) Birds, reptiles and insects d) Frogs and toads
26. Volume of urine is regulated by

- a) Aldosterone
c) ADH
- b) Aldosterone and testosterone
d) Aldosterone and ADH
27. Urine is yellow in colour, due to
a) Prochrome b) Haemoglobin c) Urochrome d) Creative
28. Vasa recta is minute vessel of Peritubular capillaries network, which is
a) Also known as juxta-glomerular apparatus b) Running parallel to loop of Henle
c) Running parallel to PCT d) Running parallel to DCT
29. A person is undergoing prolonged fasting. His urine will be found to contain abnormal quantities of
a) Fats b) Ketones c) Amino acids d) Glucose
30. If excess water passes out from tissues without being restored by kidneys, the cells would
a) Burst open and die b) Not be affected at all
c) Extract water from plasma d) Shivel and die
31. Part of the kidney through which the ureter, blood vessels and nerves enters into it is
a) Renal cortex b) Renal medulla c) Hilum d) Urethra
32. Which one of the following correctly explains the function of a specific part of a human nephron?
a) Henle's loop – Most reabsorption of the major substances from the glomerular filtrate b) Distal convoluted tubule– Reabsorption of ions into the surrounding blood capillaries
c) Afferent arteriole– Carries the blood away from the glomerulus towards renal vein d) Podocytes– Create minute spaces (slit pores) for the filtration of blood into the Bowman's capsule
33. When does glomerular filtration occurs in Bowman's capsule?
a) When hydrostatic pressure of blood in the glomerulus is 70 mm Hg and net filtrate pressure is -25 mm Hg
b) When hydrostatic pressure of blood in the glomerulus is 70 mm Hg and net filtrate pressure is -35 mm Hg
c) When hydrostatic pressure of blood in the glomerulus is 70 mm Hg and net filtrate pressure is 10 mm Hg
d) When hydrostatic pressure of blood in the glomerulus is 70 mm Hg and net filtrate pressure is -70 mm Hg
34. Smell of urine is due to the
a) Urochrome b) Urinode c) Urea d) Melanin
35. The counter current mechanism operates in nephron
a) In ascending and descending limb of vasa recta b) In ascending limb of Henle's loop
c) In descending limb of Henle's loop d) Between the loop of Henle and vasa recta
36. The average quantity of urea excreted in urine by man per day is
a) 1-5 g b) 25-30 g c) 1-1.5 L d) 80 g
37. Melanuria is caused by the abnormal catabolism of
a) Alanine b) Tyrosine c) Proline d) Tryptophan
38. Which one of the following statements is correct with respect to kidney function regulation?
a) Exposure to cold temperature stimulates ADH release
b) An increase in glomerular blood flow stimulates formation of angiotensin II
c) During summer when body loses lot of water by evaporation, the release of ADH is suppressed
d) When someone drinks lot of water ADH release is stopped
39. Blood leaving liver and going towards heart is rich in
a) Bile b) Urea c) Ammonia d) Oxygen
40. Urea synthesis occurs in
a) Kidney b) Liver c) Brain d) Muscles
41. Green glands present in some arthropods help in
a) Respiration b) Excretion c) Digestion d) Reproduction
42. I. Na^+ II. H_2O
III. HCO_3^- IV. H^+

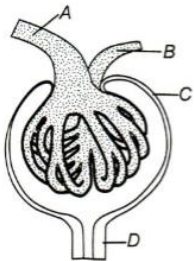
V. K^+ VI. NH_3

Which of the given ions are reabsorbed and secreted DCT?

Reabsorb Secreted

- a) I, II and III IV, V and VI b) IV, V and VI I, II and III
c) I, II and V III, IV and V d) III, IV, and VI I, II and V

43. Reabsorption of the filtrate in the renal tubules takes place by
a) Active means b) Passively means c) Either (a) or (b) d) Osmosis means
44. Aldosterone causes reabsorption of ...A... from distal part of tubule. This leads to increase in ...B... Here A and B refers to
a) A- Na^+ ; B - GFR b) A-water; B-GFR c) Both (a) and (b) d) A- Cl^- ; B-GFR
45. In human, excretory system consists of
I. pair of kidneys II. one pair of ureters
III. urinary bladder III. Urethra
V. skin VI. Lungs
VII. liver
a) I, II, III and II b) I, II, III and IV
c) I, II, III and IV d) I, II, III, IV, V, IV and VII
46. The net pressure gradient that cause the fluid to filter out of the glomeruli in the capsule is
a) 20 mm Hg b) 75 mm Hg c) 30 mm Hg d) 50 mm Hg
47. In the glomerulus of the nephron, the afferent arteriole is
a) Narrower than efferent arteriole b) Wider than efferent arteriole
c) Of some diameter as efferent arteriole d) Of same diameter as vasa-recta
48. NaCl is returned to interstitium by
a) Ascending limb of Henle's loop b) Descending limb of Henle's loop
c) Ascending limb of vasa recta d) Descending limb of vasa recta
49. Identify A to D in the following structure and choose the correct option for A, B, C and D



- a) A-Afferent arteriole, B-Efferent arteriole, C-Bowman's capsule, D-Proximal convoluted tubule
b) A-Efferent arteriole, B-Afferent arteriole, C-Bowman's DTC
c) A-Efferent arteriole, B-Efferent arteriole, C-Bowman's capsule, D-DCT
d) A-Efferent arteriole, B-Afferent arteriole, C-Bowman's capsule, D-DCT
50. Choose the correct statements
a) Sebaceous gland eliminate sterols, hydrocarbons, waxes
b) Secretion of sebaceous gland provide oily protective covering of skin
c) Small amount of nitrogenous wastes eliminated through saliva
d) All of the above
51. Choose the correct option with respect to the maximum urea level
a) Renal vein b) Hepatic vein c) Pulmonary artery d) Pulmonary vein
52. Renin is secreted from
a) Juxtaglomerular cells b) Podocytes c) Nephridia d) Stomach
53. Main function of DCT of nephron is to maintain the
a) pH in blood b) Na-K balance of blood
c) Both (a) and (b) d) Temperature of blood
54. Uric acid is the chief nitrogenous excretory component of
a) Man b) Earthworm c) Cockroach d) Frog

55. A fall in the GFR rate activates the
a) JG cells to release renin
b) JG cells to release aldosterone
c) JG cells to release epinephrine
d) JG cells to release nor-epinephrine
56. Name the condition when the concentration of ketone body increases in urine
a) Acromegaly
b) Ketonuria
c) Diabetes insipidus
d) Cushing's disease
57. The excretory organ in crustaceans, like prawns is
a) Antennal glands
b) Nephridia
c) Flame cells
d) Malpighian tubules
58. Which one of the following statements in regard to the excretion by the human kidneys is correct?
a) Descending limb of loop of Henle is impermeable to water
b) Distal convoluted tubule is incapable of reabsorption HCO_3
c) Nearly 99 per cent of the glomerular filtrate is reabsorbed by the renal tubules
d) Ascending limb of loop of Henle is impermeable to electrolytes
59. Glucose and amino acids are reabsorbed in the
a) Proximal tubule
b) Distal tubule
c) Collecting duct
d) Loop of Henle
60. What is the obligatory water reabsorption?
a) Reabsorption of water from PCT
b) Reabsorption of water from loop of Henle
c) Both (a) and (b)
d) Water secretion by Bowman's capsule
61. Ammonia or urea are the waste products, which are derived from
a) Proteins
b) Carbohydrate
c) Lipids
d) Fats
62. Transport of electrolytes through loop of Henle takes place by
a) Actively
b) Passively
c) Both (a) and (b)
d) Diffusion
63. Choose the correct statement.
a) The juxta medullary nephrons have reduced Henle's loop
b) Vasa recta is well developed in cortical nephrons
c) The PCT and DCT are situated in the medulla of the kidney
d) The ascending limb of the Henle's loop extends as the DCT
64. Which one is mismatched?
a) Bowman's capsule—Glomerular filtration
b) PCT—Absorption of Na^+ and K^+
c) DCT—Absorption of glucose
d) None of the above
65. In which of the following regions of a nephron, does maximum reabsorption of useful substances takes place?
a) Henle's loop
b) Glomerulus
c) Proximal convoluted tubule
d) Distal convoluted tubule
66. Urea cycle is also called
a) Kreb's cycle
b) Henselet cycle
c) Kreb-Henselet cycle
d) Dark reaction
67. Percentage of electrolytes and water reabsorbed by PCT is
a) 60-70
b) 70-80
c) 80-90
d) 90-95
68. ADH is also called
a) Vasopressin
b) Prolactin
c) Urease
d) Oxytocin
69. Gout is a condition in which
a) High level of urine in blood is found
b) High level of urea in blood is found
c) High level of uric acid in blood is found
d) All of the above
70. During urine formation, which of the following processes create high osmotic pressure in the uriniferous tubule?
a) Active Na^+ absorption, followed by absorption of Cl^-
b) Active Cl^- absorption, followed by absorption of Na^+
c) Active secretion of Na^+ into efferent arteriole followed by absorption of Cl^- into efferent renal arteriole
d) Active secretion of Cl^- and absorption of Na^+ into efferent renal arteriole
71. Order of toxicity among ammonia, urea and uric acid (from lower to higher) is
a) Uric acid < urea < ammonia
b) Uric acid < ammonia < urea
c) Urea < uric acid < ammonia
d) Ammonia < urea < uric acid

72. Which substance is in higher concentration in blood than in glomerular filtrate?
 a) Water b) Glucose c) Urea d) Plasma proteins
73. Average pH of human urine is
 a) 6.0 b) 9.0 c) 3.0 d) 7.0
74. A portion of uric acid is converted to urea and ammonia by intestinal
 a) Urogenolysis b) Ureolysis c) Uricolysis d) Ureotolysis
75. Mammals have the ability to produce
 a) Isotonic urine b) Hypertonic urine c) Hypotonic urine d) Acidic urine
76. The process of excretion is the
 a) Removal of useful substances from the body
 b) Removal of metabolic waste from the body
 c) Removal of the substances which have never been a part of the body
 d) Formation of useful substances in the body
77. Which one of the following amino acids is not found in proteins?
 a) Arginine b) Ornithine c) Aspartic acid d) Tyrosine
78. Inner to the hilum of the kidney, there is a broad funnel-shaped space called
 a) Renal pelvis b) Medulla c) Cortex d) Adrenal gland
79. Vasopressin released from the neurohypophysis is mainly responsible for
 a) Facultative reabsorption of water through Henle's loop
 b) Obligatory reabsorption of water through Bowman's capsule
 c) Facultative reabsorption of water through DCT
 d) Obligatory reabsorption of water through PCT
80. What will happen if the stretch receptors of the urinary bladder wall are totally removed?
 a) Urine will not collect in the bladder
 b) Micturition will continue
 c) Urine will continue to collect normally in the bladder
 d) There will be no micturition
81. Glomerulus is a tuft of capillaries formed by ...A... (A fine branch of renal artery). Blood from the glomerulus is carried away by an ...B...
 Select the correct option for A and B to complete the given NCERT statement
 a) A-efferent arteriole; B-afferent arteriole b) A-efferent arteriole; B-efferent arteriole
 c) A-afferent arteriole; B-afferent arteriole d) A-afferent arteriole, B-efferent arteriole
82. RAAS
 a) Is triggered when juxta-glomerular cells of JGA releases renin in response to various stimuli
 b) Is responsible for regulation of kidney function
 c) Is a powerful mechanism responsible for regulation of functioning of heart
 d) Both (a) and (b)
83. Nephritis is caused by
 a) Fungi b) Bacteria c) Virus d) Protozoa
84. Ammonia is converted into urea in
 a) Kidney b) Lungs c) Liver d) Spleen
85. Solenocytes are used for
 a) Elimination of nitrogenous excretory wastes b) Respiration
 c) Digestion d) All of the above
86. Nitrogenous waste products are eliminated mainly as
 a) Urea in tadpole and uric acid in adult frog b) Urea in adult frog and ammonia in tadpole
 c) Urea in tadpole as well as in adult frog d) Urea in tadpole and ammonia in adult frog
87. Accessory excretory organs are
 I. skin II. lungs
 III. liver IV. sebaceous gland
 Choose the correct option

- a) I and II b) II and III c) III and IV d) I, II, III and IV
88. Erythropoietin is secreted from
a) Pituitary gland b) Pancreas c) Adrenal gland d) Kidney
89. A fall in GFR activate ...A... to release ...B..., which converts angiotensinogen in blood to ...C... and further to ...D...
Choose the correct option for A, B, C, D from given options
a) A-JG cells, B-renin, C-angiotensin-I, D-angiotensin-II
b) A-renin, B-JG cells, C-angiotensin-I, D-angiotensin-II
c) A-renin, B-JG cells, C-angiotensin-II, D-angiotensin-I
d) A-JG cells, B-angiotensin, A-renin-I, D-angiotensin-II
90. The human kidney
a) Is responsible for the storage of nutrients such as glycogen
b) Concentrates the urine by actively transporting water out of the filtrate
c) Produces more dilute urine when the collection ducts become less permeable to water
d) Responds to antidiuretic hormone by increasing urine output
91. The excretory material of bony fish is
a) Urea b) Protein c) Ammonia d) Amino acid
92. The urine is
a) Hypotonic to blood and isotonic in medullary fluid
b) Hypertonic to blood and isotonic to medullary fluid
c) Isotonic to blood and hypotonic to medullary fluid
d) Isotonic to blood and hypertonic to medullary fluid
93. I. ADH
II. Renin-angiotensin
III. ANF
IV. Counter – current mechanism which
Choose the option containing factors, which regulates the osmoregulation of body fluids?
a) I, II and III b) II, III and IV c) I, II and IV d) All of the above
94. Counter current mechanism helps to maintain a concentration gradient. This gradient help in
a) Easy passage of water from medulla to collecting tubule and thereby concentrating urine
b) Easy passage of water from collecting tubule to interstitial fluid and thereby concentrating urine
c) Easy passage of water from medullary interstitial fluid to collecting tubule and thereby diluting urine
d) Inhibition of passage of water between the collecting tubule and medulla and so isotonic urine is formed
95. Choose the correct statement
I. Renal artery transport blood to kidney
II. Loop of Henle concentrate urine
III. Podocytes occur in inner wall of Bowman's capsule
IV. Ultrafiltrate is blood plasma minus protein
a) I, II and III b) I, II and IV c) I, II and IV d) None of these
96. While urine formation progress, which of the following process takes place in the region labelled as A, B, C and D in the given diagram?



- a) A-Collection of urine, B-Secretion C-Reabsorption, D-Pressure filtration

- b) A-Pressure filtration, B-Reabsorption C-Secretion, D-Collection of urine
 c) A-Pressure filtration, B-Secretion C-Reabsorption, D-Collection of urine
 d) A-Reabsorption, B-Secretion C-Pressure filtration, D-Collection of urine
97. Which one is the component of ornithine cycle?
 a) Ornithine, citrulline and fumaric acid b) Ornithine, citrulline and arginine
 c) Ornithine, citrulline and alanine d) Amino acids are not used
98. Collecting duct of nephron extends kidney from cortex to
 a) Capsule region b) Inner part of medulla
 c) Outer part of medulla d) Middle part of medulla
99. Kidney stones are produced due to deposition of uric acid and
 a) Silicates b) Minerals c) Calcium carbonate d) Calcium oxalate
100. Anuria is failure of
 a) Kidney to form urine b) Tubular secretion in kidney
 c) Tubular filtration in kidney d) Tubular reabsorption in kidney
101. Choose the correct order of urine formation in human
 a) PCT → ALH → DLH → DCT → CD b) ACH → DLH → PCT → DCT → CD
 c) PCT → DLH → ALH → DCT → CD d) CD → DCT → ACH → DLH → PCT
102. Consider the following statements
 I. Flame cells are excretory structures in flatworms.
 II. Green glands are excretory organs in annelids.
 III. Columns of Bertini are the conical projections of renal pelvis into renal medulla between the renal pyramids.
 a) I and II correct b) II and III incorrect c) I and III correct d) I, II and III correct
103. Arrange the following parts of the nephron in a sequential manner and select the correct option accordingly
 I. Glomerulus
 II. Bowman's capsule
 III. Henle's loop
 IV. Proximal convoluted tubule
 V. Collecting duct
 VI. Distal convoluted tubule
 a) I→II→III→IV→V→VI b) I→II→IV→III→VI→V c) I→II→IV→III→V→VI d) VI→III→II→I→VI→V
104. The outline of principal event of urination is given below in unorder manner
 I. Stretch receptors on the wall of urinary bladder send signal to the CNS
 II. The bladder fills with urine and becomes distended
 III. Micturition
 IV. CNS passes on motor messenger to initiate the contraction smooth muscles of bladder and simultaneous relaxation of urethral sphincter
 The correct order of steps for urination is
 a) II→I→IV→III b) IV→III→II→I c) II→I→III→IV d) III→II→I→IV
105. Malpighian tubules are the excretory structures of
 a) Insects b) Mammals c) Birds d) Reptiles
106. The first step in the urine formation is the filtration of the blood, which is carried by the ...A... and is called ...B.... On an average ...C... mL of blood is filtered by kidneys per minute, which constitutes ...D... of the blood pumped out by each ventricle of the heart in a minute.
 Choose the correct options for the blanks A to D to complete the given NCERT statement
 a) A-glomerulus; B-filtration, C-800-900, D - $\frac{1}{4}$ th
 b) A-glomerulus; B-filtration, C-1100-1200, D - $\frac{1}{5}$ th
 c) A-glomerulus; B-filtration, C-1100-1300, D - $\frac{1}{6}$ th

d) A-glomerulus; B-filtration, C-1100-1500, D - $\frac{1}{5}$ th

107. Choose the correct ones

I. Vasa recta is lacking in cortical nephrons

II. Maximum number of nephrons in kidney are juxta-medullary type

III. DCT of many nephrons open into collecting tubule

IV. During summer when body loses lot of water by evaporation, the release of ADH is suppressed

V. When someone drinks lot of water, ADH release is suppressed

VI. Exposure to cold temperature stimulates ADH release

VII. An increase in glomerular blood flow stimulates formation of angiotensin II

The correct option is

a) All except I and IV b) All except V and VII c) All except I and V d) All except II and VI

108. All Bowman's capsules of the kidney are found in

a) Pelvis b) Medulla c) Cortex d) None of these

109. Human kidneys can produce urine nearly

a) Three times concentrated than initial filtrate

b) Four times concentrated than initial filtrate

c) Five times concentrated than initial filtrate

d) Six times concentrated than initial filtrate

110. ANF (Anti Natriuretic Factor) is released by

a) Lung b) Kidney c) Heart d) All of the above

111. Mammals excrete

a) Urea b) Uric acid c) Ammonia d) All of these

112. Medullary gradient is mainly developed due to

a) NaCl and urea b) NaCl and glucose
c) Glucose and urea d) Ammonia and glucose

113. An adult human excretes on an average

a) 2-3 litres of urine per day b) 1-1.5 litres of urine per day
c) 2-5 litres of urine per day d) 4-5 litres of urine per day

114. Angiotensin-II activates theA.... and releaseB.....

Choose the correct option for A and B to complete the given statement

a) A-adrenal cortex; B-aldosterone b) A-adrenal medulla; B-aldosterone
c) A-adrenal capsule; B-aldosterone d) A-adrenal medulla; B-oxytocin

115. I. Ureter II. Renal pelvis, III. Calyx IV. Urinary bladder V. Urethra

Choose the correct sequence of urine route to outside

a) I→II→III→IV→V b) V→IV→III→II→I c) V→III→IV→I→II d) III→II→I→IV→V

116. Loop of Henle is associated with

a) Excretory system b) Respiratory system c) Reproductive system d) Digestive system

117. For brain cells the ammonia is very toxic because

a) Ammonia (NH_4^+ ions) affect the brain cell functioning by changing polarity of cell membrane
b) Ammonia is not very toxic to the other cell than brain cells
c) Ammonia is highly stable in brain cells
d) Ammonia penetrate the cell membrane of brain cells

118. NaCl is transported by ascending limb of Henle's loop, which is exchanged with

a) DCT b) PCT
c) Ascending limb of vasa recta d) Descending limb of vasa recta

119. Which one is related to urine concentration in mammals?

a) Testosterone hormone b) Antidiuretic hormone
c) Oxytocin hormone d) All of these

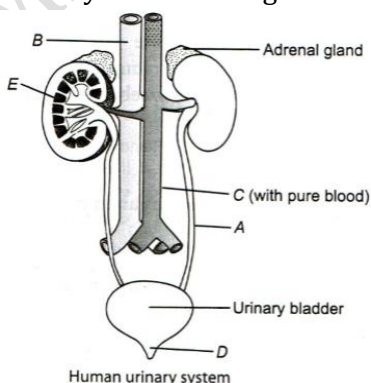
120. Characteristic common in frog and human

I. Internal fertilisation

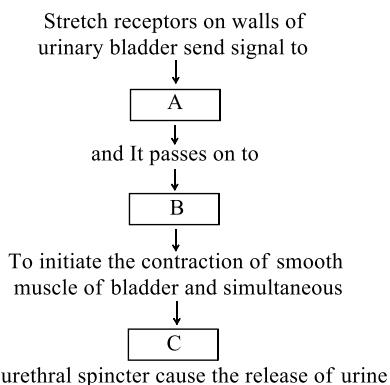
- II. Nucleated RBC
- III. Four chamber heart
- IV. Ureotalic excretion
- V. Lungs are organ of respiration

The correct option is

- a) I and III b) II and IV c) II and IV d) Only IV
121. A child has single kidney since birth. This variation is
 a) Hybridization b) Negative meristic c) Blastogenic d) Substantive
122. Haemodialysis helps in patient having
 a) Anaemia b) Uremia c) Goitre d) Diabetes
123. JGA (Juxta Glomerular Apparatus), a sensitive region, which regulates the glomerular filtration rate is present near the
 a) DCT and PCT b) DCT and efferent arteriole
 c) DCT and afferent arteriole d) Loop of Henle's and DTC
124. Choose the correct statements
 I. Kidney transplantation is the ultimate method at the stage where drug or dialysis do not help
 II. Close relatives are often used as kidney donors to minimise risk of rejection
 III. Cylosporin-A is used as immunosuppressive agent in kidney transplant patient
 IV. Heparin and antiheparin are used in haemodialysis
 Choose the correct option
 a) I, II and III b) IV, III and II c) I, III and IV d) I, II, III and IV
125. What is glycosuria?
 a) Low amount of sugar in urine b) Low amount of fat in urine
 c) Average amount of carbohydrate in urine d) High amount of sugar in urine
126. An organism which don't have loop of Henle will excrete
 a) No urine b) Dilute urine c) Concentrated urine d) No change in urine
127. Which among the following is the only osmoconformer vertebrate?
 a) Rabbit b) Hagfish c) Bird d) None of these
128. Duct of Bellini opens on
 a) Ureter b) Renal papilla c) Duodenum d) DCT
129. Ornithine cycle refers to the sequence of biochemical reactions taking place in the
 a) Oral cavity b) Liver c) Pancreas d) Stomach
130. In the nephron of rabbit, reabsorption of glucose occurs in
 a) Descending limb of Henle's loop b) Proximal convoluted tubule
 c) Distal convoluted tubule d) Ascending limb of Henle's loop
131. Facultative water reabsorption is
 a) Reabsorption of water in PCT through ADH
 b) Reabsorption of water in Loop of through ADH
 c) Reabsorption of water in DCT and CT through ADH
 d) All of the above
132. Identify A to E in the given structure and choose the correct option accordingly



- a) A-Ureter, B-Inferior vana cava, C-Dorsal aorta, D-Urethra, E-Medulla
 b) A-Ureter, B-Inferior vana cava, C-Dorsal aorta, D-Pelvis, E-Urethra
 c) A-Ureter, B-Inferior vana cava, C-Dorsal aorta, D-Urethra, E-Pelvis
 d) A-Ureter, B-Inferior vana cava, E-Pelvis, D-Dorsal aorta, E-Urethra
133. Excretory product of spider is
 a) Uric acid b) Ammonia c) Guanine d) None of these
134. Henle's loop of nephron plays a significant role in maintaining a high osmolarity in
 a) Interstitial fluid of hilum b) Medullary interstitial fluid
 c) Cortex interstitial fluid d) All of the above
135. Micturition reflex is a neural mechanism to
 a) Release sweat b) Formation of urine
 c) Release urine d) Release inorganic substance to the urine
136. Choose the right option for A, B, C from given options



- a) A-CNS, B-Motor message, C-Extraction b) A-ANS, B-Motor message, C-Relaxation
 c) A-PNS, B-Motor message, C-Extraction d) A-CNS, B-Motor message, C-Relaxation
137. Identify the wrong statements about human excretory system and choose the correct option accordingly
- I. Kidneys are reddish brown and bean-shaped structure
 II. Kidneys are situated between the last thoracic and third lumbar vertebra
 III. Each kidney of an adult human measures 10-12 cm in length, 5-7 cm in width, 2-3 cm thickness, and average weight 120-170 gram
- a) I and II b) II and III c) III and I d) None of these
138. The region of the nephrons found in the renal medulla is
 a) Malpighian corpuscle b) Proximal convoluted tubule
 c) Distal convoluted tubule d) Henle's loop
139. Antennary glands of crustaceans are meant for
 a) Excretion b) Respiration c) Digestion d) Circulation
140. Functional kidney of frog tadpole is
 a) Archiperos b) Pronephros c) Mesonephros d) Metanephros
141. Specific gravity of urine normally is
 a) 1.010-1.015 b) 1.015-1.020 c) 1.020-1.025 d) Both (a) and (b)
142. During hemodialysis process
- I. blood drained from a convenient artery and anticoagulant is added (heparin)
 II. removal of nitrogenous waste from blood
 III. blood is passed through a coiled porous cellophane membrane of tube bathing in dialysis fluid
 IV. blood is mixed with antiheparin and passed into vein
- Arrange the steps
- a) I→II→III→IV b) IV→III→II→I c) I→III→II→IV d) I→IV→II→III
143. The renal fluid isotonic to the cortical fluid and blood is found in
 a) The collecting duct and ascending limb
 b) The distal convoluted tubule and ascending limb
 c) The proximal convoluted tubule and distal convoluted tube

- d) The ascending limb and descending limb
144. Which one of the following statements is false?
- Presence of albumin in urine is albuminuria
 - Presence of glucose in urine is glycosuria
 - Presence of ketone sugar in urine is Ketonuria
 - Presence of excess urea in blood is uremia
145. I. Reabsorption of water occurs passively in the initial segment of nephron
 II. Nitrogenous waste are absorbed by active transport
 III. Conditional reabsorption of Na^+ and water takes place in DCT
 IV. DCT reabsorbs glucose
 V. DCT is capable of selective secretion of H^+ , K^+ and NH_3 to maintain pH and $\text{Na}^+ - \text{K}^+$ balance in blood
 VI. Substances like glucose, amino acids, Na^+ , etc, in the filtrate are reabsorbed actively
 Choose the option with incorrect statements
- I and II
 - III and IV
 - V and VI
 - II and IV
146. Each nephron has two parts, which are
- Bowman's capsule and P C T
 - Glomerulus and renal tubule
 - Glomerulus and Bowman's capsule
 - Bowman's capsule and renal tubule
147. Identify the correct statements
- The outer layer of the kidney is called capsule
 - Cortex is divided into outer cortex and inner medulla
 - Medulla is divided into medullary pyramids
 - The cortex extends in between the medullary pyramids which is called as columns of Bertini
- Choose the correct option accordingly
- I, III and IV
 - I and IV
 - I, II and III
 - I, II, III and IV
148. Out of the four parts given below, which parts play significant role in forming concentrated urine in human?
- Loop of Henle
 - Glomerulus
 - Bowman's capsule
 - Vasa recta
- The correct option is
- I and II
 - III and IV
 - II and III
 - I and IV
149. Aldosterone causes conditional reabsorption of in the distal part of tubule
- CO_2
 - Ca^{2+}
 - Na^+
 - Cl^-
150. Alkaptonuria is a condition in which
- Accumulation of homogenetic acid in blood
 - Excretion of homogenetic acid in sweat
 - Excretion of homogenetic acid in urine
 - All of the above
151. Sweat produced by sweat glands is a watery fluid which contain
- NaCl
 - Urea
 - Lactic acid
 - All of the above
152. GFR (Glomerular Filtration Rate) is the amount of filtrate formed by the kidney per
- Hour
 - Second
 - Minute
 - 10 seconds
153. Ammonia produced by metabolism is converted into the ...A... in the ...B... in ureotelic and released into the blood, which is filtered and excreted out by ...C...
 Choose the appropriate options for A, B and C to complete the given NCERT statement
- A-uric acid, B-spleen, C-kidney
 - A-uric acid, B-liver, C-kidney
 - A-urea, B-liver, C-kidney
 - A-urea, B-spleen, C-kidney
154. How much percentage of the filtrate is reabsorbed in the renal tubules?
- 5%
 - 25%
 - 90%
 - 99%
155. Which one of the following statements is correct with respect to salt water balance inside the body of living organisms?

- a) When water is not available camels do not produce urine but store urea in tissues
 b) Salmon fish excretes lot of stored salt through gill membrane when in fresh water
 c) *Paramecium* discharges concentrated salt solution by contractile vacuoles
 d) The body fluids of freshwater animals are generally hypotonic to surrounding water
156. Find the correct option regarding mechanism of urine formation in man.
 a) The glomerular filtration rate is about 125 mL/min
 b) The ultra filtration is opposed by the colloidal osmotic pressure of plasma
 c) Tubular secretion takes place in the PCT
 d) Aldosterone induces greater reabsorption of sodium
157. pH of urine (average pH) is
 a) 7.0 b) 6.5 c) 7.5 d) 6.0
158. If one liter of water is introduced in human blood, then
 a) BMR increases b) RBC collapses and urine production increases
 c) RBC collapses and urine production decreases d) BMR decreases
159. Large amount of water is ...A... from collecting duct to produce ...B... urine. This segment allows passage of small amounts of ...C... into interstitium of medulla to keep up the osmolarity.
 Here, A, B and C refers to
 a) A-secreted, B-dilute, C-sugar b) A-secreted, B-dilute, C-NH₃
 c) A-secreted, B-dilute, C-urea d) A-reabsorbed, B-concentrated, C-urea
160. I. Glucose
 II. Amino acid
 III. Na⁺
 IV. Nitrogenous waste
 Which of them reabsorbed actively in the nephron?
 Choose the correct option
 a) I and II b) I, II and III c) I and III d) Only I
161. Reabsorption of water in DCT and CT part of nephron is function of
 a) Prolactin b) Oxytocin
 c) Vasopressin d) Luteinising hormone
162. Choose the false statement
 a) Tubular cells secretes H⁺, K⁺, ammonia to filtrate
 b) Tubular cells helps to maintain the acid base balance of the body fluid
 c) Tubular cells helps in ionic balance
 d) Tubular secretion is not very important step in urine formation
163. In micturition,
 a) Urethra relaxes b) Ureter relaxes c) Ureter contracts d) Urethra contracts
164. Haemodialysis is associated with
 a) Liver b) Spleen c) Kidney d) Stomach
165. Glomerular filtrate is
 a) Blood minus blood corpuscles and plasma protein
 b) Blood minus corpuscles
 c) Mixture of water, ammonia and corpuscles
 d) Urine
166. ANF mechanism checks on
 a) Oxytocin – renin mechanism b) Counter – current mechanism
 c) Renin – angiotensin mechanism d) Oxytocin – angiotensin mechanism
167. Urine formed by nephrons is ultimately carried to ...A... where at stored fill a voluntary signal is given by the ...B... This signal is initiated by ...C... of urinary bladder as it gets filled with urine.
 Choose the correct option for A, B and C to complete the given NCERT statement
 a) A-urethra, B-CNS, C-PNS b) A-urinary bladder, B-CNS, C-stretching
 c) A-urethra, B-CNS, C-stretching d) A-urethra, B-CNS, C-ANS

III. Glomerular filtrate is diluted in ascending limb of loop of Henle

IV. Juxtra-glomerular apparatus is found

codes

A B C D

a) I II III IV

b) I II IV III

c) II III I IV

d) III II IV I

180. Urine formation involves

I. glomerular filtration

II. tubular reabsorption

III. tubular secretion

Choose the correct option for the above statements

a) I and II

b) II and III

c) I and III

d) I, II and III

181. The shape of vasa recta is

a) L-shaped

b) U-shaped

c) S-shaped

d) J-shaped

182. Animal which excrete urea, produced during metabolism of amino acid, belongs to

a) Ureotelism

b) Uricotelism

c) Ammonotelism

d) Aminotelism

183. RASS secretes which of the following hormone?

a) Mineralocorticoids

b) Glucocorticoids

c) Both (a) and (b)

d) None of the above

184. Choose the correct statement

I. Flame cell is a specialised excretory organ in flatworms

II. Bundles of flame cells are called protonephridia.

The correct option is

a) Only I

b) Only II

c) I and II

d) Neither I nor II

185. Which term is used both for a part of kidney and a part of skeleton in the mammals?

a) Centrum

b) Pelvis

c) Cortex

d) Medulla

186. Excretion of bile pigments in the urine indicates

a) Rickets

b) Jaundice

c) Diabetes

d) Anaemia

187. The proximity between Henle's loop and vasa-recta as well as the counter current in them help in maintain an ...A... in molarity towards inner interstitium medullary, region, *i. e.*, from ...B... mos mol^{-1} in the cortex to about ...C... m mol^{-1} in the inner medulla

Here a, b and c refers to

a) A-increasing, B-500, C-800

b) A-decreasing, B-300, C-1200

c) A-decreasing, B-1200, C-300

d) A-increasing, B-300, C-1200

188. Out of

I. PCT

II. DCT

III. Loop of Henle

IV. Collecting duct

Which contributes most in maintaining pH of blood?

a) I and II

b) II and III

c) III and IV

d) I and IV

189. A man takes large amount of proteins. He is likely to excrete a greater amount of

a) Urea

b) Uric acid

c) Sugar

d) None of these

190. Excretion means

a) Formation of those substances which have some role in the body

b) Removal of such substances which have never been part of the body

c) Removal of useless substances and substances present in excess

d) All of the above

191. Renin is released by

a) Hypothalamus

b) Posterior lobe of pituitary

c) Anterior lobe of pituitary

d) J G cells

192. If Henle's loop were absent from mammalian nephron, which of the following is to be expected?

a) The urine will be more concentrated

- b) The urine will be more dilute
 c) There will be no urine formation
 d) There will be hardly any change in the quality and quantity of urine formed
193. PCT is lined by
 a) Cuboidal epithelium
 b) Squamous epithelium
 c) Columnar epithelium
 d) Stratified epithelium
194. Which of the following disorder is an outcome of irregularities in metabolism of the nitrogenous waste?
 a) Osteoporosis
 b) Gouty arthritis
 c) Osteoarthritis
 d) Rheumatoid arthritis
195. Juxtaglomerular cells of renal cortex synthesize an enzyme called
 a) ADH
 b) Oxytocin
 c) Rennin
 d) Urochrome
196. In majority of nephrons, the loop of Henley's is found in the
 a) Cortical region of the kidney
 b) Medullary region of the kidney
 c) Both (a) and (b)
 d) Pelvis region of the kidney
197. Osmoregulation is the function of
 a) Oxytocin
 b) ADH
 c) Prolactin
 d) Both (a) and (b)
198. An increase in the body fluid volume can switch off the ...A... and ...B... the ADH release. In this way complete the ...C...
 Choose the correct option for A, B and C
 a) A-osmoreceptors, B-increase, C-feedback
 b) A-osmoreceptors, B-suppress, C-feedback
 c) A-kidney filtration, B-increase, C-feedback
 d) A-kidney filtration, B-suppress, C-feedback
199. Which of the following is first formed nitrogenous waste of vertebrate?
 a) NH_2
 b) Urea
 c) NH_3
 d) NH_4
200. Urine is concentrated in which part of nephron
 a) CT
 b) PCT
 c) Bowman's capsule
 d) JGA
201. The condition where urea accumulates in blood is
 a) Glycosuria
 b) Uremia
 c) Ketonuria
 d) Acidosis
202. A bird excretes nitrogenous waste materials in the form of
 a) Uric acid
 b) Ammonia
 c) Urea
 d) Amino acids
203. In human, the waste products of nucleotide metabolism are excreted as
 a) Ammonia
 b) Uric acid
 c) Urea
 d) Amino acid
204. Among ammonia, uric acid and urea; which one needs the least amount of water to excrete?
 a) Ammonia
 b) Uric acid
 c) Urea
 d) Both (b) and (c)
205. I. Excess loss of water from body
 II. Hypothalamus
 III. Osmoreceptors
 IV. ADH
 V. Neurohypophysis
 VI. Water reabsorption DCT and CT
 VII. Prevention of diuresis
 Arrange the given processes in correct sequence for regulation in kidney
 a) I→II→III→IV→V→VI→VII
 b) VII→VI→V→IV→III→II→I
 c) I→III→II→V→IV→VI→VII
 d) I→III→II→IV→V→VII→VI
206. Angiotensin-II being a powerful ...A... increase the glomerular blood pressure and there by ...B... .
 Angiotensin-II also activates the adrenal cortex to release ...C....
 Find the correct for A, B and C
 a) A-vasodilator, B-GFR, C-vasopressin
 b) A-vasodilator, B-GFR, C-aldosterone
 c) A-vasoconstrictor, B-GFR, C-aldosterone
 d) A-vasoconstrictor, B-GFR, C- vasopressin
207. Urine is concentrated in
 a) Kidney
 b) Liver
 c) Colon
 d) Heart
208. Which one of the following is not a part of a renal pyramid?

- a) Convoluted tubules
c) Hanle's loop
209. Primary function of sweat in humans is
a) Excretion b) Cooling of skin
c) Both of (a) and (b) d) Removal of urea
210. Which of the following are secreted by liver?
I. Bilirubin
II. Biliverdin
III. Cholesterol
IV. Degraded steroid hormone
V. Vitamin
VI. Drug
Choose the correct option
a) I, II, III and IV b) II, III, IV and V c) III, IV, V and VI d) I, II, III, IV, V and VI
211. Functions of ADH
I. reabsorption of water from distal tubules
II. secretion of water from distal tubules
III. constriction of blood vessels
IV. dilatation of blood vessels
V. increase the blood flow
VI. decrease the blood flow
Choose the correct combination of given functions from given option
a) I, III, IV and V b) I, IV and V c) I, III and V d) II, IV and VI
212. Which of the following is responsible for excretion of dilute urine?
a) More secretion of insulin b) Less secretion of vasopressin
c) More secretion of Aldosterone d) Less secretion of glucagon
213. The size of filtration slits of glomerulus is
a) 10 nm b) 15 nm c) 20 nm d) 25 nm
214. Indication of diabetes mellitus is/are
a) Presence of glucose in urine b) Presence of ketone bodies in urine
c) Presence of amino acid in urine d) Both (a) and (b)
215. The vital morphological and physiological units of mammalian kidney are
a) Ureters b) Uriniferous tubule
c) Nephridia d) Seminiferous tubules
216. If you take large amount of protein then you will likely to excrete large amount of the
a) Uric acid b) Urea c) Ammonia d) Amino acid
217. Choose the correct option from given options in referenced to haemodialysis
I. Blood pumped back to suitable artery
II. Heparin is used after haemodialysis
III. Nitrogenous waste are removed by active transport
IV. The dialysis unit has coiled cello phone tube
V. Blood is pumped into dialysing unit from the artery
The correct option is
a) I, II and III b) II, IV and V c) III and IV d) IV and V
218. Major nitrogenous waste product in ureotelic animals like rabbit and other mammals is
a) Uric acid b) Urea c) Ammonia d) Amino acids
219. Urea cycle was discovered in
a) 1940 b) 1945 c) 1950 d) 1932
220. Glomerular area of adrenal cortex is responsible for
a) Water and electrolyte balance b) Carbohydrate metabolism
c) Steroid and hormone secretion d) Blood pressure
221. Filtration in Malpighian body of the nephrons involves

- a) One layer b) Two layer c) Three layer d) Four layer
222. Podocytes are the cells present in
 a) Cortex of nephron b) Inner wall of Bowman's capsule
 c) Outer wall of Bowman's capsule d) Wall of glomerular capillaries
223. The characteristic that is shared by urea, uric acid and ammonia is/are
 I. They are nitrogenous wastes.
 II. They all need very large amount of water for excretion.
 III. They are all equally toxic.
 IV. They are equally in the kidneys.
 a) I and III b) I and IV c) I, III and IV d) I only
224. Uricotelic mode of passing out nitrogenous wastes is found in
 a) Birds and annelids b) Amphibians and reptiles
 c) Insects and amphibians d) Reptiles and birds
225. Main function of glomerulus is
 a) Filtration of urine b) Reabsorption of H₂O
 c) Reabsorption of Na⁺ d) Concentration of urine
226. The expulsion of urine from the urinary bladder is called
 a) Uricolysis b) Micturition c) Ornithine d) None of these
227. Which one is not correct?
 a) Humans-Ureotelic b) Birds-Uricotelic c) Lizards-Uricotelic d) Whale-Ammonotelic
228. ADH is secreted by
 a) Anterior lobe of pituitary b) Middle lobe of pituitary
 c) Posterior lobe of pituitary d) All of the above
229. The function of Henle's loop is
 a) Passage of urine b) Formation of urine
 c) Conservation of water d) Filtration of water
230. Choose the correct ones
 I. **Afferent arteriole** carries the blood away from the glomerulus toward renal vein
 II. **Efferent arteriole** carries the blood to glomerulus
 III. **Podocytes** form minute spaces (slit pores) for the filtration of blood into the Bowman's capsule
 IV. **In Henle's loop** There are most reabsorption of the major substances from the glomerular filtrate
 V. **Distal convoluted tubule** reabsorption K⁺ ions into the surrounding blood capillaries
 The correct option is
 a) I, II and III b) III, IV and V c) Only III d) Only IV
231. Select the right option
 a) Nitrogenous excretory products are synthesised in kidney and eliminated in liver
 b) Nitrogenous excretory products are synthesised in kidney, and eliminated also
 c) Nitrogenous excretory products are synthesised in liver, and eliminated via bile juice
 d) Nitrogenous excretory products are synthesised in liver eliminated by kidney
232. Glomerulus is formed by
 a) Branch from renal vein b) Uriniferous tubule
 c) Branch from renal artery d) Coiling of proximal part of uriniferous tubule
233. In uremia condition the urea can be removed by a process called
 a) Haemolysis b) Haemodialysis c) Dialysis d) Micturition
234. Which is not correct with respect to human kidney?
 a) The peripheral region is called cortex and central medulla
 b) Malpighian capsule are present in the cortex region
 c) Blood enters glomerulus through efferent arterioles
 d) The concave part of kidney is called hilus
235. Composition of urine
 I. Water ...A%

II. Urea ...B%

III. Uric acid ...C%

IV. Salt ...D%

Choose the right options for A, B, C and D from given options

a) A-90; B-2.0; C-1; D-2

b) A-95; B-2.6; C-0.3; D-1.5

c) A-80; B-2.6; C-0.3; D-1.5

d) A-85; B-2.6; C-0.3; D-1.5

236. What happens in micturition?

a) Contraction of smooth muscles of bladder

b) Relaxation of the urethral sphincter

c) Release of urine

d) All of the above

237. GFR is a healthy individual is

a) 125 mL/min

b) 150 L/day

c) 125 mL/sec

d) 135 L/day

238. Longest loop of Henle is found in

a) Kangaroo rat

b) Opossum

c) rhesus monkey

d) All of these

239. Most of the secretory product of liver ultimately pass out along with

a) Urine

b) Digestive wastes

c) Urea

d) Sweat

240. Guano is

a) Bird's nitrogenous excretion

b) Men's nitrogenous excretion

c) Fish's nitrogenous excretion

d) Amphibian's nitrogenous excretion

241. An increase in blood flow to atria of heart can cause release of ...A... causes ...B... and there by decrease the blood pressure. ANF mechanism therefore acts as checks on ...C...

Here, A - C refers to

a) A-ANF, B-vaso constrictor, C-renin-angiotensin mechanism

b) A-ANF, B-vasodilator, C-renin-angiotensin mechanism

c) A-vasopressin, B-vasodilator, C-renin-angiotensin mechanism

d) A-vasopressin, B-vaso constrictor, C-renin-angiotensin mechanism

242. Which of the following statements is/are true?

I. Urine is hypertonic in distal convoluted tubule.

II. When the urine passes into the collecting tubule, it becomes hypotonic.

III. Urine is isotonic in proximal convoluted tubule.

IV. Urine becomes more and more hypotonic as it passes through the Henle's loop.

a) I and IV

b) I, II and III

c) II and III

d) I only

243. Triazines are derived from

a) Uric acid

b) Urea

c) Ammonia

d) None of these

244. The human kidney has about

a) One million nephrons

b) Two million nephrons

c) Three million nephrons

d) Ten million nephrons

245. In ornithine cycle, which of the following wastes are removed from the blood?

a) Urea and urine

b) Ammonia and urea

c) Carbon dioxide and ammonia

d) Carbon dioxide and urea

246. Which one of the following groups of structures/organs have similar function?

a) Typhlosole in earthworm, intestinal villi in rat and contractile vacuole in *Amoeba*

b) Nephridia in earthworm, Malpighian tubules in cockroach and urinary tubules in rat

c) Antennae of cockroach, tympanum of frog and clitellum of earthworm

d) Incisors of rat, gizzard (proventriculus) of cockroach and tube feet of starfish

247. Reabsorption of glucose occurs in of the nephron

a) Loop of Henle

b) PCT

c) DCT

d) Collecting duct

248. Read the statements given below

I. Reabsorption in this region in minimum

II. This region plays a significant role in the maintenance of high osmolarity of intestinal fluid

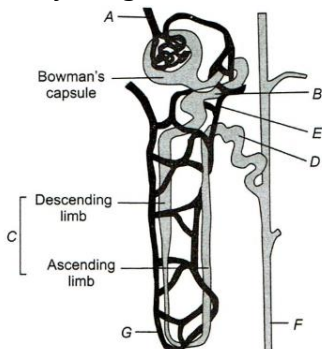
III. Its descending limb is permeable to water but almost impermeable to electrolytes

IV. Its ascending limb is impermeable to water but allows transport of electrolyte actively or passively

V. In descending limb filtrate is hypertonic, while in ascending limb filtrate is hypotonic

The above characteristics are associated with

- a) PCT b) Loop of Henle's c) DCT d) Bowman's capsule
249. In 24 hours, total glomerular filtrate formed in the human kidney is
a) 1.7 litres b) 7 litre c) 17 litres d) 170 litres
250. Bowman's capsule is found in
a) Glomerulus b) Uriniferous tubule
c) Nephron d) Malpighian capsule
251. Glucose is mainly absorbed in
a) PCT b) DCT c) Henle's loop d) Nephron
252. PCT helps in the maintenance of pH in the body fluid by
a) Selective secretion of H^+ ions b) Selective secretion of ammonia
c) Selective secretion of K^+ ions d) All of the above
253. Blackening of urine, when exposed to air is a metabolic disorder in human beings. This is due to
a) Phenylalanine b) Tyrosine
c) Valine replacing glutamine d) Homogentisic acid
254. Many freshwater animals cannot live for long in sea water and *vice versa* mainly because of the
a) Change in N levels b) Change in the levels of thermal tolerance
c) Variations in light intensity d) Osmotic problems
255. The medullary gradient tis mainly caused by
a) NaCl and urea b) H^+ and K^+ c) Urea and K^+ d) Urea and H^+
256. The process of release of urine is called
a) Micturition b) Sweatening c) Defeciation d) Perspiring
257. The ascending and descending limb of Henle's loop is a respectively lined by
a) Squamous epithelium, cuboidal epithelium b) Cuboidal epithelium, sequamous epithelium
c) Ciliated epithelium, sequamous epithelium d) Cuboidal epithelium, ciliated epithelium
258. Malpighian tubules are
a) Excretory organs of insects b) Excretory organs of frog
c) Respiratory organs of insects d) Endocrine glands of insects
259. Study the given structure and match A, B, C, D, E, F and G with correct option



- a) A-Afferent arteriole, B-Proximal convoluted tubule, C-Henle's loop, D-Distal convoluted tubule, E-Peritubular capillaries, F-Collecting duct, G-Vasa recta
- b) A-Efferent arteriole, B-PCT, C-Henle's loop, D-DCT, E-Peritubular capillaries, F-Collecting duct, G-Vasa recta
- c) A-Afferent arteriole, B-Peritubular capillaries, C-Henle's loop, D-DCT, E-PCT, F-Collecting duct, G-Vasa recta
- d) A-Afferent arteriole, B-Henle's loop, C-Collecting duct, D-PCT, E-DCT, F-Peritubular capillaries, G-Vasa recta
260. In juxta-medullary nephrons,
a) Vasa recta is prominent b) Loop of Henle is long
c) Loop of Henle runs deep into the medulla d) All of the above

261. Choose the correct option from given statement
- I. Glomerular filtration rate is 125 mL/min
 - II. Ultrafiltration is opposed by colloidal osmotic pressure of plasma
 - III. Tubular secretion takes place in loop in Henle
 - IV. Tubular secretion takes place in glomerulus
 - V. Aldosterone induces greater sodium reabsorption
- The correct option is
- a) III, IV and V b) I, IV and V c) I, II and V d) I, II and III
262. Almost all the aquatic animals excrete ammonia as the nitrogenous waste product. Which of the following statements is not in agreement with this situation?
- a) Ammonia is easily soluble in water
 - b) Ammonia is released from the body in gaseous state
 - c) Ammonia is highly toxic and needs to be eliminated as and when formed
 - d) Ammonia gets converted into a less toxic form called urea
263. Which one is the excretory organ in the following?
- a) Archaeocyte b) Choanocyte c) Pinacocyte d) Solenocyte
264. In cortical nephrons,
- a) Loop of Henle is short b) Loop of Henle is long
 - c) The PCT is very long d) The DCT is short
265. Other than kidney which of the following organs help in elimination of excretory wastes?
- I. Lungs
 - II. Liver
 - III. Skin
 - IV. Spleen
- Choose the correct option containing all correct organs
- a) I, II and III b) II, III and IV c) I, III and IV d) I, II and IV
266. The stage of ornithine cycle at which arginase enzyme is used?
- a) Ornithine → citrulline b) Arginine → ornithine
 - c) Citrulline → argininosuccinic acid d) Ornithine → urea
267. The structural unit of human kidney is
- a) Nephron b) Ureter c) Loop of Henle d) Bowman's capsule
268. Chick excrete their secretion in the form of
- a) Ammonia b) Urea c) Uric acid d) Crystal of guanine
269. Which of the following organs synthesises urea?
- a) Duodenum b) Kidney c) Liver d) Pancreas
270. Primary or main excretory organ in humans is
- a) Skin b) Lung c) Kidney d) Spleen
271. Which of the following is right statement?
- I. Angiotensin-II, being a powerful vasoconstrictor, increases glomerular pressure and thereby GFR
 - II. Angiotensin-II activates the adrenal cortex to release aldosterone
 - III. Aldosterone promotes reabsorption of Na^+ and water from the DCT and CT leading to an increase in GFR and GFR
 - IV. ANF causes vasoconstriction
- Select right combination
- a) I, II and III b) I, II and IV c) I, III and IV d) II, III and IV
272. Glomerular filtrate rate per day is
- a) 150 L b) 190 L c) 170 L d) 180 L
273. The rupture of urinary bladder is prevented by
- a) Pseudostratified epithelium b) stratified columnar epithelium
 - c) Stratified cuboidal epithelium d) Transitional epithelium
274. Glomerulonephritis is

- a) Bleeding of glomeruli of kidney
c) Inflammation of glomeruli of kidney
- b) Absence of glomeruli of kidney
d) Inflammation of PCT of kidney
275. Glomerular filtration occurs in Bowman's capsule when Hydrostatic pressure of Net filtrate pressure blood in glomerulus is
a) 70 mm Hg 10 mm Hg
b) 70 mm Hg 25 mm Hg
c) 70 mm Hg 40 mm Hg
d) 70 mm Hg 30 mm Hg
276. Choose the correct option containing compounds of ornithine cycle from the options given below
a) Ornithine, citrulline and fumaric acid
b) Ornithine, citrulline and alanine
c) Ornithine, citrulline and arginine
d) Ornithine, citrulline and tyrosine
277. Sodium reabsorption from the distal tubule will be increased if there is an increase in
a) Plasma potassium concentration
b) Plasma volume
c) Mean arterial pressure
d) Urine flow rate
278. The principle nitrogenous excretory compound in humans is synthesized
a) In kidneys, but eliminated mostly through liver
b) In kidneys as well as eliminated by kidneys
c) In liver and also eliminated by the same through bile
d) In the liver, but eliminated mostly through kidneys
279. Largest gland of our body is
a) Spleen
b) Lung
c) Liver
d) kidney
280. A person who is on a long hunger strike and is surviving only on water, will have?
a) More sodium in his urine
b) Less amino acids in his urine
c) More glucose in his blood
d) Less urea in his urine
281. A terrestrial animal must be able to
a) Excrete large amounts of water in urine
b) Conserve water
c) Actively pump out salts through the skin
d) Excrete large amounts of salts in urine
282. Human urine as compared to human blood is
a) Hypotonic
b) Hypertonic
c) Isotonic
d) All of these
283. Wolffian body is also known as
a) Pronephros
b) Mesonephros
c) Metanephros
d) Abnormal heart
284. Which one of the following body functions is not performed by kidneys?
a) Excretion
b) Osmoregulation
c) Regulation of blood volume
d) Destruction of dead blood corpuscles
285. Ultrafiltrate generated by the glomerulus is having all the constituent of the blood plasma except
a) Protein
b) RBC
c) WBC
d) All of these
286. Which of the following is not an excretory organ?
a) Liver
b) Book lungs
c) Kidney
d) Hepatopancreas
287. Podocytes are present on the
a) Endothelial cells of the glomerulus
b) Endothelial cells of the Bowman's capsule
c) Epithelium cells of the Bowman's capsule
d) Epithelium cells of the glomerulus
288. The functioning of the kidneys is efficiently monitored and regulated by the hormonal feedback mechanism involving
a) Hypothalamus
b) JGA
c) Heart
d) All of the above
289. In which part of nephron, reabsorption is minimum from filtrate?
a) Henle's loop
b) Proximal convoluted tubule
c) Distal convoluted tubule
d) Collecting duct
290. Animal accumulates waste like urea, uric acid, CO_2 , H_2O , ions like Na^+ , K^+ , Cl^- , phosphate, sulphate, etc., by
a) Metabolic activities
b) Excess ingestion
c) Either (a) or (b)
d) Excretion
291. Which of the following structures are situated in the cortical region of the kidney?
I. Malpighian corpuscle

II. PCT (Proximal Convolute Tubules)

III. DCT (Distal Convolute Tubules)

IV. Loop of Henle

V. Collecting duct

a) I, II and III

b) III, IV and V

c) II, III and IV

d) IV, V and I

292. Normal level of urea in blood plasma is

a) 80-100 mg/100 mL blood

b) 18-38 mg/100 mL blood

c) 30-40 mg/100 mL blood

d) 1-10 mg/100 mL blood

SMART ACHIEVERS LEARNING PVT. LTD.

EXCRETORY PRODUCTS AND THEIR ELIMINATION

BIOLOGY

: ANSWER KEY :

1)	b	2)	a	3)	b	4)	b	177)	a	178)	b	179)	a	180)	d
5)	b	6)	d	7)	c	8)	c	181)	b	182)	a	183)	a	184)	c
9)	c	10)	d	11)	a	12)	d	185)	b	186)	b	187)	d	188)	a
13)	c	14)	c	15)	b	16)	d	189)	a	190)	c	191)	d	192)	b
17)	c	18)	b	19)	d	20)	d	193)	a	194)	b	195)	c	196)	a
21)	a	22)	c	23)	a	24)	d	197)	b	198)	b	199)	c	200)	a
25)	c	26)	d	27)	c	28)	b	201)	b	202)	a	203)	b	204)	b
29)	b	30)	d	31)	c	32)	d	205)	c	206)	c	207)	a	208)	a
33)	c	34)	b	35)	d	36)	b	209)	b	210)	d	211)	c	212)	b
37)	b	38)	d	39)	b	40)	b	213)	d	214)	d	215)	b	216)	b
41)	b	42)	a	43)	c	44)	c	217)	d	218)	b	219)	d	220)	a
45)	c	46)	a	47)	b	48)	c	221)	c	222)	b	223)	d	224)	d
49)	a	50)	d	51)	b	52)	a	225)	a	226)	b	227)	d	228)	c
53)	c	54)	c	55)	a	56)	b	229)	c	230)	a	231)	d	232)	b
57)	a	58)	c	59)	a	60)	c	233)	b	234)	c	235)	b	236)	d
61)	a	62)	c	63)	d	64)	c	237)	a	238)	a	239)	b	240)	a
65)	c	66)	c	67)	b	68)	a	241)	b	242)	d	243)	b	244)	a
69)	c	70)	a	71)	a	72)	d	245)	c	246)	b	247)	b	248)	b
73)	a	74)	c	75)	b	76)	b	249)	d	250)	d	251)	a	252)	d
77)	b	78)	a	79)	c	80)	c	253)	d	254)	d	255)	a	256)	a
81)	d	82)	d	83)	b	84)	c	257)	b	258)	a	259)	a	260)	d
85)	a	86)	b	87)	d	88)	d	261)	c	262)	b	263)	d	264)	a
89)	a	90)	c	91)	c	92)	b	265)	a	266)	b	267)	a	268)	c
93)	d	94)	b	95)	c	96)	b	269)	c	270)	c	271)	a	272)	d
97)	b	98)	b	99)	d	100)	a	273)	d	274)	c	275)	a	276)	c
101)	c	102)	b	103)	b	104)	a	277)	a	278)	d	279)	c	280)	a
105)	a	106)	b	107)	d	108)	c	281)	b	282)	b	283)	b	284)	d
109)	b	110)	c	111)	a	112)	a	285)	d	286)	d	287)	c	288)	d
113)	b	114)	a	115)	d	116)	a	289)	d	290)	d	291)	a	292)	b
117)	a	118)	d	119)	b	120)	d								
121)	b	122)	b	123)	c	124)	d								
125)	d	126)	b	127)	b	128)	b								
129)	b	130)	b	131)	c	132)	c								
133)	c	134)	b	135)	c	136)	d								
137)	d	138)	d	139)	a	140)	b								
141)	b	142)	c	143)	c	144)	b								
145)	d	146)	b	147)	d	148)	d								
149)	c	150)	c	151)	d	152)	c								
153)	c	154)	d	155)	a	156)	c								
157)	d	158)	b	159)	d	160)	b								
161)	c	162)	d	163)	a	164)	c								
165)	a	166)	c	167)	b	168)	c								
169)	d	170)	c	171)	c	172)	b								
173)	c	174)	b	175)	d	176)	c								

EXCRETORY PRODUCTS AND THEIR ELIMINATION

BIOLOGY

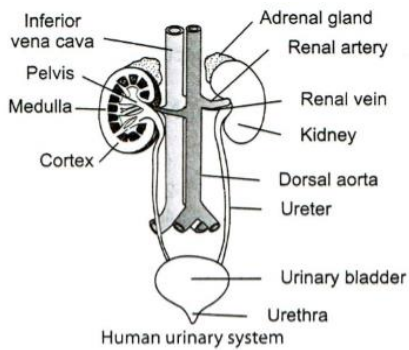
: HINTS AND SOLUTIONS :

- 1 **(b)**
Haemodialyser is also known as blood dialyser or artificial kidney and is used in the condition of renal failure. During dialysis, the blood is taken from radial artery, mixed with heparin (anticoagulant) cooled to 0°C and passed through cellophane tubes of the disposable dialyser. The nitrogenous waste products are passed out into dialysing fluid through simple diffusion. Then purified blood is mixed with antiheparin and passed into radial vein.
- 2 **(a)**
Polyuria amount of urine passed out is more
- 3 **(b)**
Because these are ATP dependant substances whose movement occurs against concentration gradient. In active transport, ATP provided by mitochondria, provides energy needed to move these ions and molecules across the cell membrane
- 4 **(b)**
Urea is both nitrogenous product as well as osmoregulator. It is the excretory product in man and mammals, *Ascaris*, earthworm, fishes like sharks and string rays, etc.
- 5 **(b)**
Mostly aquatic arthropods, bony fishes, freshwater fishes, amphibian tadpoles, etc, excrete ammonia, *i. e.*, phenomenon called ammonotelism and the animal concerned is called **ammonotelic**.
- 6 **(d)**
Blood vessels, which supply blood to glomerulus is called the afferent arteriole and the outgoing or exit is done by efferent arteriole
- 7 **(c)**
The yellow colour of urine is due to the presence of pigment Urochrome. This pigment is formed by bile pigment bilirubin.
Bilirubin
- ↓ Liver
Intestine
↓
Urobilinogen
↓
Urochrome (Yellow pigment of urine)
- 8 **(c)**
Excessive loss of fluid activate the receptor, which stimulate hypothalamus to release the ADH from posterior lobe of pituitary. Facilitate the water reabsorption of water from the lateral part of tubule (DCT and CT)
- 9 **(c)**
Each kidney has nearly one million complex tubular structures called nephrons, which are called functional unit of kidney
- 10 **(d)**
In certain marine molluscs, crustaceans and teleost fishes, the excretory product is TMO (trimethylamine oxide). In these animals, ammonia is converted into **trimethylamine** (TMA) after its methylation. Thus, either TMA or its oxidation product **trimethyl oxide** (TMO) is the excretion product in these causes.
- 11 **(a)**
A – Calyx
B – Cortex
C – Renal column
D – Ureter
- 12 **(d)**
Effective Filtration Pressure (EFP) or Net Filtration Pressure (NFP) is glomerular blood hydrostatic pressure (GBHP) minus the colloidal osmotic pressure of blood (BCOP) and capsular hydrostatic pressure (CHP).
EFP/NFP = GBHP – (BCOP + CHP)
= 60 – (32 + 18)

= 10mmHg

- 13 (c) Water is a high threshold substance. During selective reabsorption 99.5% of water is reabsorbed (active transport) and reabsorption takes place in loop of Henle.
- 14 (c) 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, increase 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. This complex mechanism is generally known as the renin-angiotensin mechanism. An increase in blood flow to the atria of the heart can cause the release of Atrial Natriuretic Factor (ANF). ANF can cause vasodilation (dilation of blood vessels) and thereby decrease the blood pressure. ANF mechanism, therefore, acts as a check on the renin-angiotensin mechanism.
- 15 (b) Passage of urine in humans is
Glomerulus → DCT → Loop of Henle → PCT → Collecting tubule → Ureter → Bladder → Urethra → Outside
- 16 (d) Excretion is the elimination of metabolic wastes from the body. Carbon dioxide is removed as a gas by respiratory organs. The common excretory product in man are CO_2 , minerals, salts, urea, water, pigments, etc.
- 17 (c) Uricotelism is found in those animals, which need water conservation. It is the elimination of uric acid and urates as the main nitrogenous wastes in the form of paste or in a semisolid state.
- 18 (b) Juxta glomerular apparatus is a modification in afferent arteriole and distal convoluted tubule for regulation of osmoregulation in body
- 20 (d) Renin angiotensin mechanism, vasopressin and juxta-glomerular apparatus autoregulate the GFR
- 21 (a) Urea cycle takes place in liver cells with the hydrolytic enzyme arginase. Arginase splits Arginine into urea and ornithine with the elimination of a water molecule.
- 23 (a) **Levels of solubility of nitrogenous waste**
From higher to lower
Ammonia > urea > uric acid
Levels of toxicity
Ammonia > urea > uric acid
- 24 (d) The living steady state has a self-regulatory mechanism which is known as **homeostasis**.
- 25 (c) Birds, reptiles and insects are uricotelic animals. These animals excrete uric acid as excretory product.
- 26 (d) Both Aldosterone and ADH regulate volume of urine. ADH (antidiuretic hormone) stimulates the reabsorption of water through the distal convoluted tubule of the kidney nephron in mammals and thus, limits the water content and the overall volume of urine. Aldosterone, secreted from adrenal cortex, increases the reabsorption of sodium ions and water and the release of potassium ions in the collecting duct and DCT.
- 27 (c) The yellow colour of urine is caused by the pigment urochrome, which is breakdown product of haemoglobin from worn out RBCs
- 28 (b) Vasa-recta are the blood vessels running parallel to loop of Henle forming a counter current system in juxta-medullary nephron. These are in the continuation of efferent arteriole. The slow blood flow of vasa-recta is responsible for maintaining the hyperosmolarity of interstitium fluid
- 29 (b) Presence of ketones or acetone bodies in urine are due to metabolism of fatty acids instead of glucose during diabetes, starvation, fasting and pregnancy.

- 30 **(d)**
Loss of water from tissues results in the dehydration of cells.
- 31 **(c)**
Towards the centre of the inner concave surface of the kidney, there is a notch called hilum through which ureter, blood vessels and nerves enter. Inner to the hilum is a broad funnel-shaped space called the renal pelvis with the projections called calyces
- 32 **(d)**
Podocytes or visceral epithelial cells are the cells in Bowman's capsule in the kidney that wrap around the capillaries of glomerular. They create minute pores (site pores) for the filtration of blood into the Bowman's capsule.
- 33 **(c)**
Glomerular filtration occurs in Bowman's capsule when hydrostatic pressure of blood in the glomerulus is 70 mm Hg and net filtrate pressure is 10 mm Hg.
- 34 **(b)**
Urine is a transparent, light yellow liquid with a slightly acidic pH. The colour of urine is caused by the pigment **urochrome**, which is a breakdown product of haemoglobin from worn out a red blood corpuscles, while the pungent smell of urine is due to **urinode**.
- 35 **(d)**
The flow of blood through the two limbs of vasa recta is in counter current pattern (opposite) The proximity between the Henle's loop and vasa recta as well as the counter current in them help in maintaining an increasing osmolarity toward the inner medullary interstitium. *i.e.*, from 300 mos mol L⁻¹ in cortex to about 1200 mos mol L⁻¹ in the inner medulla. This is also called medullary gradient
- 36 **(b)**
An adult man normally passes about 1 to 1.5 litres of urine in 24 hours. It contains about 30 g urea.
- 37 **(b)**
Abnormal catabolism of tyrosine causes melanuria. The excretion of urine of a dark colour resulting from the presence of melanin or other pigments, etc.
- 38 **(d)**
When someone drinks lot of water which is not required by body, the osmolarity of the blood will decrease. The decrease in osmolarity will inhibit the release of ADH.
- 39 **(b)**
As urea formation takes place in liver through ornithine cycle, the blood leaving liver and going towards heart has high amount of urea.
- 40 **(b)**
The formation of urea from NH₃ and CO₂ occurs in liver through ornithine cycle or Krebs Henseleit cycle.
- 41 **(b)**
Green glands are present at the base of the antennae of certain crustaceans. These glands help in excretion.
- 42 **(a)**
DCT (Distal Convolved Tubule) Conditional reabsorption of Na⁺ and water takes place in this segment. DCT also capable of reabsorption of HCO₃⁻ and selective secretion of hydrogen and potassium ions and NH₃ to maintain the pH and sodium-potassium balance in blood
- 43 **(c)**
The tubular epithelial cells in different segments of the nephrons perform reabsorption either by active or passive mechanisms. For example, substances like glucose, amino acids, Na⁺ etc, in the filtrate reabsorbed actively whereas the nitrogenous wastes are absorbed by passive transport. Reabsorption of the water also occurs passively in the initial segments of the nephron
- 44 **(c)**
Aldosterone causes the reabsorption of Na and water from distal part of tubule. This leads to the increase in Glomerular Filtration Rate (GFR)
- 45 **(c)**
Human excretory system consists of
(i) a pair of kidney (ii) a pair of ureter
(iii) urinary bladder (iv) urethra



46 (a) Kidneys help in the formation of urine, from the blood flowing through glomerular capillaries. About 20% of plasma fluid filters out into the Bowman's capsule through a thin glomerular-capsular membrane due a net or effective filtration of about 10 to 15 mm Hg. So, the nearest option is (a).

47 (b) The efferent arteriole is narrower as compared to afferent arteriole, hence a hydrostatic pressure develops in the glomerulus, which forces a large amount of water, entire glucose, all amino acid, urea, and salts of sodium potassium out of the glomerulus into the Bowman's capsule

48 (c) Ascending limb of vasa recta. The gradient of medullary region is primarily by NaCl and urea. NaCl is transported by ascending limb of Henle's loop which is exchanged with descending limb of vasa recta. Similarly small amount of urea enter the thin segment of the ascending limb of Henle's loop which is transported back to interstitium by collecting tubule. The above described transport of substances facilitated by special arrangement of Henle's loop and vasa recta is called counter current mechanism

49 (a)
 A - Afferent Atriole
 B - Efferent atriole
 C - Bowman's capsule
 D - Proximal convoluted tubule

50 (d) Sebaceous glands eliminate certain substances like sterols, hydrocarbons and waxes through sebum. This secretion provides a protective oily covering for the skin. Small amounts of nitrogenous wastes could be eliminated through saliva

51 (b)

Hepatic vein has highest urea level because urea is synthesised in liver

52 (a) Rennin is an enzyme which is released by Juxtaglomerular cells of kidneys when blood pressure becomes low. It plays an important role in reabsorption of sodium.

53 (c) Main function of DCT is to maintain the pH and sodium-potassium balance in blood

54 (c) **Cockroach** excretes uric acid as the chief nitrogenous excretory product. Man excrete urea as the chief nitrogenous excretory product. Earthworm excretes 40% urea, 20% ammonia and 40% amino acids. Frog excretes urea as the chief nitrogenous product.

55 (a) JG cells to release renin. The kidneys have built in mechanisms for the regulation of glomerular filtration rate. One such efficient mechanism is carried out by juxta glomerular apparatus (JGA), JGA is the special sensitive region formed by cellular modification in the distal convoluted tubule and the afferent arteriole at the location of their contact. A fall in GFR can activate the JG cells to release renin, which can stimulate the glomerular blood flow and there by GFR back to normal

56 (b) Increased concentration of ketone bodies in urine is called **ketonuria**.

57 (a) Antennal glands or green glands. A survey of animal kingdom presented a variety of excretory structures
 (i) **Invertebrate** have simple tubular type of excretory organs
 (ii) **Vertebrate** have complex tubular form called the kidney
 (iii) **Platyhelminthes** (Flatworm planaria) Protonephridia of flame cells are excretory organs
 (iv) **Some Annelids and Cephalochordate** Protonephridia concerned primarily osmoregulations
 (v) **Earthworm and Annelids** Nephridia is the excretory organ
 (vi) **Insect** Malpighian tubules are the excretory

organs. Antennal glands or green glands performs the excretory functions in crustaceans like prawn

58 (c)

The plasma fluid that filters out from glomerular capillaries into Bowman's capsule of nephron is called glomerular filtrate. A comparison of the volume of the filtrate formed per day (180 L/day) with that of the urine released (1.5 L), suggest that nearly 99% of the filtrate has to be reabsorbed by the renal tubules. This process is called reabsorption.

59 (a)

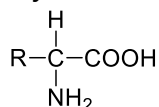
Proximal convoluted tubule of nephron is pivotal site for reabsorption of glucose, amino acids, Na^+ , K^+ by active transport. Here, 80% of water is reabsorbed by passive transport.

60 (c)

Large quantity of water is reabsorbed in PCT and loop of Henle. About 80% of water is reabsorbed in PCT and loop of Henle. This is called obligatory water reabsorption

61 (a)

Ammonia is produced by amino acid metabolism. Ammonia combine with CO_2 in liver to form urea by urea cycle



General structure of amino acid

62 (c)

Active and passive both are the ways to transport electrolyte through loop of Henle

63 (d)

The ascending limb of Henle's loop (the next part of renal tubule) continue as another highly coiled tubular region called Distal Convoluted Tubule (DCT).

The juxta medullary nephrons have long Henle's loop.

Vasa recta is absent or highly reduced in cortical nephrons.

Bowman's capsule encloses the glomerulus.

The Malpighian corpuscles, proximal convoluted tubule (PCT) and distal convoluted tubule (DCT) are situated in the cortical region of the kidney, whereas the Henel's loop in the medulla.

64 (c)

The urine formation includes glomerular filtration. Selective reabsorption and tubular secretion. The glucose is reabsorbed at proximal convoluted tubules.

65 (c)

Reabsorption is the selective transport of substances across the epithelium of excretory tubule from the filtrate to the interstitial fluid. The proximal convoluted tubule (PCT) region of a nephron does maximum reabsorption of useful substances such as glucose, amino acids, vitamin-C, Na^+ , K^+ , Ca^{2+} , etc.

66 (c)

Kreb-Henseleit cycle

67 (b)

Nearly all of the essential nutrients and 70-80 per cent of electrolytes and water are reabsorbed by this segment. PCT also helps to maintain the pH and ionic balance of the body fluids by selective secretion of hydrogen ion and potassium ions into the filtrate and by absorption of HCO_3^- from it

68 (a)

Vasopressin

69 (c)

Gout happens when there is high level of uric acid in blood

70 (a)

Osmotic pressure is a measure of tendency to take in water by osmosis. During urine formation, approximately two-thirds of the NaCl^- and water filtered into Bowman's capsule is immediately reabsorbed across the walls of proximal convoluted tubule. This reabsorption is driven by active transport of Na^+ out of the filtrate and into surrounding peritubular capillaries. Cl^- follows Na^+ passively because of electric attraction and water follows them both because of osmosis.

71 (a)

(i) **Ammonia** (NH_3) It is the first metabolic waste of the protein metabolism. Ammonia is produced in the liver by the process of deamination.

Ammonia is very toxic and requires large amount of water for its excretion

(ii) **Urea** White crystalline solid product produced in the liver from CO_2 and NH_3 . It is comparatively less toxic. Normal level of urea is 18-38 mg/100 mL of the blood

- (iii) **Uric Acid** It is least toxic and insoluble in water. It is produced in the liver by purine catabolism in birds, and reptiles. It can be excreted in solid or semisolid form. Excretion of uric acid in solid or semisolid form conserve water. Uric acid is commercially extracted from the bird dropping (guano)
- 72 **(d)**
The plasma fluid that filters out from glomerular capillaries into Bowman's capsule of nephrons is called glomerular filtrate. It is a non-colloidal part and possesses urea, water, glucose, amino acids, vitamins, fatty acid, uric acid, creatinine salts, etc. RBCs, WBCs platelets and plasma proteins are the colloidal parts of the blood and do not filtrated out from glomerulus. Thus, plasma proteins are higher in concentration in blood than in glomerular filtrate.
- 73 **(a)**
Normal urine is slightly acidic. Variations in urine pH are closely related to diet. A high protein diet increases acidity, a diet composed largely of vegetables increases alkalinity.
- 74 **(c)**
Intestinal Uricolysis converts uric acid into urea and ammonia.
- 75 **(b)**
Mammals have the ability to produce a concentrated urine. Henle's loop and vasa recta plays a significant role in producing concentrated urine
- 76 **(b)**
Excretion is the removal of metabolic wastes from the body. CO_2 and water are the metabolic waste for carbohydrates and fat metabolism. Their removal is, therefore called excretion
Osmoregulation is the control over the concentration of the water and salt in the body
- 77 **(b)**
Ornithine is not found in proteins. It is formed by hydrolyzing arginine and important in the formation of urea.
- 78 **(a)**
Renal pelvis.
Towards the centre of the inner concave surface of the kidney, there is a notch called hilum through which ureter, blood vessels and nerves enter. Inner to the hilum is a broad funnel-shaped space called the renal pelvis with the projections called calyces
- 79 **(c)**
ADH released from the posterior pituitary plays an important role in regulating the amount of urine passed out by affecting the permeability of the DCT. Water absorption in DCT mediated by ADH is called facultative water reabsorption.
- 81 **(d)**
A – afferent arteriole
B – efferent arteriole
- 82 **(d)**
Both (a) and (b).
Juxta-glomerular apparatus (JGA) operates a multihormonal Renin-angiotensin-Aldosterone System (RAAS). JGA release an enzyme renin in the blood, which initiates chemical reactions that produces angiotensin-II, a potential stimulator of aldosterone (mineralocorticoids) release by the glomerulosa cell. It increases blood pressure, blood volume and completes the feedback circuit by supporting the release of renin
- 83 **(b)**
Nephritis The infection is caused by bacteria (streptococci) which results in inflammation of kidney that involve glomerulus
- 84 **(c)**
Ammonia is converted into urea through urea cycle or Krebs-Henseleit cycle in liver.
- 85 **(a)**
Solenocytes are excretory structures similar to flame cells but supplied with blood vessels for picking up excretory products present in some invertebrates and lower chordates.
- 86 **(b)**
Tadpole of frog, excretes ammonia as a waste product, called ammonotelic and this phenomenon is called ammonotelism, whereas adult frog, excretes urea as a waste product, called ureotelic and the phenomenon is called ureotelism.
- 87 **(d)**
Accessory excretory organs are the organs, which have their own specific functions but carry out excretion as a secondary activity, e.g., lung, skin, liver
- 88 **(d)**
The Juxtaglomerular cells of kidney produce a

peptide hormone called erythropoietin which stimulates erythropoiesis (formation of RBCs).

89 (a)

A – JG cells

B – Renin

C – angiotensin-I

D – angiotensin-II

90 (c)

From the distal convoluted tubule, the filtrate enters the collecting tubule, where further reabsorption of water takes place. Now the filtration become more concentrated which place. Now the filtration become more concentrated which makes the filtrate hypertonic. When the collecting duct become less permeable to water it produces more dilute urine.

91 (c)

The excretory material of bony fishes like *Hippocampus* is ammonia. So, bony fishes are ammonotelic.

92 (b)

Urine consists of water and organic and inorganic substances. It is hypertonic to blood. The medullary part of kidney possesses loop of Henle, which has fluid that is hypertonic to blood plasma but isotonic to urine.

93 (d)

ADH, Renin angiotensin, ANF, countercurrent mechanism all of them plays a significant role in osmoregulation of body fluids

94 (b)

When blood from cortex goes through the descending loop, it loses water and gain salts and solutes. As blood ascends, the reverse occurs and it gains water and gradually loses salts and solutes

95 (c)

Filtration takes place through tiny spaces amongst the cells of capillary walls and filtration slits of podocytes in Bowman's capsule. Ultrafiltrate is plasma minus protein. Loop of Henle concentrate the urine counter current mechanism

96 (b)

The correct process of urine formation in the given figure are-

A-Pressure filtration

B-Reabsorption

C-Secretion

D-Collection of urine

97 (b)

Ornithine cycle or urea cycle or Krebs-Henseleit cycle was discovered by Hans Krebs and Kurt Henseleit. It takes place in liver cells. The main component of ornithine cycle are arginine, ornithine and citrulline.

98 (b)

Collecting duct

(i) This is the long ducts extends from cortex of the kidney to the inner parts of medulla

(ii) Large amount of water reabsorbed from this region

(iii) Concentrated urine production takes place

99 (d)

During urine formation, salts and other wasters are dissolved in the filtrate and pass with it out of the kidney as urine. But sometimes, certain salts (such as calcium oxalate) do not dissolved and form crystals called **calcium stones**. These can partially block the flow of the urine from the kidney.

100 (a)

Anuria Happens when failure of kidney to form urine

101 (c)

Proximal Convoluted Tubule (PCT)

↓

Descending Loop of Henle (DLH)

↓

Ascending Loop of Henle (ALH)

↓

Distal convoluted Tubule (DCT)

↓

Collecting Duct (CD)

102 (b)

Green glands are excretory organs in **Arthropoda**. The **renal columns of Bertini** is the part of cortex continued inside medulla between pyramids.

104 (a)

Steps for Urination Bladder fills with urine and becomes distended. Stretch receptors on the wall of urinary bladder send signal to the CNS. CNS passes on motor message to initial messengers to initiate the contraction smooth muscle of bladder and simultaneous relaxation of urethral sphincter causing the release of urine

105 (a)

Insects.

A survey of animal kingdom presented a variety of excretory structures

(i) **Invertebrate** have simple tubular type of excretory organs

(ii) **Vertebrate** have complex tubular form called the kidney

(iii) **Platyhelminthes** (Flatworm planaria)

Protonephridia of flame cells are excretory organs

(iv) **Some Annelids and Cephalochordate**

Protonephridia concerned primarily osmoregulations

(v) **Earthworm and Annelids** Nephridia is the excretory organ

(vi) **Insect** Malpighian tubules are the excretory organs. Antennal glands or green glands performs the excretory functions in crustaceans like prawn

106 (b)

A - glomerulus

B - filtration

C - 1100 - 1200

D - $\frac{1}{5}$ th

107 (d)

Vasa recta is present in cortical nephron at the juxta medullary region for conserving the water (counter current mechanism).

During summers, when body loses lot of water by evaporation, the release of ADH is increased due to decrease of water loss

108 (c)

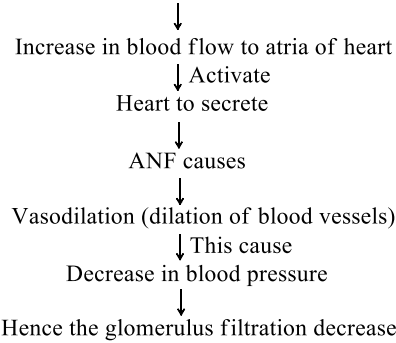
Cortex region of kidney is outer region. The proximal end of each nephron forms a blind or closed enlarged and double walled cup, the Bowman's capsule in the cortex. Thus, all the Bowman's capsules of the kidney are found in the cortex.

109 (b)

Presence of interstitial gradient helps in an easy passage of water from the collecting tubule there by concentrating the filtrate (urine). Human kidney can produce nearly four times concentrated than the initial filtrate formed

110 (c)

ANF (Atrial Natriuretic Factor) mechanism



ANF - mechanism therefore, acts as a check on renin-angiotensin mechanism

111 (a)

In mammals, main excretory product is urea (20-30 gm).

112 (a)

Medullary gradient is mainly developed by NaCl and urea and this is developed by counter current mechanism of vasa recta and Henle loop

113 (b)

An adult human excretes, on an average, 1-5.5 of urine per day. Volume of urine depends upon intake of fluids, external temperature and physical activities

114 (a)

A-adrenal cortex, B-aldosterone

115 (d)

Sequence of urine route

Calyx → Renal pelvis → Ureter → Urinary bladder → Urethra

116 (a)

Kidneys are excretory organs of vertebrates. They are consisted of numerous units called **nephrons**. Each nephron contains a U-shaped tube, which has an ascending and a descending limb. This U-shaped tube is known as loop of **Henle**. Thus, it is associated with excretory system. The loop of Henle works on the basis of counter current multiple system and thus, helps in regulating concentration of urine.

117 (a)

Ammonia (NH_4^+) affect the brain cell by changing the polarity of cell membrane of brain. Change in polarity affects transport across the cell membrane

118 (d)

The gradient of medullary region is primarily by NaCl and urea. NaCl is transported by ascending limb of Henle' loop which is exchanged with descending limb of vasa recta. Similarly small

amount of urea enter the thin segment of the ascending limb of Henle's loop which is transported back to interstitium by collecting tubule. The above described transport of substances facilitated by special arrangement of Henle's loop and vasa recta is called counter current mechanism

119 (b)

ADH or vasopressin is a hormone secreted from posterior pituitary. It controls the reabsorption of molecules in the tubules of the kidney by affecting the tissues permeability.

120 (d)

(i) Fertilisation is external in frog and internal in humans
(ii) Human's RBC is non-nucleated
(iii) Frog has three chambered heart, humans have four-chambered heart
(iv) Frog and human both are ureotelic
(v) Lungs are organs of respiration in human, while in frog cutaneous and lung respiration is there

121 (b)

Meristic variation is a type of variation involving the number of arrangement of parts of an organism.

In meristic trait, the phenotype is determined by counting.

122 (b)

Haemodialysis is the process, in which an artificial kidney is used for removing accumulated excretory substances like urea, uric acid, creatinine and other waste products from the blood. It is generally used in case, of uremia (in which concentration of urea is increased) in urine patients when kidneys are not functioning properly.

123 (c)

The kidneys have built in mechanisms for the regulation of glomerular filtration rate. One such efficient mechanism is carried out by juxta glomerular apparatus (JGA). JGA is the special sensitive region formed by cellular modification in the distal convoluted tubule and the afferent arteriole at the location of their contact. A fall in GFR can activate the JG cells to release renin, which can stimulate the glomerular blood flow and thereby GFR back to normal

124 (d)

Kidney transplantation is the ultimate method in the correction of acute renal failure. A functioning kidney is used is transplantation from a donor, preferably a close relative, to minimise its chances of rejection by immune system of the host. Modern clinical procedures have increased the success rate of such complicated technique. Cyclosporin-A is used as immunosuppressive agent in the kidney transplant patient

125 (d)

Glycosuria is the condition, when glucose is excreted in the urine because the blood sugar level exceeds from the normal.

126 (b)

Henle's loop concentrate the urine. It is highly develop in the organism, which are found in xerophytic condition in order to conserve water. But organism, which produces the dilute urine have little or no Henle's loop like fishes

127 (b)

Osmoconformers are those organisms whose body is osmotic, *i. e.*, osmotic concentration of internal environment and surrounding sea water are approximately equal. There is no net tendency for water to move in or out of body in osmoconformers. Among vertebrates hagfishes are osmoconformers.

128 (b)

Duct of Bellini is one of the main urinary ducts of the mammalian kidney, acting as a common collecting duct receiving branches from a number of Malpighian bodies.

All duct of Bellini then, open at the tip of the papilla or papillae into the pelvis.

129 (b)

Ornithine cycle or urea cycle takes place in the liver cells by which urea is produced from the deaminated excess amino acids.

130 (b)

It has been found that in rabbit, all the glucose, amino acids and some urea are absorbed in the proximal convoluted tubule.

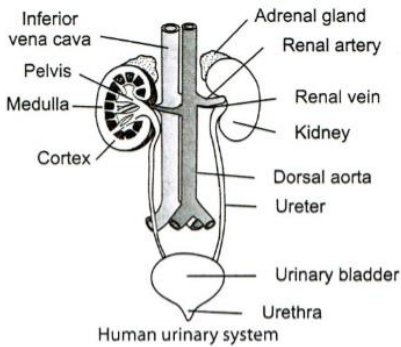
131 (c)

Water reabsorption in DCT and CT by ADH is called the facultative water reabsorption.

Vasopressin (ADH) hormone from posterior pituitary plays an important role in regulating the amount of urine passed out by effecting the permeability of DCT

132 (c)

- A – ureter
- B – Inferior vana cava
- C – Dorsal aorta
- D – Urethra
- E – Medulla



133 (c)

Spiders excrete guanine and therefore, these are called guanotelic. Guanine is a metabolic waste product of nucleotide metabolism.

134 (b)

Medullary interstitial fluid

135 (c)

Release Urine.

Micturition is a reflex of voiding urine. If the urine content of urinary bladder reaches more than 300 mL micturition reflex starts. Neural mechanism of micturition is called micturition reflex

136 (d)

A – CNS, B – motor message, C – relaxation.

Steps for Urination Bladder fills with urine and becomes distended. Stretch receptors on the wall of urinary bladder send signal to the CNS. CNS passes on motor message to initial messengers to initiate the contraction smooth muscle of bladder and simultaneous relaxation of urethral sphincter causing the release of urine

137 (d)

Kidneys are the main excretory organ in humans. Kidneys are reddish-brown, bean-shaped structure situated between the levels of the last thoracic and third lumbar vertebrae closer to the dorsal inner wall of the abdominal cavity.

Each kidney is 10-12 cm long, 5-7 cm width, 2-3 cm in thickness. The average weight of the kidney is 120 to 170 gm

138 (d)

Loop of Henle is found in renal medulla of kidney. It consists of a descending limb and an ascending limb. The upper part of descending limb is the thick segment while distal part of descending limb is the thin segment.

139 (a)

The excretory system of crustacean (*Palaemon*) consists of a pair of antennary or green glands, a pair of lateral ducts and an unpaired renal or nephroperitoneal sac. Coxa of each antenna encloses an antennary gland.

140 (b)

Pronephric kidney is the most primitive type of kidney. It opens into body cavity and the functional unit is ciliated funnel or nephrostomes, e. g., tadpole of frog.

141 (b)

Urine specific gravity is a test that measures the concentration of particles in the urine. Specific gravity of urine is normally 1.015-1.020.

142 (c)

Haemodialysis During dialysis, the blood drained from a convenient artery is pumped into a dialysing unit after adding anticoagulant like heparin. The unit contains a coiled cell phone tube surrounded by a fluid (dialysing fluid) having the same composition as that of plasma except the nitrogenous wastes.

The porous cell phone membrane of the tube allows the passage of molecules based on concentration gradient. As nitrogenous wastes are absent in dialysing fluid these substances freely move out, there by clearing the blood. The cleared blood is pumped back to the body through a vein after adding antiheparin to it. This method is a boon for thousands of uremia patient all over the world

143 (c)

The process of pressure filtration through glomerular capillaries in Bowman's capsule is known as glomerular filtration and the filtrate is called renal fluid. Renal fluid is isotonic to cortical fluid and blood in PCT and DCT.

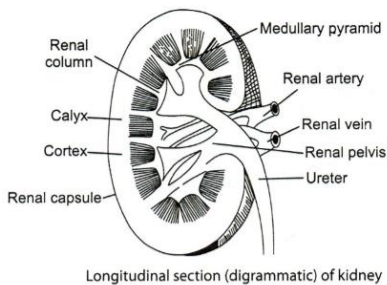
144 (b)

Presence of excess urea in urine is uremia.

145 (d)

DCT reabsorbs $\rightarrow \text{Na}^+, \text{K}^+, \text{HCO}_3^-, \text{NH}_3$ and water. Nitrogenous waste products are absorbed by passive transport. Reabsorption of water also occurs passively in the initial segment of nephron

147 (d)



The outer layer of the kidney is a tough capsule. Inside the kidney, there are two zones—cortex and medulla. Medulla is divided into few conical masses called medullary pyramids. The cortex extends in between the medullary pyramids as renal columns called columns of Bertini

148 (d)

The flow of filtrate in the two limbs of Henle's loop is in opposite directions and thus forms a counter current mechanism (The process due to which the urine is made hypertonic). Vasa-recta also plays a significant role in counter-current mechanism

149 (c)

Aldosterone causes the reabsorption of water and Na^+ from distal part of duct

150 (c)

Alkaptonuria is the genetic disease in which homogentisic acid is excreted out with urine

151 (d)

Sweat produced by sweat gland is a watery fluid containing NaCl , small amounts of urea, lactic acid, etc. Though the primary function of sweat is to facilitate a cooling effect on the body surface

152 (c)

GFR The amount of the filtrate formed by the kidneys per minute is called glomerular filtration rate. GFR in healthy individual is 125 mL/minute, i.e., 180 litres per day

153 (c)

A-urea, B-liver, C-kidney

154 (d)

A comparison of the volume of the filtrate formed per day (180 litre per day) with that of the urine released (1.5 litres), suggests that nearly 99% of this filtrate has to be reabsorbed by the renal tubules. This process is called reabsorption

155 (a)

Camel is called as 'Ship of Desert' due to its adaptations for xerophytic environment. Camel excretes a highly concentrated urine to conserve water and can also tolerate desiccation up to 40% cellular content.

156 (c)

Tubular secretion takes place in DCT and collecting tubules. It is the active secretion or excretion of waste products from blood capillaries and interstitial fluid into the lumen of nephron.

157 (d)

pH of urine ranges from the 5.0 to 7.8. Average pH = 6.0 (slightly acidic)

158 (b)

If one litre of water is introduced in human blood then RBCs absorb it (as water is hypotonic to their internal environment) swell up and burst. Besides of this, there is also increase in the urine production as more water is passed in the nephric filtrate.

159 (d)

A – reabsorbed, B – Concentrated, C – Urea

160 (b)

Glucose, amino acid, Na^+ are absorbed actively in the nephron

161 (c)

Vasopressin

162 (d)

During urine formation, the tubular cells secrete substances like H^+ , K^+ and ammonia into the filtrate. Tubular secretion is also an important step in urine formation as it helps in the maintenance of the ionic and acid base balance of the body fluids

163 (a)

The expulsion of urine from the urinary bladder is called **micturition**. It is a reflex process but in grown up children and adults, it can be controlled voluntarily to some extent.

164 (c)

When the kidneys completely damaged and do not function, the patient often receives **haemodialysis** (treatment with an artificial kidney). Haemodialysis is the separation of certain substances (e.g., urea, uric acid, creatinine, etc) from blood by use of a selective permeable membrane.

165 (a)
 Glomerular filtrate = Plasma – Proteins
 = Blood – (blood cells + plasma proteins)

166 (c)
 Renin angiotensin mechanism.
 ANF (Atrial Natriuretic Factor) mechanism

```

  graph TD
    A[ANF (Atrial Natriuretic Factor) mechanism] --> B[Increase in blood flow to atria of heart]
    B --> C[Activate Heart to secrete]
    C --> D[ANF causes]
    D --> E[Vasodilation (dilation of blood vessels)]
    E --> F[This cause Decrease in blood pressure]
    F --> G[Hence the glomerulus filtration decrease]
  
```

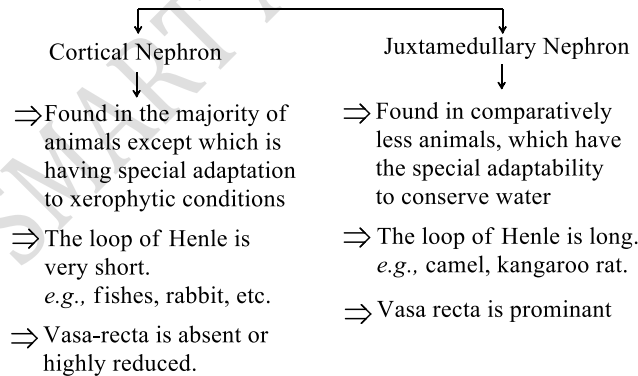
ANF – mechanism therefore, acts as a check on renin-angiotensin mechanism

167 (b)
 A – Urinary bladder, B – CNS, C – Stretching

168 (c)
 Renal portal system is well developed in fishes and amphibians, reduced in reptiles and birds and is absent in mammals.

169 (d)
 Fall in Glomerular Blood Flow (GbF)/Glomerular Blood Pressure (GBP)/ and low Glomerular Filtration Rate (GFR) can activate the juxta-glomerulus cells in kidney

170 (c)
 Juxta medullary nephrons are found in camel, kangaroo and rat.
 On the basis of the length of loop of Henle, the nephron is of two types



171 (c)
 Renalcaluli stones or insoluble mass of crystallised salts (oxalates, etc.) formed with in the kidneys

172 (b)
 Our lungs removes large amounts of CO₂ (18 L/day) and also significant quantities of water every day

173 (c)
 I, III and IV.
 Glomerular capillary blood pressure causes the filtration of the blood through three layers, i.e.,
 (i) The endothelium of the glomerular blood vessels
 (ii) Epithelium of Bowman's capsule
 (iii) Basement membrane between these two layers
 The epithelium of the Bowman's capsule called podocytes are arranged in an intricate manner so as to leave some minute spaces called podocytes

174 (b)
 Ornithine cycle or Kerbs Henseleit cycle takes place in liver cells. It continuously removes dangerously toxic ammonia and some CO₂ from blood and releases less toxic urea into the blood. Kidney continuously remove urea from blood to excrete it in urine.

175 (d)
 All of these.
 Osmoreceptors in the body are activated by changes in the blood volume, body fluid volume and ionic concentration. An excessive loss of fluid from the body can activate these receptors, which stimulate the hypothalamus to release ADH (Antidiuretic Hormone) or vasopressin from neurohypophysis (posterior lobe of pituitary). ADH facilitate the water reabsorption from latter parts of the tubule there by preventing decreases or water loss

176 (c)
Distal Convoluted Tubule (DCT) Conditional reabsorption of Na⁺ and water takes place in this segment. DCT is also capable of reabsorption of HCO₃⁻ and selective secretion of hydrogen and potassium ions and NH₃ to maintain the pH and sodium-potassium balance in blood

177 (a)
 On an average, 25-30 gm of urea is extracted per day. Various conditions can affect the characteristics of urine like type of food, weather condition, etc.

178 (b)
 Malfunctioning of kidneys can lead of the accumulation of urea in blood, this condition is

called uremia which is very harmful and may lead to kidney failure. In such patient urea can be removed by process called haemodialysis

179 (a)

Podocyte cells are present on membrane of Bowman capsule glomerular filtrate is concentrated in descending loop of Henle because it is permeable for water and is ascending limb it is diluted because Na , K^+ , Cl^- are juxta-glomerular apparatus is present in distal convoluted tubule

180 (d)

Urine formation involves three stages

(i) Ultrafiltration (*step-I*)

↓

(ii) Reabsorption (*step-II*)

↓

(iii) Tubular secretion (*step-III*)

181 (b)

Vasa Recta are 'U'-shaped blood vessels running parallel to the loop of Henle, forming a counter current system in the juxtamedullary nephron. These are the continuation of efferent arterioles. The slow blood flow of vasa recta and are responsible for maintaining the hyperosmolarity

182 (a)

Urea is generally excreted outside the body through Nephridia or kidney. Animals, which produce urea are known as ureotelic and excretion as ureotelism, *e. g.*, mammals, adults amphibian, etc.

183 (a)

Juxtaglomerular apparatus (JGA) operates a multihormonal **Renin-Angiotensin-Aldosterone System** RAAS. JGA releases an enzyme renin in the blood, which initiates chemical reactions that produces **angiotensin-II**, a potential stimulator of aldosterone (mineralocorticoids) release by the glomerulosa cell. It increases blood pressure, blood volume and completes the feedback circuit by supporting the release of renin.

184 (c)

A flame cell is a specialised excretory cell found in the simplest freshwater invertebrates, including, flatworms, rotifers and nemertans. These are the simplest animals to have a dedicated excretory system. Flame cells function like a kidney, removing waste material bundles of flame cells are called protonephridia

185 (b)

Pelvis is the main, basin-shaped cavity of the kidney into which urine is discharged by nephrons. The term 'pelvis' is also used for the basin-shaped structure formed by the hipbones together with the sacrum and coccyx (or caudal vertebrae).

186 (b)

Jaundice is characterized by the presence of abnormal amount of bilirubin in blood and urine.

187 (d)

A – Increasing, B – 300, C – 1200

188 (a)

PCT helps to maintain the pH and ionic balance of the body fluid by selective secretion of hydrogen ion, ammonia and potassium ion into filtrate and by absorption of HCO_3^- from it.

DCT capable of reabsorption of HCO_3^- and selective secretion of hydrogen and potassium and NH_3 to maintain the pH and sodium-potassium balance in blood

189 (a)

On taking large amount of proteins, a great amount of urea is excreted out.

190 (c)

Metabolism of food materials products some waste materials, and removal of these waste materials from the body is called **excretion**.

191 (d)

Renin-angiotensin mechanism

Fall in glomerular blood flow glomerular blood pressure/glomerular filtrations rate

↓ Activate the

juxtageslomerular cells (JG - cells)

↓ To Release

Renin which convert

↓ Angiotensinogen (in blood)

↓ to

Angiotensin-I

↓ Proteolytic enzyme

Angiotensin-II

↓ Activate the adrenal cortex to release

Aldosterone

(Causes reabsorption of Na^+ and water from distal parts of tubule this also leads to an increase in blood pressure in GFR. This complex mechanism is generally known as renin-angiotensin mechanism.)

192 (b)

The main function of the Henle's loop is to absorb water from the tubular lumen thus, making the urine concentrated. If they have been absent, the

urine would have been more dilute.

193 (a)

PCT (Proximal Convolute Tubule) PCT is lined by simple cuboidal brush border epithelium, which increases the surface area for reabsorption. Which secreted H^+ , K^+ and ammonia into the filtrate and absorption of HCO_3^- from it

194 (b)

Uric acid, a normal waste product of nucleic acid metabolism, is ordinarily excreted in urine without any problems. However, when blood levels of uric acid rise excessively (due to its excessive production or slow excretion), it may be deposited as needle-shaped urate crystals in the soft tissues of joints. An inflammatory response follows, leading into an agonizingly painful attack of **gouty arthritis** (goute) or gout.

195 (c)

Juxtaglomerular cells of the kidney secrete an enzyme **renin**, which converts angiotensinogen in liver into angiotensin-I, which is then converted into angiotensin-II. Thus, this **renin-angiotensin pathway** stimulates the adrenal cortex to produce **aldosterone**, which maintains Na^+ and water concentration and controls the blood pressure.

196 (a)

About 80% of the nephrons have, loop of Henle, which is too short, therefore it is present in the cortical region of the kidney, 20% nephron have long loop of Henle, which dips into the medulla of the kidney

197 (b)

ADH hormone prevent the loss of water from our body by increasing the permeability of DCT. Hence, it regulate the osmoregulation of our body

198 (b)

A = osmoreceptors
B = suppress
C = Feed back

199 (c)

Nitrogen compound is produced by various metabolic process, known as Deamination. A small fraction of nitrogen is used to produce new compounds, while the remaining part is washed away as waste products. First formed vertebrate was fish, which excrete out ammonia. Ammonia is a water soluble compound so, it can diffuse out from the body easily.

200 (a)

Kidney regulate the concentration and volume of blood by maintaining chemical balance and removing excess fluids in the form of urine. Urine formation takes place in kidney. It includes glomerulus filtration, selective reabsorption and tubular secretion. Maximum concentrated urine is present in CT. Urine is concentrated in kidney

201 (b)

Malfunctioning of kidney can lead to accumulation of urea in blood a condition called uremia, which is highly harmful and may lead to kidney failure. In such patients, urea can be removed by a process called haemodialysis.

202 (a)

The excretion of nitrogen in the form of uric acid (excretory product) is called Uricotelism and the concerned animals are called Uricotelic, *e. g.*, insects, birds and reptiles. Uric acid is the end product of purine metabolism and is excreted in semi-solid form.

203 (b)

Uric acid is the excretory product of purine catabolism in primates, birds and some other animals, but in many other vertebrates, it is further degraded to allantoin by the action of urate oxidase. Human urine consists of 95% water, mainly nitrogenous organic compounds including urea, uric acid, creatinine and hippuric acid.

204 (b)

Uric acid.

(i) **Ammonia** (NH_3) It is the first metabolic waste of the protein metabolism. Ammonia is produced in the liver by the process of deamination. Ammonia is very toxic and requires large amount of water for its excretion
(ii) **Urea** White crystalline solid product produced in the liver from CO_2 and NH_3 . It is comparatively less toxic. Normal level of urea is 18-38 mg/100 mL of the blood
(iii) **Uric Acid** It is least toxic and insoluble in water. It is produced in the liver by purine catabolism in birds, and reptiles. It can be excreted in solid or semisolid form. Excretion of uric acid in solid or semisolid form conserve water. Uric acid is commercially extracted from the bird dropping (guano)

205 (c) Osmoreceptors in the body are activated by changes in the blood volume, body fluid volume and ionic concentration. An excessive loss of fluid from the body can activate these receptors, which stimulate the hypothalamus to release ADH (Antidiuretic Hormone) or vasopressin from neurohypophysis (posterior lobe of pituitary). ADH facilitate the water reabsorption from latter parts of the tubule there by preventing decreases or water loss

- 206 (c)
 A – vaso constrictor
 B – GFR
 C – aldosterone

207 (a) Kidney regulate the concentration and volume of blood by maintaining chemical balance and removing excess fluids in the form of urine. Urine formation takes place in kidney. It includes glomerular filtration, selective reabsorption and tubular secretion.

208 (a) Convoluted tubule is the highly convoluted segment of nephron in the renal labyrinth of the kidney. It is made up of the proximal tubule leading from the Bowman’s capsule to the descending limb of Henle’s loop and the distal tubule leading from the ascending limb of Henle’s loop to a collecting tubule.

209 (b) Primary function of skin is cooling. Sweat produced by sweat gland is a watery fluid containing NaCl, small amounts of urea, lactic acid, etc. Though the primary function of sweat is to facilitate a cooling effect on the body surface

210 (d) Our liver secretes bilirubin, biliverdin, cholesterol, degraded steroid hormone, vitamin and drugs

211 (c) Functions ADH
 (i) Reabsorption of water from DCT and CT
 (ii) Constriction of blood vessel
 (iii) Increase the blood flow

212 (b) ADH (Antidiuretic hormone) or vasopressin produced in the hypothalamus of the brain and released into the blood stream from the pituitary gland, enhances fluid retention by making the

kidneys to reabsorb more water. Hyposecretion of vasopressin leads no water absorption in the collecting ducts, which results in secretion of dilute urine.

213 (d) The average size of filtration slit or slit pore of glomerulus is 25-60 nm.

214 (d) Analysis of urine helps in clinical diagnosis of many metabolic disorders as well as malfunctioning of the kidney. For example, presence of glucose (glycosuria) and ketone bodies (ketonuria) in urine are indicative of diabetes mellitus

215 (b) **Uriniferous tubules** are the vital morphological and physiological units of mammalian kidney.

216 (b) On taking large amount of proteins, large amount of ammonia is formed and as a result large amount of urea is formed in liver by combining ammonia and CO₂

217 (d) Correct statements regarding the dialysis
 (i) Blood taken out from the artery and pumped back to vein in dialysis
 (ii) Heparin is used before heamodialysis
 (iii) Nitrogenous waste are removed by passive transport

218 (b)

Animal	Excretory Product	Example
Uricotelic	Uric acid	Reptiles
Ammonot-elic	Urea	Sponges
Ureotelic	Ammonia	Mammals like rabbit
Aminotelic	Amino - acids	In some animal, amino acids are excreted in small amount

219 (d) 1932

220 (a) Glomerular area of adrenal cortex is responsible for water and electrolyte balance. Zona glomerulosa layer of adrenal cortex secretes

hormones that influences the kidneys to excrete or retain sodium and potassium, depending on the needs of the body. These hormones and mineralocorticoids.

221 (c)

Glomerular capillary blood pressure causes the filtration of the blood through three layers, *i.e.*,

(i) The endothelium of the glomerular blood vessels

(ii) Epithelium of Bowman's capsule

(iii) Basement membrane between these two layers

The epithelium of the Bowman's capsule called podocytes are arranged in an intricate manner so as to leave some minute spaces called podocytes

222 (b)

Podocytes or foot cells are specialized cells of peculiar shape present in the epithelium visceral inner layer of Bowman's capsule, surrounding the glomerulus. They possess foot like processes or projections, the pedicels. Hence, called as foot cells.

223 (d)

Urea, uric acid and ammonia all are nitrogenous wastes. Ammonia is highly toxic and soluble in water, therefore, requires a large amount of water for excretion. Urea is less toxic and less soluble in water than ammonia. Uric acid crystals are non-toxic and almost insoluble in water.

224 (d)

Reptiles, birds, land snails and insects excrete nitrogenous waste as uric acid in the form of pellet of paste with a minimum loss of water and are called Uricotelic animals.

225 (a)

Main function of glomerulus is filtration of urine.

226 (b)

The expulsion of urine from the urinary bladder is called **micturition**.

227 (d)

The animals that excrete nitrogen in the form of urea are called ureotelic. Ureotelic animals include man, other mammals and aquatic mammals like whales. So, whale is ureotelic and not ammonotelic.

228 (c)

Posterior lobe of pituitary (neuro hypophysis)

229 (c)

Loop of Henle, also called nephron loop, is a U-shaped tube that extends from the proximal tubule. It plays a role in the transport of ions and water and the concentration of urine.

230 (a)

A – **Afferent arteriole** Carries the blood to **glomerulus**

B – **Efferent arteriole** carries the blood away from glomerulus toward renal vein

C – **Henle's loop** least reabsorption take place here and concentrate the urine

D – **DCT** Secretion of K^+ ions into the surrounding medulla

231 (d)

In humans, the principal nitrogenous excretory compound (urea) is synthesised in liver by ornithine cycle. Urea is eliminated mostly through kidney as excretory product

232 (b)

Each nephron or uriniferous tubule contains a network of blood capillaries, the glomerulus, connected with afferent arteriole on one side and an efferent arteriole on the other side.

233 (b)

Haemodialysis.

Malfunctioning of kidneys can lead of the accumulation of urea in blood, this condition is called uremia which is very harmful and may lead to kidney failure. In such patient urea can be removed by process called haemodialysis

234 (c)

Blood enters in glomerulus through afferent arterioles and exits out through efferent arterioles.

235 (b)

Composition of urine

Water – 95%

Urea – 2.6%

Uric acid – 0.3% (derived from nucleic acid metabolism)

Salts (NaCl) – 1.5%

236 (d)

All of these.

Steps for Urination Bladder fills with urine and becomes distended. Stretch receptors on the wall of urinary bladder send signal to the CNS.

- CNS passes on motor message to initial messengers to initiate the contraction smooth muscle of bladder and simultaneous relaxation of urethral sphincter causing the release of urine
- 237 (a) GFR of a healthy person is 125 mL/min or 180 L per day
- 238 (a) In kangaroo rat, loop of Henle is significantly longer as it descends further into the medulla and produces a higher concentration gradient in the surrounding tissue. This concentration gradient allows more water to diffuse into the surrounding tissues to be reabsorbed.
- 239 (b) Digestive wastes. Liver, the largest gland in our body secretes bile containing substances like bilirubin, biliverdin, cholesterol, degraded steroid hormones, vitamins and drugs. Most of these substances ultimately pass out along with digestive wastes
- 240 (a) Uric acid is commercially extracted from the bird droppings. Bird droppings or excretion is also called guano
- 241 (b) An increase in blood flow to the atria of heart can cause the release of ANF, which causes vasodilation of blood vessels and thereby decreases blood pressure
- 242 (d) The kidneys have a special mechanism for concentrating the urine, it is called counter current mechanism. The animals which excrete hypertonic urine have longer loop of Henle.
- 243 (b) Triazines are derived from urea.
- 244 (a) One million nephron
- 245 (c) The mammals, CO₂ and ammonia are removed from blood and used up in ornithine cycle.
- 246 (b) Nephridia in earthworm, Malpighian tubules in cockroach and urinary tubules in rat, all are excretory in functions.
- 247 (b) All glucose amino acid and some urea are absorbed in the proximal convoluted tubule, 70-80% substances reabsorbed in this region
- 248 (b) **Henle's Loop** Reabsorption in this segment is minimum. However, this region plays a significant role in the maintenance of high osmolarity of medullary interstitial fluid. The descending limb of loop of Henle is permeable to water but almost impermeable to electrolytes. This concentrates the filtrate as it moves down. The ascending limb is impermeable to water but allows transport of electrolytes actively or passively. Therefore, as the concentrated filtrate pass upward, it gets diluted due to the passage of electrolytes to the medullar fluid
- 249 (d) The blood pressure in glomerular capillaries become very high, so that there is continuous process of ultra-filtration. Glomerular filtrate contains a large amount of water and other dissolved substances such as urea, uric acid, creatinine, amino acids, glucose, sodium, potassium, vitamins, etc. About 120 mL, GP is produced per minute, *i. e.*, approx 170 L filtrate is produced in 24 hour.
- 250 (d) Each nephron or uriniferous tubule is made up of two main parts, *i. e.*, Malpighian body and renal tubule. **Malpighian body** is composed of glomerulus and Bowman's capsule. Bowman's capsule is a blind cup shaped end of uriniferous tubule.
- 251 (a) Proximal convoluted tubule (PCT) is involved with complete reabsorption of glucose by active transport and reabsorption of most of the amino acids and vitamin-C, Na⁺ (70%), K⁺ (75%) and a large amount of Ca²⁺ from glomerular filtrate.
- 252 (d) All of above. Nearly all of the essential nutrients and 70-80 per cent of electrolytes and water are reabsorbed by this segment. PCT also helps to maintain the pH and ionic balance of the body fluids by selective secretion of hydrogen ion and potassium ions into the filtrate and by absorption of HCO₃⁻ from it

253 (d) **Alkaptonuria** is a genetic disease. It is a metabolic disorder, in which patient excrete large amount of **homogentisic acid** in urine. Such urine turns black, when exposed to air.

254 (d) Due to osmotic problems, many freshwater animals cannot live for long in sea water and *vice versa*.

255 (a) Medullary gradient is caused by NaCl and urea. The gradient of medullary region is primarily by NaCl and urea. NaCl is transported by ascending limb of Henle' loop which is exchanged with descending limb of vasa recta. Similarly small amount of urea enter the thin segment of the ascending limb of Henle's loop which is transported back to interstitium by collecting tubule. The above described transport of substances facilitated by special arrangement of Henle's loop and vasa recta is called counter current mechanism

256 (a) Micturition is a reflex of voiding urine. If the urine content of urinary bladder reaches more than 300 mL micturition reflex starts. Neural mechanism of micturition is called micturition reflex

257 (b) Loop of Henle has two limb
Descending Thin walled, lined by squamous epithelium and permeable to water
Ascending Thick walled formed by cuboidal epithelium and impermeable to water

258 (a) **Malpighian tubule** are the excretory organs of insects. These open at the junction of midgut and hindgut (ileum) in cockroach. Malpighian tubules absorb excretory substances from haemolymph and fat bodies and pass into the proctodaeum. The excretory product of insects is uric acid related with water conservation in the body. These tubules are related with homeostasis, Osmoregulation and excretion.

260 (d) *Juxta-medullary nephrons have following characteristics*
 (i) Vasa-recta is prominent
 (ii) Loop of Henle is long

(iii) Loop of Henle runs deep into the medulla
 (iv) Found in xerophytic animals like camel, kangaroo and rat

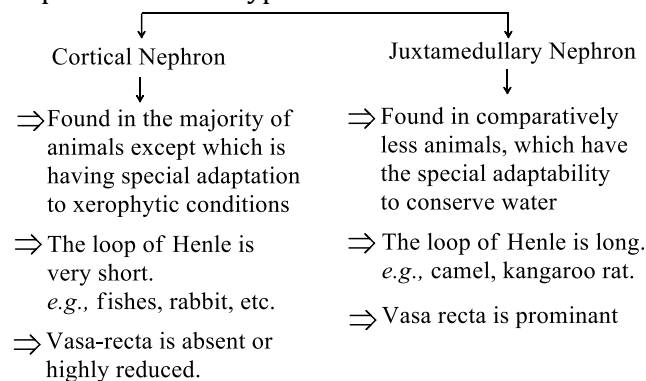
261 (c) Tubular secretion takes place in the Proximal Convoluted Tubule (PCT) and Distal Convoluted Tubule (DCT) and also CT Ultra filtration takes place in glomerulus

262 (b) **Ammonia** is the universal excretory of the waste product of nearly all aquatic animals, because of the following reasons :

- 1.It is readily soluble in water and also needs large amounts of water to dissolve.
- 2.It is highly toxic to internal environment of the organism and needs to be eliminated as and when it is formed.
- 3.It is converted to a less toxic product in aquatic animals like sharks, sting rays, semi-aquatic amphibians, aquatic or semi-aquatic reptiles and aquatic mammals.

263 (d) **Solenocytes** or **flame cells** are the excretory organ in phylum-Platyhelminthes.

264 (a) On the basis of the length of loop of Henle, the nephron is of two types



265 (a) Our lungs removes CO₂. Our liver secretes bile containing substances. The sweat and sebaceous gland in skin eliminate salts and other excretory product

266 (b) The enzyme arginase cleaves arginine to form urea and ornithine. The urea is transported to kidneys for excretion. Urea is synthesized in liver through ornithine cycle, which was discovered by

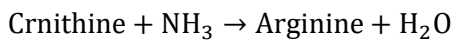
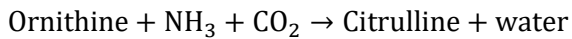
Hans Krebs and Kurt Henseleit (1932).

267 (a)

Nephron is the structural unit of human kidney.

269 (c)

Synthesis of urea takes place in liver through ornithine on Krebs-Henseleit cycle.



270 (c)

Primary excretory organs are specialised for carrying out exclusive function of excretion. *e. g.*, kidney

271 (a)

ANF (Anti Natriuretic Factor) decrease the blood pressure vaso dilation and hence checks on renin-angiotensin mechanism

272 (d)

The GFR in a normal adult person is 125 mL of plasma per minute or 180 litre of plasma per day.

273 (d)

Transitional epithelium occurs, when there is a great degree of distension or expansion in the body, *e. g.*, urinary bladder and uterus. It appears stratified with 4 to 6 layers. This epithelium prevents rupture of urinary bladder by permitting distension. It is a type of specialized epithelia.

274 (c)

Glomerulonephritis inflammation of glomeruli of kidney

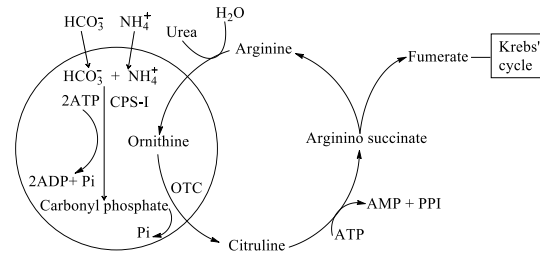
275 (a)

Glomerular filtration occurs in Bowman's capsule when the hydrostatic pressure in the glomerulus is 70 mm Hg and net filtration rate is 10 mm Hg.

Effective Filtration Pressure (EEP) or Net Filtration Pressure (NEP) is Glomerular Blood Hydrostatic Pressure (GBHP) minus the Colloidal Osmotic Pressure of Blood (BCOP) and Capsular Hydrostatic Pressure (CHP)

$$\begin{aligned} \text{EEP/NFP} &= \text{GBHP} - (\text{BCOP} + \text{CHP}) \\ &= 60 - (32 + 18) = 10 \text{ mmHg} \end{aligned}$$

276 (c)



Urea cycle The reaction of urea cycle, which occur in the mitochondria are contained in the oval. CPS-I \Rightarrow Carbamyl phosphate synthetase-I, OTC-is ornithine transcarbamoyl case

1. This is also called Krebs-Henselet cycle (1932)
2. Formation and transformation of three amino acids namely ornithine, citrulline and arginine one after the other constitute the major steps in this cycle

277 (a)

Sodium reabsorption in DCT is controlled primarily by aldosterone. Increase in plasma aldosterone concentration increases Na^+ reabsorption.

278 (d)

In humans, the principle nitrogenous excretory compound (*i. e.*, urea) is synthesized in liver by ornithine cycle. Urea is eliminated mostly through kidney as excretory product.

279 (c)

Liver, the largest gland in our body secretes bile containing substances like bilirubin, biliverdin, cholesterol, degraded steroid hormones, vitamins and drugs. Most of these substances ultimately pass out along with digestive wastes

280 (a)

The normal concentration of sodium in the blood plasma is 150 mEq/L. If this level drops below 120 mEq/L, the result may be lethargy, coma or death. Unlike deficiencies of other important fluid constituents, the most common cause of this drop in sodium concentration is not a nutritional deficit of sodium, but rather an excess of water.

281 (b)

A terrestrial animal must be able to conserve water.

282 (b)

The urine is hypertonic (*i. e.*, it has higher osmotic pressure than the blood plasma).

283 (b)

Wolffian body is also known as mesonephros.

284 **(d)**

Kidneys do not take part in destruction of dead blood corpuscles.

285 **(d)**

Blood is filtered so finely through these membranes (three layers) that almost all the constituents of the plasma except the proteins, RBC and WBC pass into the lumen of the Bowman's capsule. Therefore, it is considered as the process of ultra filtration

286 **(d)**

Hepatopancreas is not an excretory organ. Hepatopancreas is an organ of the digestive track of arthropods, mollusks and fish. It provides function as same as liver and pancreas of mammals.

287 **(c)**

Epithelium cells of the Bowman's capsule. Glomerular capillary blood pressure causes the filtration of the blood through three layers, *i.e.*,
(i) The endothelium of the glomerular blood vessels
(ii) Epithelium of Bowman's capsule
(iii) Basement membrane between these two layers
The epithelium of the Bowman's capsule called podocytes are arranged in an intricate manner so as to leave some minute spaces called podocytes

288 **(d)**

Functioning of kidney is regulated by

(i) Hypothalamus by ADH or vasopressin hormone

(ii) JGA by renin angiotensin mechanism

(iii) Heart by ANF (Atrial Natriuretic Factor)

289 **(d)**

In nephron, reabsorption from filtrate is minimum in collecting duct, while maximum in proximal convoluted tubule.

290 **(d)**

Waste like urea, uric acid, CO₂, H₂O and ions gets accumulated in the body. Their accumulation occurs by the metabolic activities or excess ingestion

291 **(a)**

The malpighian corpuscle, PCT and DCT of the nephrons are situated in the cortex or cortical part of the kidney whereas the loop of Henle dips into the medullary part of the kidney

292 **(b)**

Human blood normally contains 18 to 38 mg of urea per 100 mL blood.