CHAPTER

19

Excretory Products and Their Elimination

PRACTICE QUESTIONS

Excretory System

1. Select the incorrect statement from the following:
(a) Animals accumulate ammonia, urea, uric acid, CO_2 and water by metabolic activities.
(b) Animal accumulate substances like ions (Na^+, K^+, Cl^-) and urea, ammonia, uric acid, CO_2 and water are removed totally or partially.
(c) Ammonia produced by metabolism is converted into urea in the liver of mammals.
(d) Kidneys play significant role in the removal of ammonia directly.

2. Select ammonotelic from the following
(a) Many bony fishes (b) Aquatic amphibians
(c) Aquatic insects (d) All of these

3. Select the order of toxicity.
A. Ammonia B. Urea C. Uric acid
(a) A > B > C (b) B > A > C (c) C > A > B (d) C > B > A

4. Which excretory product requires maximum water for its elimination?
(a) Ammonia (b) Urea (c) Uric acid (d) Creatinine

5. Select the incorrect statement from the following:
(a) Ammonia is readily soluble in water.
(b) Ammonia is generally excreted by the process of diffusion.
(c) Ammonia is excreted as ammonium ion through gill surface in fishes.
(d) Ammonia is the major and urea and uric acid are the minor forms of nitrogenous waste excreted by animals.

6. Metabolic wastes containing nitrogen in our body are due to
(a) Carbohydrates (b) Proteins (c) Fats (d) Vitamins

7. Excretion involves the process in which
(a) Harmful substances in the body are chemically changed.
(b) Substances of no further use or those present in excessive quantities are thrown out of the body.
(c) Harmful substances are stored in cells before being eliminated.
(d) Expulsion of urine from the urinary bladder and sweat from the skin.

8. Which of the following is Ureotelic?
(a) Mammals (b) Most of the terrestrial amphibians
(c) Marine fishes (d) All the above

9. Ammonia which is produced by metabolism is converted into **A** in the liver of mammals and released into **B** which is filtered and **C** out by kidney
(a) A–Uric acid, B–Blood, C–excreted
(b) A–Urea, B–Blood, C–excreted
(c) A–Amino acid, B–Blood, C–excreted
(d) A–Sugar, B–Blood, C–excreted

10. Which of the following is uricotelic?
(A) Reptiles (B) Birds (C) Insects (D) Land snails
(a) A, B and C only (b) B and C only (c) A and D only (d) All of these

11. With respect to the mode of excretion, bony fish falls into what category of organism?
(a) Ureotelic (b) Uricotelic
(c) Ammonotelic (d) Osmoconformers

12. Aquatic animals are mostly ammonotelic because
(a) Ammonia helps in checking the inflow of water into body.
(b) Excretion of ammonia requires large amount of water which is available to these animals.
(c) Water contains less nitrogen.
(d) These get less light.

13. What gets increased in blood if liver becomes functionless?
(a) Urea (b) Ammonia (c) Uric acid (d) Proteins

14. Nitrogenous excretory product of frog tadpole is
(a) Ammonia (b) Urea (c) Guanine (d) Uric acid

15. In aquatic organisms, the waste end product of nitrogen metabolism is
(a) Urea (b) Nitrogen (c) Ammonia (d) Allantois

16. The chief nitrogenous waste product present in urine of frog is
(a) Ammonia (b) Urea (c) Uric acid (d) Allantoin

17. Nitrogenous waste is excreted mainly as
(a) Urea in both frog and tadpole (b) Urea in frog and ammonia in tadpole
(c) Uric acid in frog and urea in tadpole (d) Urea in tadpole and ammonia in frog

18. Urea is derived from
(a) Fats (b) Amino acids
(c) Carbohydrates (d) Uric acid

19. Which of the following sets of animals produce the same substances as their chief excretory product?
(a) Fish, pigeon and frog (b) Camel, housefly and snake
(c) Frog, monkey and dog (d) Amoeba, ant and antelope

20. Which of the following sets of animals are uricotelic?
(a) Fish, snake, fowl and man (b) Fish, frog, lizard and fowl
(c) Crow, snake, cockroach and lizard (d) Camel, dog, monkey and man

21. Excretion of nitrogenous waste product mainly as uric acid by birds is helpful in
(a) Conserving body heat (b) Conserving water
(c) Eliminating excess water (d) Eliminating excess body heat

22. Uric acid is formed in human being from
(a) Proteins (b) Glucose (c) Purines (d) Pyrimidines

23. Uric acid is excreted by
(a) Pigeon (b) Frog (c) Rabbit (d) Man

24. The least toxic nitrogenous waste is
(a) Ammonia (b) Ammonia + Urea
(c) Urea (d) Uric acid

25. Marine teleost fishes excrete
(a) Uric acid (b) TMO (c) Ammonia (d) All of these

26. Select the correct statement from the following:
(A) In most of the invertebrates, excretory structures are in complex tubular forms.
(B) Vertebrates have simple tubular organ as excretory structure like kidney.
(C) Protonephridia is primarily concerned with excretion.
(D) Protonephridia are excretory structure in rotifers, some annelids and cephalochordates (Amphioxus).
(a) A (b) B (c) C (d) D

27. Excretory and osmoregulatory structure in cockroach is
(a) Flame cells (b) Green glands
(c) Nephridia (d) Malpighian tubules

28. The animal which retains urea for hypertonicity is (most appropriate)
(a) Elasmobranch (b) Man (c) Bird (d) Amphibian

29. Malpighian tubules are the excretory organs in
(a) Platyhelminthes (b) Cockroach (c) Pila (d) Ascaris

30. In annelids, excretory organs are
(a) Nephridia (b) Malpighian tubules
(c) Green glands (d) Kidneys

31. The excretory organs in prawn are
(a) Malpighian tubules (b) Nephridia
(c) Kidneys (d) Green glands or antennal gland

32. Green glands are excretory organs of
(a) Moths (b) Crayfishes (c) Scorpions (d) Spiders

33. Coxal glands are excretory organs in
(a) Spiders and scorpions (b) Insects
(c) Annelids (d) Molluscs

34. Which of these parts in vertebrates functionally corresponds to the contractile vacuole of protozoans?
(a) Heart (b) Cloaca (c) Sweat glands (d) Kidneys

35. In humans, the excretory system coexist of
(a) Pair of kidneys (b) Pair of ureters
(c) A urinary bladder and a urethra (d) All of these

36. Kidneys in human is situated between _____.
(a) T12–L3 (b) T11–L2 (c) T12–L1 (d) T12–L5

37. The correct dimensions of human kidney are

	Length	Width	Thickness	Weight
(a)	10–12 cm	5–7 cm	2–3 cm	120–170 gm
(b)	10–12 cm	2–3 cm	5–7 cm	120–140 gm
(c)	12–14 cm	5–7 cm	2–3 cm	120–140 gm
(d)	12–14 cm	2–3 cm	2–3 cm	120–170 gm

38. Which of the following is correct about hilum of kidney?
(a) It is present on the convex outer surface.
(b) It is present at the inner convex surface.
(c) It is notch through which ureter, nerve and blood vessel enter.
(d) It is the place where the calyces are open.

39. Which of the following is incorrect about human kidney?
(a) Kidney is covered by tough capsule
(b) Kidney is divided into cortex and medulla on the outer side
(c) The cortex is extended in between the medullary pyramid and the renal column of bertini.
(d) Kidney is situated close to the dorsal inner wall of abdominal cavity.

40. Each kidney has (nearly) how many nephrons?
(a) 1 million (b) 2 million (c) ½ million (d) 3 million

41. The extension of cortex in medulla is known as
(a) Columnae carneae (b) Columns of bertini
(c) Renal columns (d) both (b) and (c)

42. Each nephron consists of
(a) Glomerulus (b) Renal tubules
(c) Both (a) and (b) (d) Calyces

43. Glomerules along with Bowman's capsule is called
(a) Renal corpuscle (b) Malpighian tubule
(c) Malpighian body (d) Both (a) and (c)

44. A part of Nephron is situated in cortex completely
A. Malpighian Corpuscle B. PCT
C. DCT D. Loop of Henle
E. Collecting duct
(a) A, B and C only (b) B and C only
(c) A, B, C and D only (d) D and E only

45. Select the incorrect statement from the following:
(a) The DCTs of many nephrons opens into a straight tube called collecting duct.
(b) In cortical nephrons (majority), the loop of Henle is too short and extended only very little in medulla.
(c) In juxta medullary nephrons (minority), the loop of Henle is very long and runs deeply into medulla.
(d) Vasa recta is not a part of peritubular network .

46. Two kidneys of human beings lie
(a) At the level of ovaries
(b) At the same level
(c) Left kidney at a higher level than the right one
(d) Right kidney at a higher level than the left one

47. 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

48. Mammalian kidney serve to excrete
(a) Excess water, urea and amino acids
(b) Excess salts, urea and excess water
(c) Excess salts, excess water and excess amino acids
(d) Excess salts, urea and water

49. The part through which arteries and veins enter or leave the kidney is called
(a) Major calyces (b) Minor calyces
(c) Hilus (d) Renal pore

50. Cells named podocytes occur in the wall of
(a) Neck region of nephrons (b) Glomerular capillaries
(c) Outer wall of Bowman's capsules (d) Inner wall of Bowman's capsules

51. A malpighian corpuscle is
(a) Another name for nephron
(b) An excretory structure of insects
(c) Combined name for glomerulus and Bowman's capsule
(d) None of the above

52. Blood vessel leading to glomerulus is called
(a) Renal artery (b) Renal vein
(c) Efferent arteriole (d) Afferent arteriole

53. Blood vessel draining the glomerulus in a mammalian nephron is called
(a) Afferent arteriole and is narrower than the vessel entering it.
(b) Efferent venule and is narrower than the vessel entering it.
(c) Efferent arteriole and is narrower than the vessel entering it.
(d) Renal artery and is wider than the vessel entering it.

54. In mammalian kidneys, the Bowman's capsules or Malpighian corpuscles occur in
(a) Cortex (b) Medulla
(c) Pelvis (d) All of these

55. In a glomerulus
(a) Afferent arteriole is thicker than efferent arteriole.
(b) Afferent capillaries are thicker than efferent capillaries.
(c) Afferent capillaries are thinner than efferent capillaries.
(d) Afferent arteriole is thinner than efferent arteriole.

56. Which one of these is not a part of uriniferous tubule?
(a) Loop of Henle (b) Collecting duct
(c) Bowman's capsule (d) Distal convoluted tubule

57. Bowman's capsule is lined by
(a) Ciliated epithelium (b) Squamous epithelium
(c) Cuboidal epithelium (d) Cuboidal and columnar epithelium

58. Brush border is a characteristic of
(a) Neck of nephron (b) Collecting tube
(c) Proximal convoluted tubule (d) All of these

59. Filtration of blood occurs in
(a) Loop of Henle (b) Bowman's capsule (c) Lungs (d) Renal papillae

60. The glomerular filtrate, i.e., the liquid collected in the cavity of Bowman's capsule is
(a) Blood minus proteins (b) Blood minus proteins and corpuscles
(c) Water (d) Urine

61. Normally that is absent in Glomerular filtrate is
(a) Albumin (b) Glucose (c) NaCI (d) Creatinine

62. The glomerular filtration rate would be decreased by
(a) Constriction of the efferent arteriole
(b) An increase in afferent arteriolar pressure
(c) Compression of the renal capsule
(d) An increase in the renal blood flow

63. A minute vessel runs parallel to the Henle's loop forming 'U' shape vasa recta is a part of
(a) Peritubular network (b) Afferent arteriole
(c) Efferent arteriole (d) Bowman's capsule

64. Urine formation mainly involves the process of
(a) Ultrafiltration (b) Selective reabsorption
(c) Secretion (d) All of these

65. How much amount of blood is filtered out by kidney's/min?
(a) 500 ml (b) 1100–1200 ml (c) 1500 ml (d) 125 ml

66. How many layers do filtration membrane consist of?
(a) 1 (b) 2 (c) 3 (d) 4

67. Filtration membrane consist of
(a) Endothelium of glomerular blood vessels
(b) Epithelium of Bowman's capsule
(c) Basement membrane between the above two layers
(d) All the above

Regulation of Organ

68. Which of the following is incorrect about ultrafiltration?
(a) Podocytes are arranged in intricate manner so as to leave minute space called filtration slits and slit pore, filtration occurs finely through these pores.
(b) Filtration is so fine that almost all the constituent of blood except protein pass onto the lumen of Bowman's capsule.
(c) Filtrated fluid is isotonic to blood plasma.
(d) JGA controls the filtration rate of ultrafiltration.

69. The values of GFR in an healthy individual is
(a) 125 ml/min (b) 150 ml/min (c) 100 ml/min (d) 200 ml/min

70. The amount of the filtrate formed by the kidneys are
(a) 125 ml/min (b) 7.5 litre/hr (c) 180 litre/day (d) All of these

71. Select the total number of correct matching.
(1) JGA → Juxtaglomerular Apparatus
(2) GFR → Glomerular Filtration Rate
(3) PCT → Proximal Conducting Tube
(4) DCT → Distal Convoluted Tubule
(5) CD → Conducting Duct
(6) ADH → Antidiuretic Hormone
(a) 6 (b) 5 (c) 4 (d) 2

72. JGA is formed by
(a) Part of DCT (b) Part of afferent arteriole
(c) Both (a) and (b) (d) None of these

73. Following are the points of mechanism of JGA. Arrange them accordingly.
(A) Activation of JG cells
(B) Activated JG cells release renin
(C) Fall in GFR
(D) Increase of glomerular blood flow
(E) GFR back to normal
(a) E, A, D, C, B (b) C, A, B, D, E (c) A, B, C, D, E (d) C, A, D, B, E

74. Nearly how much percent of the filtrate is reabsorbed by the renal tubules?
(a) 70–80% (b) 85% (c) 99% (d) 90%

75. Choose the correct statement about absorption in renal tubules from the following:
(a) Glucose, amino acids and Na^+ reabsorbed actively.
(b) Nitrogenous waste are absorbed by passive transport.
(c) 70–80 per cent of electrolyte and water are absorbed in PCT.
(d) All the above

76. Tubular secretion helps in
(a) Ionic balance of body fluid (b) Acid base balance of body fluid
(c) Both (a) and (b) (d) None of these

77. Which of the following is an incorrect statement about filtration?
(a) Selective process
(b) Non-selective process
(c) Performed by glomerulus
(d) It occurs through the usage of capillary (glomerulus) blood pressure

78. Which of the following is incorrect about PCT?
(a) Lined with simple cuboidal brush border epithelium.
(b) All essential nutrient and 70 to 80 per cent of the electrolyte and water are reabsorbed here.
(c) It helps in the PH maintenance of body fluid by the selective secretion of H^+ ion and by the absorption of HCO_3^-.
(d) It does not help in the maintenance of ionic balance of body fluid.

79. Which of the following part has minimum reabsorption?
(a) PCT (b) HL (c) DCT (d) Collecting duct

80. Select the total number of correct statements about the loop of Henle.
(1) Descending limb is permeable to water.
(2) Descending limb is almost impermeable to electrolyte.
(3) Ascending limb is impermeable to water.
(4) It allows the transport of electrolyte only actively.
(5) At the tip of loop of Henle, the concentration of filtrate is 1200 m osmol/l.
(6) It helps in the maintenance of high osmolarity in medullary interstitium.
(a) 6 (b) 3 (c) 4 (d) 5

81. Which segment helps in the pH maintenance of body fluid?
(a) PCT (b) DCT (c) Collecting duct (d) All

82. DCT helps in
(A) Conditional reabsorption of Na^+ and water
(B) HCO_3^- absorption
(C) pH maintenance
(D) Selective secretion of H^+ and K^+
(a) A, C and D only (b) B, C and D only
(c) All of these (d) C and D only

83. Which of the following segment allows the passage of small amount of urea into modularly interstitium to keep up the osmolarity?
(a) PCT (b) DCT (c) HL (d) Collecting duct

84. At which place we initially used the term 'urine' for filtrate?
(a) PCT (b) DCT
(c) HL (d) Collecting duct (end)

85. Counter-current mechanism is present in
(a) HL (b) Vasa recta
(c) Both (a) and (b) (d) DCT

86. Which of the following is incorrect about counter-current mechanism?
(a) The flow of filtrate in two limbs of vasa recta is in opposite direction.
(b) The flow of blood in two limbs of vasa recta is also in opposite direction.
(c) NaCI is transported by the ascending limb of HL which is exchanged with the descending limb of vasa recta.
(d) NaCI is returned to in interstitium by the ascending portion of vasa recta.

87. Counter current mechanism maintains the concentration gradient in the medullary interstitium. It helps in
(a) Easy passage of water from PCT
(b) Easy passage of water from DCT
(c) Easy passage of water from HL
(d) Easy passage of water from collecting duct

88. The total filtrate formed in 24 hours in human kidney is
(a) 1.8 litre (b) 8.0 litre (c) 18 1itre (d) 180 litre

89. Which of the following is most likely to cause an increase in the glomerular filtration rates?
(a) Blockage of ureter
(b) Dilation of the afferent arterioles
(c) Release of renin from the juxtaglomerular apparatus
(d) Volume depletion

90. Which of these will be completely reabsorbed from glomerular filtrate under normal conditions in the nephrons?
(a) Urea (b) Salts (c) Uric acid (d) Glucose

91. What are mainly reabsorbed from Henle's loops?
(a) Potassium (b) Glucose
(c) Water and NaCl (d) Urea and NaCl

92. The part of the nephron that helps in active reabsorption of sodium is
(a) Bowman's capsule (b) Distal convoluted tubule
(c) Ascending limb of Henle's loop (d) Proximal convoluted tubules

93. Which of the following substance is actively secreted into glomerular filtrate of the kidney tubule?
(a) Amino acids (b) Chloride ions
(c) Na^+ (d) K^+

94. The effect of antidiuretic hormone (ADH) on the kidney is to increase the
(a) Excretion of water
(b) Excretion of Na'
(c) Permeability of the distal nephron to water
(d) Glomerular filtration rate

95. In deficiency of ADH, the rate of micturition
(a) Decreases (b) Increases
(c) Remains the same (d) None of these

96. Volume of urine is regulated by
(a) Aldosterone
(b) Aldosterone and ADH
(c) Aldosterone, ADH and testosterone
(d) ADH alone

97. When a person is suffering from poor renal reabsorption, which one of the following will not help in the maintenance of blood volume?
(a) Increased ADH secretion
(b) Decreased glomerular filtration
(c) Increased arterial pressure in kidneys
(d) Decreased arterial pressure in kidneys

98. The number of nephrons in a kidney is equal to the
(a) Number of Bowman's capsules
(b) Sum of Bowman's capsules and glomeruli
(c) Double the number of Bowman's capsules
(d) Sum of Bowman's capsules and Malpighian corpuscles

99. If Henle's loop were absent from mammalian nephron, which of the following is to be expected?
(a) The urine will be more dilute.
(b) There will be no urine formation.
(c) The urine will have more concentration.
(d) There will be hardly any change in the quality and quantity of urine formed.

100. Which of the following statements is/are true?
1. Urine is hypertonic in distal convoluted tubule.
2. When the urine passes into the collecting tubule it becomes hypotonic.
3. Urine is isotonic in proximal convoluted tubule.
4. Urine becomes more and more hypotonic as it passes through the Henle's loop.
(a) 1 and 4 only (b) 1, 2 and 3 only (c) 2 and 3 only (d) 3 only

101. 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.

102. Ducts of Bellini are present in
(a) Liver (b) Kidney
(c) Intestine (d) Medulla oblongata

103. The human kidney produces how much concentrated urine than the initial filtrate formed?
(a) 2 times (b) 4 times (c) 6 times (d) 3 times

104. What is the ratio of concentration of outer medulla to outer portion of inner medulla?
(a) $\frac{1}{3}$ (b) $\frac{2}{3}$ (c) $\frac{4}{3}$ (d) $\frac{1}{4}$

105. The functioning of kidney is regulated by
(a) Hypothalamus (b) JGA (c) Heart (d) All of these

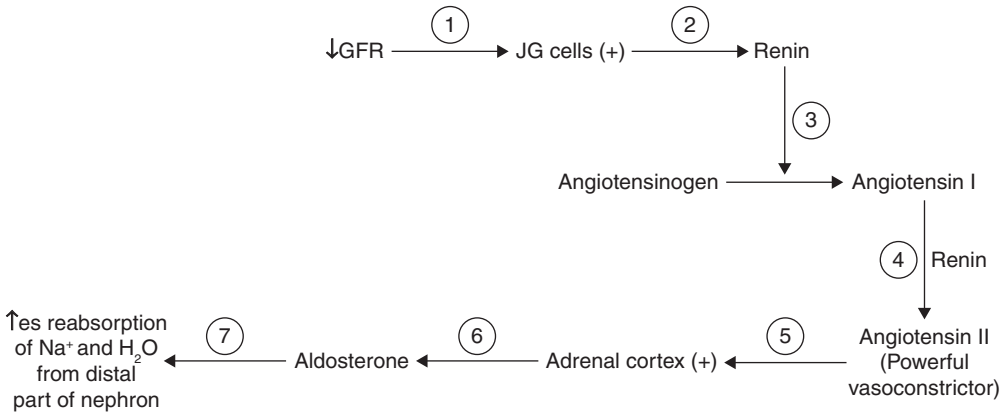
106. ADH causes
(a) Increased water absorption from DCT and CT
(b) Increased GFR by increasing blood pressure
(c) Increases reabsorption of electrolyte from distal tubules
(d) All of these

107. Arrange the following steps in order
(1) Excessive loss of fluid
(2) Stimulation of osmoreceptor
(3) Stimulation of Hypothalamus
(4) Release of ADH or Vasopressin
(5) ADH facilitate water reabsorption from distal tubules
(6) Increase in body fluid switch off osmoreceptor and suppress the release of ADH.
(a) 1, 2, 3, 4, 5, 6 (b) 1, 3, 2, 4, 5, 6 (c) 6, 1, 2, 3, 4, 5 (d) 2, 3, 4, 1, 5, 6

108. Stimulus for activation of JG cells to release rennin is/are
(a) ↓ Glomerular blood flow (b) ↓ Glomerular blood pressure
(c) ↓ GFR (d) All of these

109. RAAS involve
(a) JGA apparatus (b) Angiotensinogen (c) Adrenal cortex (d) All of these

110. Select the incorrect from the following:



(a) 2, 3 (b) 1, 3 (c) 4 (d) 5, 6

111. Increase in blood pressure is caused by
(a) ↑es ADH secretion (b) ↑es Aldosterone secretion
(c) ↑es Angiotensinogen II (d) All of these

112. Which of the following is true about ANF?
(a) Full form is Autonomic Nervous Factor
(b) Antagonistic to Renin–Angiotensin mechanism
(c) It causes vasoconstriction
(d) All are true

113. Find the correct steps for micturition (arrange in order).
(A) Urine filled in urinary bladder
(B) Stretch–receptor activation
(C) Wall of bladder send signal to CNS
(D) Motor message from CNS to urinary bladder and urethral sphincter
(E) Bladder contracts and sphincter dilates leads to micturition
(a) A → B → C → D → E
(b) C → B → A → D → E
(c) B → A → C → D → E
(d) A → B → C → E → D

114. Neural mechanism of micturition is called
(a) Micturition reflex (b) Simple reflex
(c) Conditioned reflex (d) All of these

115. An adult human excretes how much urine per day?
(a) 1–1.5 litre (b) 1.5–2 litre (c) 5–1 litre (d) 3 litre

116. On an average _____ of urea is excreted out per day
(a) 20–25 gm (b) 25–30 gm (c) 25–30 mg (d) 40–45 gm

117. Analysis of urine help in the clinical diagnosis of
(a) Metabolic disorders (b) Malfunctioning of kidney
(c) Diabetes mellitus (d) All of these

118. Select the correct matching:

	Colour	pH	Odour
(a)	Light yellow	7.0	Characteristic
(b)	Light yellow	6.0	Characteristic
(c)	Light yellow	6.5	Pungent
(d)	Light yellow	6.0	Almond

119. Presence of glucose and ketone bodies in urine is called
(a) Glycosuria and ketonuria (b) Glycogenic and ketonuria
(c) Glycosuria and ketonemia (d) Gluconeogenesis and ketonaemia

120. Glycosuria and ketonuria is indicative of
(a) Starvation (b) Diabetes mellitus
(c) Diabetes insipidus (d) All of these

121. Sweat contains
(a) Watery fluid with NaCl (b) Urea
(c) Lactic acid (d) All of these

122. Primary function of sweat is
(a) Removal of excess of water (b) Removal of urea
(c) Cooling of body surface (d) All of these

123. Nitrogenous waste is eliminated through
(a) Kidney (b) Saliva (c) Sweat gland (d) All of these

124. Sterols, hydrocarbons and waxes are eliminated through
(a) Liver (b) Lungs
(c) Sebaceous glands (d) Sweat glands

125. Select the incorrect statement from the following.
(a) Liver is the second largest gland in our body.
(b) Sebum provides protective oily covering for skin.
(c) Bile contains substance like bilirubin, biliverdin, cholesterol, degraded steroid hormones, vitamins and drugs are passed with digestive wastes.
(d) Other than kidneys lungs, liver and skin also helps in the elimination of excretory wastes.

126. Which is not a part of renal tubule?
(a) PCT (b) Bowman's capsule
(c) DCT (d) Collecting duct

127. Select the total number of excretory organ from the following found in various animals:
Protonephridia, SA node, nephridia, Hepatic Cecae, atrium, Malpighian tubules, green glands, kidney, pons, ommatidia, parapodia
(a) 4 (b) 5 (c) 6 (d) 7

128. Excretory organs help in
(a) Excretion only (b) Maintenance of acid–base balance
(c) Maintenance of ionic balance (d) All of these

129. Our lung removes how much of CO_2 per hour from the body
(a) 10 L (b) 20 L (c) 18 L (d) 2 L

130. Inflammation of glomeruli of kidney is
(a) Renal failure (b) Renal calculi
(c) Glomerulonephritis (d) Cystitis

131. Stone and insoluble mass of crystallized salts, formed within the kidney is generally made up of
(a) Calcium carbonate (b) Calcium oxalate
(c) Silica (d) Any of these

132. Which is the ultimate method for the correction of acute renal failure?
(a) Haemodialysis (b) Renal transplantation
(c) Blood transfusion (c) Angioplasty

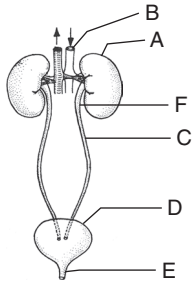
133. Following are the steps of dialysis:
A. Blood is passed into a vein.
B. Blood is mixed with heparin.
C. Blood is mixed with anti-heparin.
D. Blood is drained from convenient artery.
E. Blood is passed through a coiled and porous cellophane tube bathing in dialysis fluid.
F. Removal of nitrogenous wastes from blood.

The correct sequence of steps is
(a) $A \rightarrow B \rightarrow C \rightarrow D \rightarrow E \rightarrow F$ (b) $D \rightarrow B \rightarrow E \rightarrow F \rightarrow C \rightarrow A$
(c) $F \rightarrow C \rightarrow E \rightarrow B \rightarrow A \rightarrow D$ (d) $D \rightarrow C \rightarrow E \rightarrow F \rightarrow B \rightarrow A$

134. Malfunctioning of kidney may lead to the accumulation of _____ in blood.
(a) Glucose (b) Amino acid (c) Urea (d) All of these

135. Which of the following is true about renal transplantation?
(a) Kidney transplantation is the ultimate method at the stage where drug or dialysis do not help.
(b) Immunosuppressive agent are used in kidney transplant patient.
(c) Close relatives are often used as kidney donors to minimise the risk of rejection.
(d) All the above

136. In the diagram of excretory system of human beings given below, different parts have been indicated by alphabets; choose the answer in which these alphabets have been correctly matched with the parts which they represent.



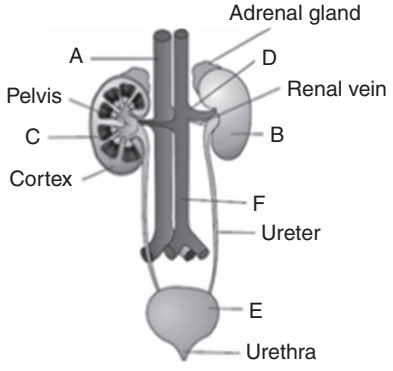
(a) A–Kidney, B–Abdominal aorta, C–Ureters, D–Urinary bladder, E–Urethra, F–Renal pelvis
(b) A–Kidney, B–Abdominal aorta, C–Urethra, D–Urinary bladder, E–Ureters, F–Renal pelvis
(c) A–Kidney, B–Renal pelvis, C–Urethra, D–Urinary bladder, E–Ureters, F–Abdominal aorta
(d) A–Kidney, B–Abdominal aorta, C–Urethra, D–Urinary bladder, E–Renal pelvis, F–Ureters

137. Match the excretory functions of section I with the parts of the excretory system in section II. Choose the correct combinations from among the answers given.

Section I			**Section II**
(i)	Ultrafiltration	–	(a) Henle's loop
(ii)	Concentration of urine	–	(b) Ureter
(iii)	Transport of urine	–	(c) Urinary bladder
(iv)	Storage of urine	–	(d) Malpighian corpuscles
			(e) Proximal convoluted tubules

(a) (i)–(d), (ii)–(a), (iii)–(b), (iv)–(c)
(b) (i)–(d), (ii)–(c), (iii)–(b), (iv)–(a)
(c) (i)–(e), (ii)–(d), (iii)–(a), (iv)–(c)
(d) (i)–(e), (ii)–(d), (iii)–(a), (iv)–(b)

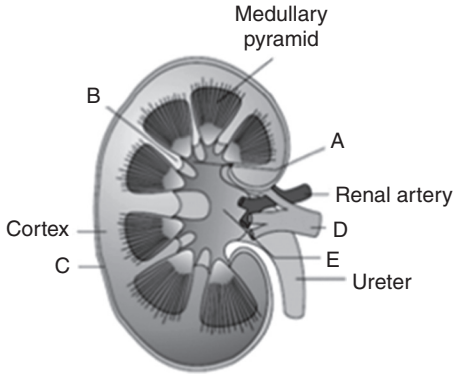
138. Observe the following figure.



Identify A to E structure:

	A	**B**	**C**	**D**	**E**
(a)	Renal artery	Urinary bladder	Inferior vena cava	Kidney	Medulla
(b)	Inferior vena cava	Kidney	Medulla	Renal artery	Urinary bladder
(c)	Urinary bladder	Medulla	Kidney	Inferior vena cava	Renal artery
(d)	Kidney	Renal artery	Inferior vena cava	Urinary bladder	Medulla

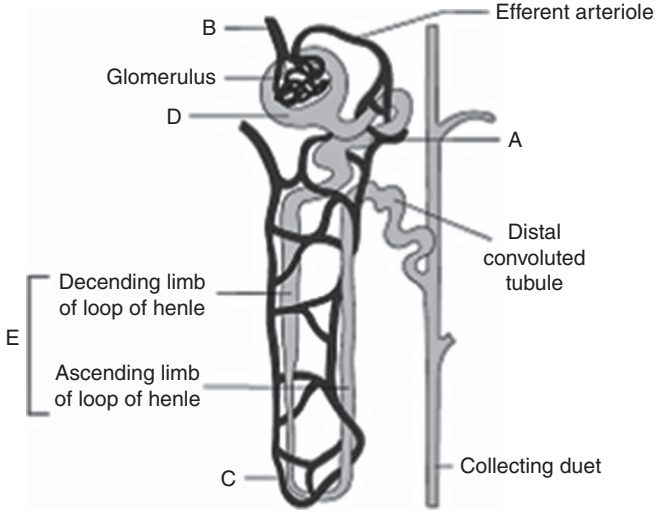
139. Go through the following figure:



Identify A to D.

	A	**B**	**C**	**D**
(a)	Renal column	Renal capsule	Calyx	Renal pelvis
(b)	Renal capsule	Renal pelvis	Renal vein	Calyx
(c)	Calyx	Renal column	Renal capsule	Renal vein
(d)	Renal vein	Calyx	Renal column	Renal capsule

140. Match the following:



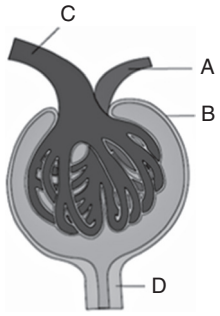
(a) A–Proximal convoluted tubule, B–Afferent arteriole, C–Vasa recta, D–Bowman's capsule, E–Henle's loop

(b) A–Henle's loop, B–Vasa recta, C–Proximal convoluted tubule, D–Bowman's capsule, E–Afferent arteriole

(c) A–Bowman's capsule, B–Henle's loop, C–Proximal convoluted tubule, D–Vasa recta, E–Afferent arteriole

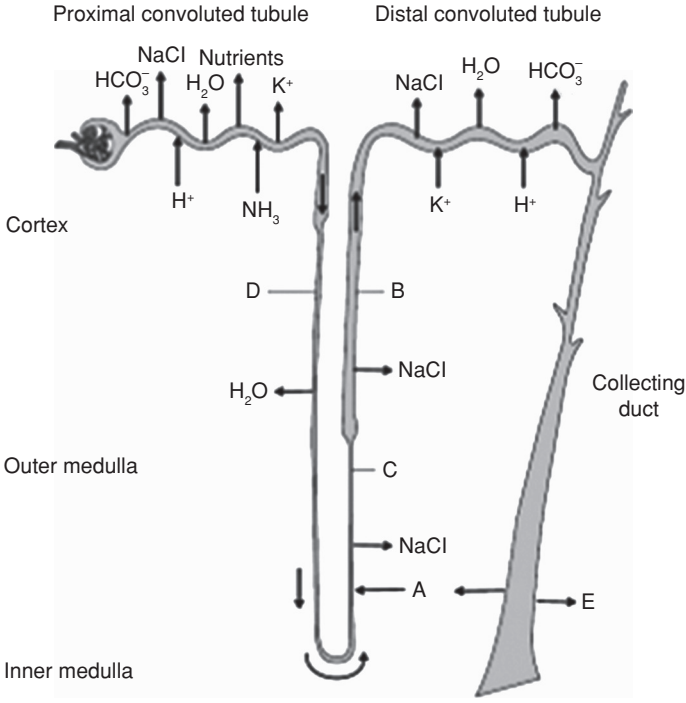
(d) A–Vasa recta, B–Proximal convoluted tubule, C–Bowman's capsule, D–Afferent arteriole, E–Henle's loop

141. The following diagram represents the Malpighian body. Identify A to D.



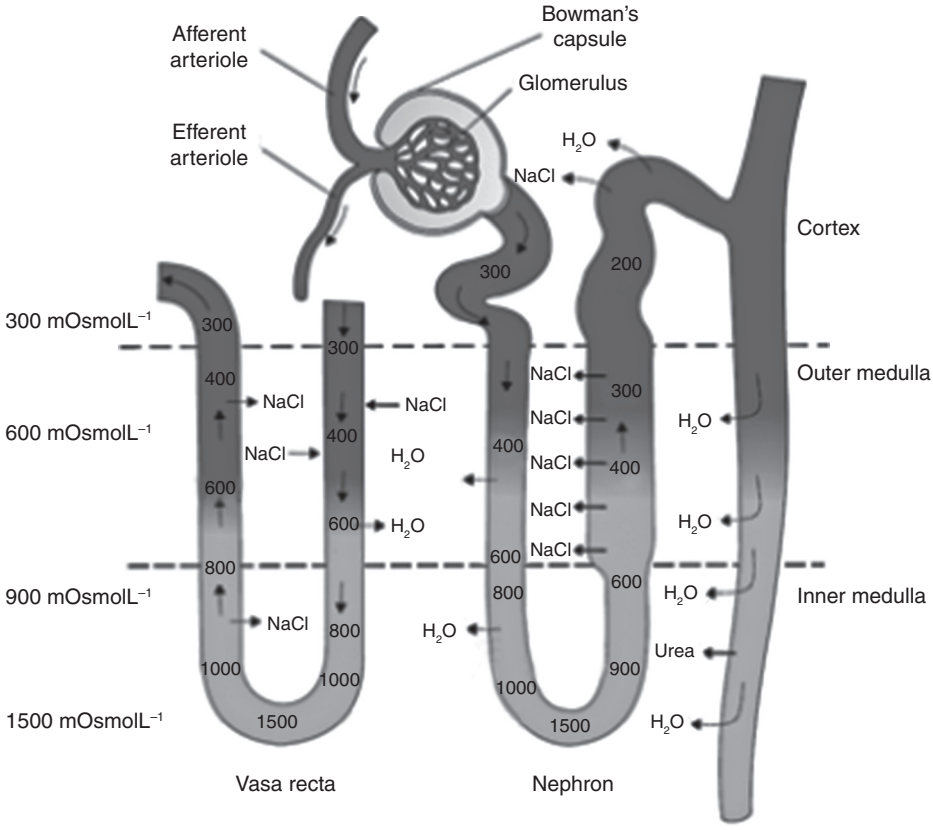
(a) A–Efferent arteriole, B–Afferent arteriole, C–Bowman's capsule, D–DCT
(b) A–Afferent arteriole, A–Efferent arteriole, C–Renal corpuscle, D–Proximal convoluted tubule
(c) A–Efferent arteriole, B–Bowman's capsule, C– Afferent arteriole, D–PCT
(d) A–Afferent arteriole, B–Efferent arteriole, C–Bowman's capsule, D–DCT

142. The diagram following the different parts absorb:



Identify A, B and D
(a) A–Urea, B–Thick segment of ascending limb, D–Descending limb of loop of Henle
(b) A–Descending limb of loop of Henle, B–Thick segment of ascending limb, D–Urea
(c) A–Thick segment of ascending limb, B–Descending limb of loop of Henle, D–Urea
(d) A–Thick segment of ascending limb, B–Thick segment of ascending limb, D–Urea

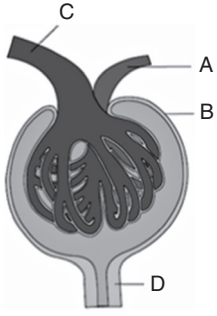
143.



Nephron produces how much concentrated urine?

(a) 4 times (b) 5 times (c) 3 times (d) 2 times

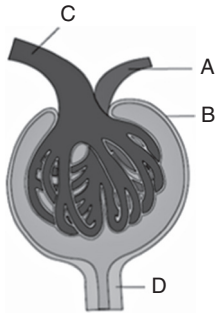
144.



Glomerulus is formed by the branching of

(a) A (b) B (c) C (d) D

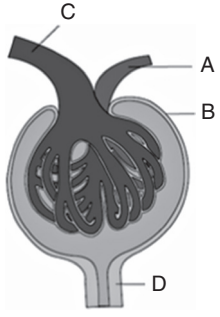
145.



The part 'B' in the above diagram is lined with

(a) Cuboidal epithelium (b) Columnar epithelium
(c) Squamous epithelium (d) Brush border epithelium

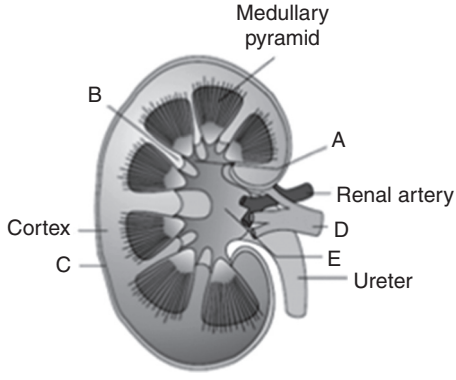
146.



Which part of the above diagram is lined with podocytes?

(a) A (b) B (c) C (d) D

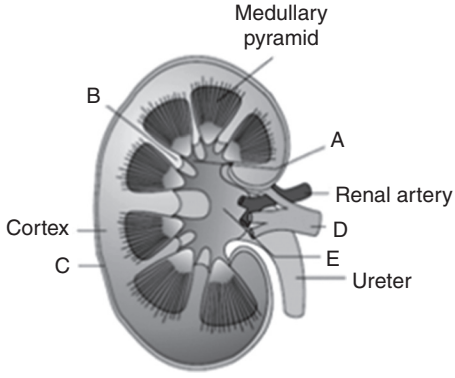
147.



B part of the above diagram contains

(a) PCT (b) DCT (c) HL (d) Blood Vessels

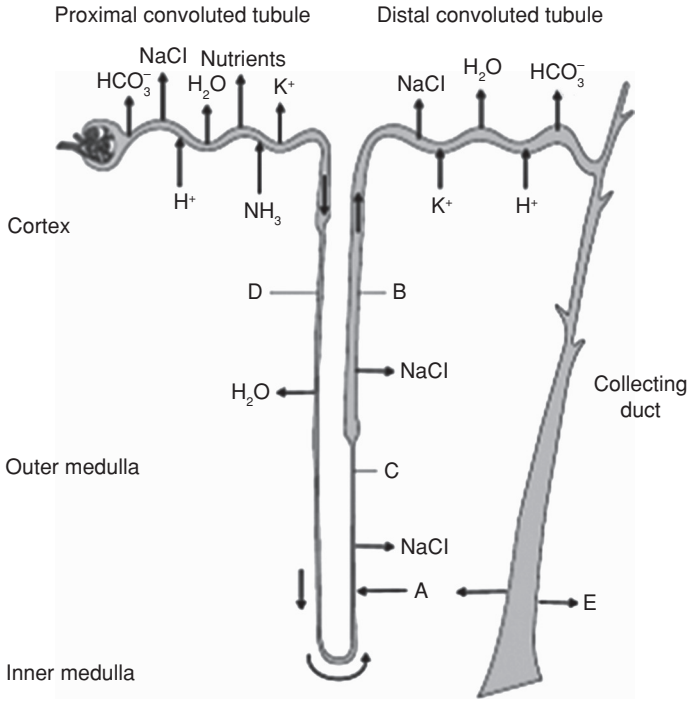
148.



In which part of the diagram calyces opens

(a) A (b) B (c) C (d) E

149. In the below diagram, identify the end excretory product which remains in body to maintain concentration of medullary interstitium?



(a) F (b) G (c) A (d) E

ASSERTION AND REASON QUESTIONS

*Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:*

(a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(c) If the assertion is true but the reason is false.
(d) If both the assertion and reason are false.

150. **Assertion:** Diabetes insipidus is marked by excessive urination and too much thirst for water.
Reason: Anti-diuretic hormone (ADH) is secreted by the posterior lobe of pituitary gland.

151. **Assertion:** Filteration is a selective process performed by the glomerulus using the glomerular capillary blood pressure.
Reason: Blood is filtered through fine pores present in PCT.

152. **Assertion:** The antidiuretic hormone increases the water permeability of distal convoluted tubule.
Reason: In the absence of ADH, water re-absorption is considerably reduced.

153. **Assertion:** Presence of glucose and ketone bodies in urine are indicative of diabetes mellitus.
Reason: Malfunctioning of kidney can lead to accumulation of urea in blood a condition called uremia.

154. **Assertion:** In the descending limb of loop of Henle, the urine is hypertonic, while in ascending limb of loop of Henle, the urine is Hypotonic.
Reason: Descending limb is impermeable to Na^+, while ascending limb is impermeable to H_2O.

155. **Assertion:** Vasa recta is absent or highely reduced in cortical nephrons.
Reason: PCT and DCT are situated in cortical region of kidney.

156. **Assertion:** Ammonia is the excretory product of aquatic amphibian.
Reason: Ammonia is readily soluble in water and requires large amount of water for excretion.

157. **Assertion:** Urinary bladder and ureters are lined by transitional epithelium.
Reason: Ureters carry the urine to urinary bladder where it is stored temporarily.

158. **Assertion:** Kidneys maintain the osmotic concentration of the blood.
Reason: Kidneys eliminate either hypotonic or hypertonic urine according to the need of the body.

159. **Assertion:** In vertebrates, the liver is also referred as an accessory excretory organ.
Reason: Liver helps kidneys in the secretion of urine.

160. **Assertion:** Sharks are said to be ammonotelic animals.
Reason: Sharks can retain considerable amounts of ammonia in their blood.

161. **Assertion:** The glomerular filtrate resembles the protein free plasma in composition and osmotic pressure.
Reason: The glomerular capillary wall and inner membrance of Bowman's capsule are impermeable to large molecules.

162. **Assertion:** PCT reabsorbs nearly all essential nutrients and 70 to 80 per cent of the electrolyte and water from filterate.
Reason: PCT is lined with brush border epithelium.

163. **Assertion:** Counter-current mechanism is responsible for the concentration of urine.
Reason: Counter-current mechanism helps to maintain the concentration gradient in the medullary interstitium.

164. **Assertion:** Aldosterone leads to the increase in blood pressure.
Reason: Aldosterone causes reabsorbtion of sodium ion and water from distal part of tubules.

165. **Assertion:** Some amount of urea is retain in medullary interstitium.
Reason: This is use to maintain require concentration in medullary interstitium.

166. **Assertion:** Urine produced (1 to 1.5 L) per day is far less than the volume of filtrate occur per day (18L).
Reason: 99% of filtrate is reabsorbed by the renal tubules.

167. **Assertion:** Uraemia is harmful condition.
Reason: Uraemia may lead to kidney failure.

168. **Assertion:** Renal tubules use to maintain ionic balance and pH of body fluids.
Reason: H^+, K^+ and NH_3 could be secreted into filtrate by renal tubules.

169. **Assertion:** ANF decreases blood pressure.
Reason: ANF causes vasodilation.

170. **Assertion:** ADH increases GFR.
Reason: ADH cause vasoconstriction thus increase blood pressure, which inturn increase the glomerular blood flow and there by GFR.

171. **Assertion:** Nephridia help in osmoregulation in earthworm.
Reason: Nephridia maintain fluid and ionic balance in earthworm.

172. **Assertion:** Antennal glands perform the excretory function in prawns.
Reason: Malpighian tubules are present in crustacean for osmoregulation.

173. **Assertion:** Glomerular filtration is considered as ultrafilteration.
Reason: Blood is filtered so finely through filtration membrane that almost all the constituent of the plasma except the proteins pass onto the lumen of Bowman 's capsule.

174. **Assertion:** Nitrogenous waste in PCT absorb passively.
Reason: It absorb by the process of diffusion down the concentration gradient.

175. **Assertion:** Uricotelism is terrestrial adaptation.
Reason: Uricotelism is least toxic and require minimum water for its excretion.

176. **Assertion:** Micturition in human is completely an endocrine mechanism.
Reason: Micturition reflex is endocrine reflex completely.

177. **Assertion:** Diabetes mellitus can be diagnosed by urine analysis
Reason: Glucose appear in urine in diabetes mellitus condition termed as glycosuria .

178. **Assertion:** Most of the secretion of liver is pass out along with faecal matter.
Reason: Bile juice is secreted in digestive tract.

PREVIOUS YEAR QUESTIONS

1. In which one of the following organisms its excretory organs are correctly stated?

[AIPMT MAINS 2010]

(a) Humans – Kidneys, sebaceous glands
(b) Earthworm – Pharyngeal, integumentary and septal nephridia
(c) Cockroach – Malpighian tubules and enteric caeca
(d) Frog – Kidneys, skin and buccal epithelium

2. Which one of the following statements with regard to the excretion by the human kidneys is correct?

[AIPMT PRE 2010]

(a) Descending limb of Loop of Henle is impermeable to water.
(b) Distal convoluted tubule is incapable of reabsorbing 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.

3. The principal nitrogenous excretory compound in humans is synthesized

[AIPMT PRE 2010]

(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.

4. Which one of the following correctly explains the function of a specific part of a human nephron?

[AIPMT PRE 2011]

(a) Henle's loop – Most reabsorption of the major substance 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 the renal vein.
(d) Podocytes – Creates minute space (slit pores) for the filtration of blood into the Bowman's capsule.

5. Which one of the following is not a part of a renal pyramid?

[AIPMT PRE 2011]

(a) Convoluted tubules (b) Collecting ducts
(c) Loops Henle (d) Peritubular capillaries

6. Uricotelic mode of passing out nitrogenous wastes is found in

[AIPMT PRE 2011]

(a) Birds and annelids (b) Amphibians and reptiles
(c) Insects and amphibians (d) Reptiles and birds

7. Which one of the following statements is correct with respect to kidney function regulation? [AIPMT PRE 2011]

(a) Exposure to cold temperature stimulates ADH release.
(b) An increase in glomerular blood flow stimulates the formation of angiotensin II.
(c) During summer when the body loses lot of water by evaporation, the release of ADH is suppressed.
(d) When someone drinks lot of water the ADH release is suppressed.

8. A fall in glomerular filtration rate (GFR) activates [AIPMT MAINS 2012]

(a) Adrenal cortex to release aldosterone
(b) Adrenal medulla to release adrenaline
(c) Posterior pituitary to release vasopressin
(d) Juxtaglomerular cells to release rennin

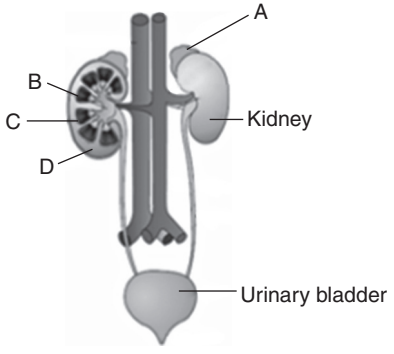
9. Which one of the following option gives the correct categorization of six animals according to the type of nitrogenous wastes {A (Ammonotelic), B (Ureotelic), C (Uricotelic)} they give out? [AIPMT MAINS 2012]

(a) A: Frog, Lizards, B: Aquatic Amphibia, Humans, C: Cockroach, Pigeon
(b) A: Aquatic Amphibia, B: Frog, Humans, C: Pigeon, Lizards, Cockroack
(c) A: Aquatic Amphibia, B: Cockroach, Humans, C: Frog, Pigeon, Lizards
(d) A: Pigeon, Humans, B: Aquatic Amphibia, Lizards, C: Cockroach, Frog

10. The maximum amount of electrolytes and water (70 to 80 per cent) from the glomerular filtrate is reabsorbed in which part of the nephron? [AIPMT PRE 2012]

(a) Ascending limb of loop of Henle
(b) Distal convoluted tubule
(c) Proximal convoluted tubule
(d) Descending limb of loop of Henle

11. Figure shows the human urinary system with structures labelled from A to D. Select the option which correctly identifies them and gives their characteristics and/or functions.



[AIPMT 2013]

(a) A: Adrenal gland – located at the anterior part of kidney, secrete catecholamines, which stimulate glycogen breakdown.
(b) B: Pelvis – broad funnel shaped space inner to hilum, directly connected to loop of Henle.
(c) C: Medulla – inner zone of kidney and contains complete nephrons.
(d) D: Cortex – outer part of kidney and do not contain any part of nephrons.

12. Which of the following causes an increase in sodium reabsorption in the distal convoluted tubule? [AIPMT 2014]

(a) Increase in aldosterone levels
(b) Increase in antidiuretic hormone levels
(c) Decrease in aldosterone levels
(d) Decrease in antidiuretic hormone levels

13. Removal of proximal convoluted tubule from the nephron will result in [AIPMT 2015]
(a) More diluted urine
(b) More concentrated urine
(c) No change in quality and quantity of urine
(d) No urine formation

14. Which of the following does not favour the formation of large quantities of dilute urine? [AIPMT 2015]
(a) Alcohol
(b) Caffeine
(c) Renin
(d) Atrial-natriuretic factor

15. Human urine is usually acidic because [RE-AIPMT 2015]
(a) Excreted plasma proteins are acidic
(b) Potassium and sodium exchange generates acidity
(c) Hydrogen ions are actively secreted into the filtrate
(d) The sodium transporter exchange one hydrogen ion for each sodium ion, in peritubular capillaries.

16. In mammals, which blood vessel would normally carry largest amount of urea? [NEET - I, 2016]
(a) Renal Vein
(b) Dorsal Aorta
(c) Hepatic Vein
(d) Hepatic Portal Vein

17. The part of nephron involved in active reabsorption of sodium is [NEET - II, 2016]
(a) Proximal convoluted tubule
(b) Bowman's capsule
(c) Descending limb of Henle's loop
(d) Distal convoluted tubule

NCERT EXEMPLAR QUESTIONS

1. The following substances are the excretory products in animals. Choose the least toxic form among them?
(a) Urea
(b) Uric acid
(c) Ammonia
(d) Carbon dioxide

2. Filtration of the blood takes place at
(a) PCT
(b) DCT
(c) Collecting ducts
(d) Malpighian body

3. Which of the following statements is incorrect?
(a) ADH prevents the conversion of angiotensinogen in blood to angiotensin.
(b) Aldosterone facilitates water reabsorption.
(c) ANF enhances sodium reabsorption.
(d) Renin causes vasodilation.

4. A larger quantity of one of the following is removed from our body by lungs.
(a) CO_2 only (b) H_2O only
(c) CO_2 and H_2O (d) Ammonia

5. The pH of human urine is approximately
(a) 6.5 (b) 7 (c) 6 (d) 7.5

6. Different types of excretory structures and animals are given below. Match them appropriately and mark the correct answer from among those given below.

Excretory structure/organ	Animals
(A) Protonephridia	(i) Prawn
(B) Nephridia	(ii) Cockroach
(C) Malpighian tubules	(iii) Earthworm
(D) Green gland or Antennal gland	(iv) Flatworms

(a) D – i, C – ii, B – iii and A – iv
(b) B – i, C – ii, A – iii and B – iv
(c) D – i, C – ii, A – iii and B – iv
(d) B – i, C – ii, B – iii and D – iv

7. Which one of the following statements is incorrect?
(a) Birds and land snails are uricotelic animals.
(b) Mammals and frogs are ureotelic animals.
(c) Aquatic amphibians and aquatic insects are ammonotelic animals.
(d) Birds and reptiles are ureotelic.

8. Which of the following pairs is wrong?
(a) Uricotelic ..... Birds
(b) Ureotelic ..... Insects
(c) Ammonotelic ..... Tadpole
(d) Ureotelic ..... Elephant

9. Which one of the following statements is incorrect?
(a) The medullary zone of kidney is divided into a few conical masses called medullary pyramids projecting into the calyces.
(b) Inside the kidney the cortical region extends in between the medullary pyramids as renal pelvis.
(c) Glomerulus along with Bowman's capsule is called the renal corpuscle.
(d) Renal corpuscle, Proximal Convoluted Tubule (PCT) and Distal Convoluted Tubule (DCT) of the nephron are situated in the cortical region of kidney.

10. The condition of accumulation of urea in the blood is termed as
(a) Renal calculi (b) Glomerulonephritis
(c) Uremia (d) Ketonuria

11. Which one of the following is also known as antidiuretic hormone?
(a) Oxytocin (b) Vasopressin
(c) Adrenaline (d) Calcitonin

12. Match the terms given in Column I with their physiological processes given in Column II and choose the answer.

Column I	Column II
(A) Proximal	(i) Formation of concentrated urine
(B) Distal convoluted tubule	(ii) Filtration of blood
(C) Henle's loop	(iii) Reabsorption of 70 to 80 per cent of electrolytes
(D) Counter–current mechanism	(iv) Ionic balance
(E) Renal corpuscle	(v) Maintenance of concentration gradient in medulla

(a) A– iii, B – v, C– iv, D – ii, E – i
(b) A – iii, B – iv, C – i, D – v, E – ii
(c) A – i, B – iii, C – ii, D – v, E – iv
(d) A – iii, B – i, C – iv, D – v, E – ii.

13. Match the abnormal conditions given in Column A with their explanations given in Column B and choose the correct option:

Column I	Column II
(A) Glycosuria	(i) Accumulation of uric acid in joints
(B) Renal calculi	(ii) Inflammation in glomeruli
(C) Glomerular nephritis	(iii) Mass of crystallized salts within the kidney
(D) Gout	(iv) Presence of glucose in urine

(a) A – i, B – iii, C – ii, D – iv
(b) A – iii, B – ii, C – iv, D – i
(c) A – iv, B – iii, C – ii, D – i
(d) A – iv, B – ii, C – iii, D – i.

14. We can produce concentrated/dilute urine. This is facilitated by a special mechanism. Identify the mechanism.
(a) Reabsorption from PCT.
(b) Reabsorption from collecting duct.
(c) Reabsorption/Secretion in DCT.
(d) Counter current mechanism in Henle's loop/Vasa recta.

15. Dialysis unit (artificial kidney) contains a fluid which is almost same as plasma except that it has
(a) High glucose
(b) High urea
(c) No urea
(d) High uric acid

Answer Keys

Practice Questions

1. (d)	2. (d)	3. (a)	4. (a)	5. (d)	6. (b)	7. (b)	8. (d)	9. (b)	10. (d)
11. (c)	12. (b)	13. (b)	14. (a)	15. (c)	16. (b)	17. (b)	18. (b)	19. (c)	20. (c)
21. (b)	22. (c)	23. (a)	24. (d)	25. (b)	26. (d)	27. (d)	28. (a)	29. (b)	30. (a)
31. (d)	32. (b)	33. (a)	34. (d)	35. (d)	36. (a)	37. (a)	38. (c)	39. (b)	40. (a)
41. (d)	42. (c)	43. (d)	44. (a)	45. (d)	46. (c)	47. (b)	48. (b)	49. (c)	50. (d)
51. (c)	52. (d)	53. (c)	54. (a)	55. (a)	56. (b)	57. (b)	58. (c)	59. (b)	60. (b)
61. (a)	62. (c)	63. (a)	64. (d)	65. (b)	66. (c)	67. (d)	68. (b)	69. (a)	70. (d)
71. (c)	72. (c)	73. (b)	74. (c)	75. (d)	76. (c)	77. (a)	78. (d)	79. (b)	80. (d)
81. (d)	82. (c)	83. (d)	84. (d)	85. (c)	86. (a)	87. (d)	88. (d)	89. (b)	90. (d)
91. (c)	92. (b)	93. (d)	94. (c)	95. (b)	96. (b)	97. (c)	98. (a)	99. (a)	100. (d)
101. (b)	102. (b)	103. (b)	104. (b)	105. (d)	106. (d)	107. (a)	108. (d)	109. (d)	110. (c)
111. (d)	112. (b)	113. (a)	114. (a)	115. (a)	116. (b)	117. (d)	118. (b)	119. (a)	120. (b)
121. (d)	122. (c)	123. (d)	124. (c)	125. (a)	126. (d)	127. (b)	128. (d)	129. (c)	130. (c)
131. (b)	132. (b)	133. (b)	134. (c)	135. (d)	136. (a)	137. (a)	138. (b)	139. (c)	140. (a)
141. (c)	142. (a)	143. (b)	144. (c)	145. (c)	146. (b)	147. (d)	148. (d)	149. (c)	

Assertion and Reason Questions

150. (b)	151. (d)	152. (b)	153. (b)	154. (a)	155. (b)	156. (a)	157. (b)	158. (a)	159. (c)
160. (d)	161. (a)	162. (a)	163. (a)	164. (a)	165. (a)	166. (a)	167. (a)	168. (a)	169. (a)
170. (a)	171. (a)	172. (c)	173. (a)	174. (a)	175. (a)	176. (d)	177. (a)	178. (a)	

Previous Year Questions

1. (b)	2. (c)	3. (d)	4. (d)	5. (a)	6. (d)	7. (d)	8. (d)	9. (b)	10. (c)
11. (a)	12. (a)	13. (a)	14. (c)	15. (c)	16. (c)	17. (a)			

NCERT Exemplar Questions

1. (b)	2. (d)	3. (a)	4. (c)	5. (c)	6. (a)	7. (d)	8. (b)	9. (b)	10. (c)
11. (b)	12. (b)	13. (c)	14. (d)	15. (c)					