



Attempt questions first; check the separate key afterward. Use labelled diagrams where asked. Give scientific reasons; answer key covers closed questions.

A. Very short answers - 1 mark each

1. Name the main nitrogenous waste in humans.
2. Name the functional unit of a kidney.
3. Which nephron structure surrounds the glomerulus?
4. Which hormone increases collecting-duct water permeability?
5. Name the enzyme released by juxtaglomerular cells.
6. Name the hormone released by stretched atrial walls.
7. Are birds generally uricotelic?
8. Name the process of blood filtration in the renal corpuscle.

B. Short answers / practice - 2 marks each

9. Compare ammonotelism, ureotelism and uricotelism.
10. Relate nitrogenous-waste form to water availability.
11. Describe kidney location and gross internal structure.
12. Draw a nephron and distinguish cortical and juxtamedullary types.
13. Explain the filtration barrier in the renal corpuscle.
14. Why are cells and most large plasma proteins normally excluded from filtrate?
15. Differentiate filtration, reabsorption and secretion.
16. Describe major reabsorptive functions of the proximal tubule.
17. Compare water and solute permeability of descending and ascending limbs.
18. Explain the contribution of vasa recta to the countercurrent mechanism.

19. Describe the roles of distal tubule and collecting duct.

20. Explain how the kidney concentrates urine.

C. Application / reasoning - 3 marks each

21. At GFR 125 mL/min, estimate daily filtrate volume.
22. If filtrate is 180 L/day and urine 1.8 L/day, find percentage reabsorbed.
23. Explain ADH action during water shortage.
24. Why can ADH deficiency cause large volumes of dilute urine?
25. Describe the renin-angiotensin-aldosterone mechanism.
26. Explain how atrial natriuretic factor opposes volume expansion.
27. Describe the micturition reflex.
28. State the excretory roles of lungs, liver and skin.
29. Distinguish uremia, renal calculi and nephritis.
30. Does dialysis fully replace every endocrine function of healthy kidneys?
31. Explain the basic principle of haemodialysis.

D. Extended practice - 5 marks each

32. Draw a nephron and explain all three processes of urine formation.
33. Explain countercurrent concentration with a labelled loop-of-Henle/vasa-recta diagram.
34. Compare hormonal mechanisms regulating water balance and blood pressure.
35. Describe haemodialysis and explain why kidney transplantation may restore functions beyond filtration.

ANSWER KEY - Numerical / closed questions

- 1) Urea. 2) Nephron. 3) Bowman's capsule. 4) ADH/vasopressin. 5) Renin. 6) Atrial natriuretic factor/peptide. 7) Yes. 8) Glomerular ultrafiltration. 21) 180 L/day. 22) 99%. 30) No.