



Attempt questions first; check the separate key afterward. Show all working. Draw accurate figures where required.

A. Very short answers - 1 mark each

1. Name Earth's air, water, rock and living systems.
2. Explain one interaction among all four.
3. What is the main external energy source for Earth's surface?
4. Explain how solar energy drives the water cycle.
5. Name the process by which water vapour becomes liquid.
6. Draw the water cycle including evaporation, transpiration, runoff and infiltration.
7. Is matter generally recycled in ecosystems?
8. Contrast the movement of matter and energy through an ecosystem.

B. Short answers / practice - 2 marks each

9. Name the process removing CO_2 from air into plant biomass.
10. Draw a carbon cycle showing respiration, decomposition and combustion.
11. Can most plants directly use atmospheric N_2 ?
12. Explain nitrogen fixation and the role of microorganisms.
13. Which gases are major greenhouse gases: CO_2 and CH_4 or O_2 and N_2 ?
14. Explain the natural greenhouse effect and its importance.
15. Does enhanced greenhouse warming mean the natural greenhouse effect is unnecessary?
16. Explain how human activity changes the carbon balance.
17. What is weathering?
18. Distinguish weathering, erosion and deposition.
19. A region receives 100 mm rain on 1 km^2 . Find rainwater volume before losses.
20. Explain why only a fraction may recharge groundwater.

C. Application / reasoning - 3 marks each

21. Name one renewable and one nonrenewable energy resource.
22. Compare them in formation time and environmental impact.
23. Can deforestation affect both local water cycling and carbon storage?
24. Explain the connections.
25. A household uses 500 L/day and reduces use by 20%. Find daily saving.
26. Find saving over 30 days.
27. Rainfall of 20 mm falls on a 100 m^2 roof. Find volume before losses.
28. Explain how a forest fire can affect atmosphere, soil and living organisms together.
29. Does energy recycle indefinitely through a food chain in the same way as matter?
30. A building reduces electricity use from 800 to 680 kWh/month. Find percentage saving.
31. Compare the short-term water cycle with the much slower formation of fossil fuels.

D. Extended practice - 5 marks per pair

32. Does biodiversity include variation within a species as well as among species?
33. Explain how biodiversity can support ecosystem resilience.
34. What is a feedback in an Earth system?
35. Explain how ice melting can increase solar absorption and design three locally practical water/energy conservation measures.

ANSWER KEY - Numerical / closed questions

- 1) Atmosphere, hydrosphere, geosphere, biosphere.
3) Sun. 5) Condensation. 7) Yes. 9) Photosynthesis. 11) No. 13) CO_2 and CH_4 . 15) No. 19) 100000 m^3 . 21) Example: solar; coal. 23) Yes. 25) 100 L. 26) 3000 L. 27) $2 \text{ m}^3 = 2000 \text{ L}$. 29) No. 30) 15%. 32) Yes.