Water (Oceans)

Standard difficulty · 20 questions · 40 marks · Time: 37 minutes

Name: _____ Date: _____ Score: ____ / 40

Write full answers in Sections B and C. Answers are on the last page — try every question first!

Section A — Choose the correct answer — 8 × 1 = 8 marks

1. About what share of the planet's water is found in the oceans?
   (a) 29 per cent **(b)** 50 per cent **(c)** 59 per cent **(d)** 91 per cent

2. What is an oceanic trench?
   (a) the deepest, narrow, steep-sided basin
   (b) a deep valley cut across the shelf and slope
   (c) a coral reef around a central lagoon
   (d) a pointed volcanic mountain that does not reach the surface

3. Which is an example of a seamount?
   (a) the Gulf Stream **(b)** Iceland
   (c) the Emperor seamount **(d)** the Bay of Fundy

4. What is the salinity of the Bay of Bengal like, and why?
   (a) low, because of river water **(b)** very low, with enormous river inflow
   (c) high, because of high evaporation **(d)** as high as 41 parts per thousand

5. Salinity is grams of salt in 1,000 g (1 kg) of water. The Indian Ocean (average) has a salinity of about 35 parts per thousand. How many grams of salt are in 24 kg of its water?
   (a) 35 g **(b)** 840 g **(c)** 8,400 g **(d)** 59 g

6. Suppose surface water is 27 °C at the equator and cools 0.5 °C for each degree of latitude. What would it be at 48° latitude?
   (a) 4 °C **(b)** 51 °C **(c)** 3 °C **(d)** 8 °C

7. Which of these has a higher salinity than the average open ocean?
   (a) the Bay of Bengal **(b)** a river estuary
   (c) the Dead Sea **(d)** the Black Sea

8. What is the effect of prevailing offshore winds on the temperature of ocean water?
   (a) they cause upwelling of cold water
   (b) it makes the water boil at the surface
   (c) it has no effect at all
   (d) surface water cools from the equator to the poles

Section B — Short answer — 8 × 2 = 16 marks

9. What is the hydrological cycle?

10. Describe each feature of the ocean floor: (a) continental slope (b) guyot

11. Describe the salinity of each and give the reason: (a) the Black Sea (b) the Red Sea

12. What is the effect of each on ocean temperature? (a) warm and cold currents (b) unequal spread of land and water

13. How many grams of salt are in 15 kg of water from (a) the Dead Sea (238‰) (b) the Indian Ocean (average) (35‰)?

14. Using 27 °C at the equator and a fall of 0.5 °C per degree of latitude, find the surface temperature at (a) 40° (b) 30°. Why is the highest temperature found slightly north of the equator?

15. 24.7 parts per thousand is the upper limit of brackish water. Is each sample brackish or not brackish? (a) 26‰ (b) 5‰

16. Give an example of each: (a) a seamount (b) a ridge rising above the ocean

Section C — Longer answers — 4 × 4 = 16 marks

17. Describe the major relief features of the ocean floor.

18. Match each with its description: (a) continental shelf (b) continental slope (c) seamount. Choose from: a pointed volcanic mountain that does not reach the surface; the steep 2–5° slope from shelf to ocean basin; the shallow extended margin of a continent, sloping 1° or less.

19. A sample of sea water has 3,875 g of dissolved salts in 125 kg of water. (a) What is its salinity in parts per thousand? (b) Is it brackish (below 24.7‰)? (c) Give two factors that could explain its salinity.

20. Suppose surface water is 27 °C at the equator and cools 0.5 °C per degree of latitude. (a) Find the temperature at 42° and at 32°. (b) How many degrees warmer is the lower latitude? (c) Describe the three-layer temperature structure of low-latitude oceans.

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Answer key

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Q	Answer	Working
1	**(d) 91 per cent**	—
2	**(a) the deepest, narrow, steep-sided basin**	—
3	**(c) the Emperor seamount**	—
4	**(a) low, because of river water**	—
5	**(b) 840 g**	35 × 24
6	**(c) 3 °C**	27 − 48 × 0.5
7	**(c) the Dead Sea**	—
8	**(a) they cause upwelling of cold water**	—
9	**The continuous circulation of water between the oceans, atmosphere, land surface and subsurface, and organisms, in liquid, solid and gas forms.**	—
10	**(a) the steep 2–5° slope from shelf to ocean basin (b) a flat-topped seamount**	—
11	**(a) very low, with enormous river inflow (b) as high as 41 parts per thousand**	—
12	**(a) they warm or cool the waters they flow into (b) northern oceans are warmer than southern ones**	—
13	**(a) 3,570 g (b) 525 g**	238 × 15; 35 × 15
14	**(a) 7 °C (b) 12 °C; the northern hemisphere has more land, which heats its oceans more.**	27 − 40 × 0.5; 27 − 30 × 0.5
15	**(a) not brackish (b) brackish**	below 24.7‰: brackish
16	**(a) the Emperor seamount (b) Iceland**	—
17	**Continental shelf (shallow, 1° or less), continental slope (2–5°, to 3,000 m), deep sea plains (3,000–6,000 m, flattest) and trenches (deepest, near island arcs).**	—
18	**(a) the shallow extended margin of a continent, sloping 1° or less (b) the steep 2–5° slope from shelf to ocean basin (c) a pointed volcanic mountain that does not reach the surface**	—

Q	Answer	Working
19	**(a) 31‰ (b) no, it is not brackish (c) e.g. evaporation and precipitation, river inflow, freezing and thawing of ice, winds and currents.**	3,875 ÷ 125
20	**(a) 6 °C and 11 °C (b) 5 °C (c) A warm top layer about 500 m thick (20–25 °C), a thermocline 500–1,000 m thick where temperature falls fast, and a very cold deep layer.**	27 − latitude × 0.5