World Climate and Climate Change

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. The most widely used classification of climate was developed by:
   (a) Ferrel **(b)** Mercalli **(c)** Hadley **(d)** Koeppen

2. Which climate type is coded BSh?
   (a) subtropical steppe **(b)** cold climate with dry winters
   (c) polar ice cap **(d)** cold climate with humid winters

3. Where is the polar ice cap (EF) climate found?
   (a) northwestern Europe and southern Chile
   (b) the Indian subcontinent and northern Australia
   (c) the north Indian plains and south China interior plains
   (d) interior Greenland and Antarctica

4. In Koeppen's codes, what does "f" stand for?
   (a) winter dry season **(b)** summer dry season
   (c) monsoon climate **(d)** no dry season

5. A humid place has a coldest month of −27 °C and a warmest month of 18 °C. In which Koeppen group is it?
   (a) D (cold snow forest) **(b)** E (cold)
   (c) A (tropical) **(d)** C (warm temperate)

6. A place has a coldest month of −18 °C and a warmest month of 3 °C. What is its annual range of temperature?
   (a) 23 °C **(b)** 15 °C **(c)** 31 °C **(d)** 21 °C

7. The Little Ice Age began in Europe in 1550; the Sahel drought began in 1967. How many years apart were these?
   (a) 417 years **(b)** 414 years **(c)** 418 years **(d)** 427 years

8. Carbon dioxide is rising about 0.5 per cent a year. Suppose a concentration of 200 parts per million rose by 0.5 per cent of that amount every year. By how many parts per million would it rise in 6 years?
   (a) 60 ppm **(b)** 1 ppm **(c)** 7 ppm **(d)** 6 ppm

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

9. Name the three approaches to classifying climate.

10. Name the climate type for each Koeppen code: (a) BSk (b) Cs

11. Where is each climate found? (a) humid subtropical with dry winter (Cwa) (b) tropical wet (Af)

12. What does each letter stand for in Koeppen's codes: (a) s (b) S

13. Give the Koeppen group letter (A, C, D or E) for each humid place: (a) coldest −1 °C, warmest 7 °C (b) coldest −14 °C, warmest 21 °C

14. Which came first, and by how many years? (a) Koeppen developed his scheme (1918) (b) the Sahel drought began (1967)

15. Find the annual range of temperature: (a) coldest month 27 °C, warmest 29 °C (b) coldest month −1 °C, warmest 31 °C. Why are ranges small in tropical climates?

16. Suppose carbon dioxide stands at 600 ppm and rises by 0.5 per cent of that amount each year. How much higher would it be after 10 years? Name two sinks for carbon dioxide.

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

17. Explain Koeppen's scheme of climate classification.

18. Three humid places have these coldest and warmest monthly means: (a) −14 °C and −5 °C (b) −4 °C and 8 °C (c) 25 °C and 29 °C. (i) Give each its Koeppen group. (ii) Find each annual range. (iii) Which group is based on precipitation instead?

19. (a) Put these in order, earliest first: the Sahel drought ended (1977); the Sahel drought began (1967); a long warming trend began (1885). (b) How many years from the first to the last? (c) Give one natural cause of climate change.

20. Describe where each climate is found and one feature of it: (a) marine west coast (Cfb) (b) humid subtropical with dry winter (Cwa)

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Answer key

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Q	Answer	Working
1	**(d) Koeppen**	—
2	**(a) subtropical steppe**	—
3	**(d) interior Greenland and Antarctica**	—
4	**(d) no dry season**	—
5	**(a) D (cold snow forest)**	A: coldest month 18 °C or more; C: coldest between −3 °C and 18 °C; D: coldest −3 °C or below; E: every month below 10 °C
6	**(d) 21 °C**	3 − (−18)
7	**(a) 417 years**	1967 − 1550 = 417
8	**(d) 6 ppm**	0.5% of 200 = 1; × 6
9	**Empirical, genetic and applied.**	—
10	**(a) mid-latitude steppe (b) Mediterranean**	—
11	**(a) the north Indian plains and south China interior plains (b) the Amazon Basin and western equatorial Africa**	—
12	**(a) summer dry season (b) steppe or semi-arid**	—
13	**(a) E (b) D**	A: coldest month 18 °C or more; C: coldest between −3 °C and 18 °C; D: coldest −3 °C or below; E: every month below 10 °C
14	**Koeppen developed his scheme, by 49 years**	1967 − 1918
15	**(a) 2 °C (b) 32 °C; the sun is high all year, so temperatures stay uniformly high.**	warmest − coldest
16	**30 ppm higher; forests and oceans**	0.5% of 600 = 3; × 10
17	**An empirical scheme relating vegetation to temperature and precipitation; five groups (A, B, C, D, E) by capital letters, with small letters for seasonality and severity.**	—
18	**(i) (a) E (cold) (b) E (cold) (c) A (tropical) (ii) (a) 9 °C (b) 12 °C (c) 4 °C (iii) B, the dry climates**	A: coldest month 18 °C or more; C: coldest between −3 °C and 18 °C; D: coldest −3 °C or below; E: every month below 10 °C
19	**(a) a long warming trend began; the Sahel drought began; the Sahel drought ended (b) 92 years (c) Answers will vary; see the chapter.**	—

Q	Answer	Working
20	**(a) northwestern Europe and southern Chile (b) the north Indian plains and south China interior plains**	—