S2 Geography Practice Paper 2 | Map scale, gradient, rainfall, population and land use

Junior Secondary Geography

S2 Geography practice paper 2 on map scale and area conversion, contour gradient, rainfall statistics, population density and dependency ratio.

1. Map scale: distance and area conversion (16 marks)

A map has a scale of 1:20,000. The straight-line distance from A to B on the map is 6.4 cm, and the plan area of a lake on the map is 12 cm^2.

#	Question	Answer and marking notes
1	(a) Calculate the actual distance from A to B in km.	Answer: 6.4 x 20,000 = 128,000 cm = 1.28 km.
2	(b) Calculate the actual area of the lake in km^2.	Answer: 1 cm represents 0.2 km, so area = 12 x 0.2^2 = 0.48 km^2.
3	(c) If the actual distance from C to D is 3.6 km, what is the map distance in cm?	Answer: 3.6 km = 360,000 cm; map distance = 360,000 / 20,000 = 18 cm.
4	(d) A person walks from A to B at an average speed of 4 km/h. How many minutes does it take?	Answer: time = 1.28 / 4 = 0.32 h = 19.2 minutes.

2. Contour lines and gradient (18 marks)

Two points P and Q on a footpath lie at 120 m and 300 m respectively. Their horizontal distance on the map is 6 cm at a scale of 1:20,000. The contour interval is 20 m.

#	Question	Answer and marking notes
5	(a) Find the height difference between P and Q.	Answer: 300 - 120 = 180 m.
6	(b) Find the actual horizontal distance in km and the gradient as a percentage.	Answer: 6 x 20,000 = 120,000 cm = 1.2 km; gradient = 180 / 1,200 x 100% = 15%.
7	(c) Express the gradient in the form 1 in n (n to 1 d.p.).	Answer: 1,200 / 180 = 6.67, i.e. 1 in 6.7.
8	(d) On another section the contour spacing is 5 mm at the same scale. Compare the steepness and explain.	Answer: the other section has contours 0.5 cm apart for the same height change, so it is much steeper.

3. Climate graph and rainfall statistics (16 marks)

Monthly rainfall (mm) at a station is: 12, 18, 45, 110, 240, 380, 395, 360, 290, 120, 45, 20.

#	Question	Answer and marking notes
9	(a) Find the annual total and the mean monthly rainfall.	Answer: total = 2,035 mm; mean = 2,035 / 12 = 169.6 mm.
10	(b) Find the range of monthly rainfall.	Answer: 395 - 12 = 383 mm.

#	Question	Answer and marking notes
11	(c) What percentage of the annual total falls in May to September?	Answer: 1,665 mm; 1,665 / 2,035 x 100% = 81.8%.
12	(d) Identify the climate type and give one piece of evidence.	Answer: tropical monsoon climate; rainfall is strongly summer-concentrated (81.8% in May-Sep) with a dry winter.

4. Population density, natural increase and dependency ratio (18 marks)

A district has 420,000 people over 12 km^2. Births were 3,360 and deaths 2,100 in a year. Age structure: 0-14 = 63,000; 15-64 = 315,000; 65+ = 42,000.

#	Question	Answer and marking notes
13	(a) Calculate the population density (persons per km^2).	Answer: 420,000 / 12 = 35,000 persons per km^2.
14	(b) Calculate the natural increase in number.	Answer: 3,360 - 2,100 = 1,260.
15	(c) Calculate the rate of natural increase per 1,000 (1 d.p.).	Answer: 1,260 / 420,000 x 1,000 = 3.0 per 1,000.
16	(d) Calculate the total dependency ratio (%, 1 d.p.).	Answer: (63,000 + 42,000) / 315,000 x 100% = 33.3%.

5. Earthquake magnitude and energy (16 marks)

An earthquake of magnitude 6.0 was recorded, and another of magnitude 4.0 the same day. Each unit increase in magnitude multiplies wave amplitude by about 10 and energy by about 31.6.

#	Question	Answer and marking notes
17	(a) How many times larger is the amplitude of the M6.0 event?	Answer: 10^2 = 100 times.
18	(b) How many times more energy is released by the M6.0 event?	Answer: 31.6^2 = about 1,000 times.
19	(c) If M6.0 releases energy E, what does M7.0 release (in terms of E)?	Answer: about 31.6E.
20	(d) Hong Kong is not on a plate boundary; give one reason why tremors are still felt.	Answer: earthquakes in nearby regions send waves to Hong Kong, and local minor fault activity exists.

6. Urban land use (16 marks)

A new town has 19.8 km^2 of developed land: residential 4.8, commercial 1.2, industrial 2.4, government and community 1.8, open space 3.6, roads and transport 6.0. The residential area holds 96,000 people.

#	Question	Answer and marking notes
21	(a) Find the percentage of residential land (1 d.p.).	Answer: 4.8 / 19.8 x 100% = 24.2%.

#	Question	Answer and marking notes
22	(b) Name the two largest land-use types by share.	Answer: roads and transport 30.3% (6.0 km^2) and residential 24.2% (4.8 km^2).
23	(c) Calculate the residential population density.	Answer: 96,000 / 4.8 = 20,000 persons per km^2.
24	(d) Industry next to housing causes conflict. Suggest one mitigation and explain.	Answer: create buffer green belts or zoning to separate industry from housing, cutting noise, fumes and traffic.