

# HKDSE Geography Paper 1 Mock Paper (10 questions, 100 marks, 105 minutes)

中四至中六 (S4 – S6)    Geography    |    時限：105 分鐘    |    總分：100 分    |    共 10 題

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## Section A (Questions 1 to 5, 50 marks)

Answer ALL questions. A calculator and the formula booklet may be used. Show your working, give numerical answers to the accuracy required, and state units in every final answer. All data are examples and this is not a past paper of any examination board.

1. A district has an area of 42 km<sup>2</sup> and a population of 336,000. Five years later the population is 352,800. (a) Find the population density (persons per km<sup>2</sup>). (b) Find the total population growth over the five years and the average annual growth rate (2 decimal places). (c) The age structure is: 0-14 years 50,400, 15-64 years 252,000, 65 years and over 33,600. Find the dependency ratio (1 decimal place).

答案：(a) Density =  $336,000 / 42 = 8,000$  persons per km<sup>2</sup>. (b) Total growth =  $(352,800 - 336,000) / 336,000 = 5.0\%$ ; average annual rate = fifth root of 1.05 minus 1 = 0.98%. (c) Dependency ratio =  $(50,400 + 33,600) / 252,000 \times 100\% = 33.3\%$ . Marking notes: (a) 2 marks, (b) 4 marks, (c) 4 marks; total 10 marks.

2. A catchment of 300 km<sup>2</sup> receives 120 mm of rain in a storm. (a) Find the total volume of rain falling on the catchment (m<sup>3</sup>). (b) If 60% becomes runoff and is discharged evenly over 24 hours, find the mean discharge (m<sup>3</sup> s<sup>-1</sup>, 1 decimal place). (c) After urbanisation the peak discharge for the same rainfall rises from 40 m<sup>3</sup> s<sup>-1</sup> to 62 m<sup>3</sup> s<sup>-1</sup>. Find the percentage increase and explain it.

答案：(a) Volume =  $120 \text{ mm} / 1000 \times 300 \times 10^6 \text{ m}^2 = 36,000,000 \text{ m}^3$ . (b) Runoff volume =  $36,000,000 \times 0.60 = 21,600,000 \text{ m}^3$ ; mean discharge =  $21,600,000 / (24 \times 3600) = 250.0 \text{ m}^3 \text{ s}^{-1}$ . (c) Increase =  $(62 - 40) / 40 \times 100\% = 55.0\%$ . Impermeable surfaces reduce infiltration and speed up overland flow, while channelling shortens the lag time, so the peak arrives earlier and higher. Marking notes: (a) 3 marks, (b) 4 marks, (c) 3 marks; total 10 marks.

3. The map scale is 1 : 20,000. Points A and B are 4.5 cm apart on the map. A is 120 m high and B is 300 m high. (a) Find the actual horizontal distance between A and B (m). (b) Find the gradient from A to B as 1 : n and as a percentage. (c) Another section measures 3.6 cm on the map with the same height difference. Find its gradient and judge whether it is suitable for building (gradients of 1 : 4 or steeper are not).

答案：(a) Horizontal distance =  $4.5 \times 20,000 / 100 = 900 \text{ m}$ . (b) Gradient =  $180 / 900 = 1 : 5.0$ , that is 20% (vertical over horizontal). (c) Horizontal distance =  $3.6 \times 20,000 / 100 = 720 \text{ m}$ ; gradient =  $180 / 720 = 1 : 4.0$ , which just reaches the 1 : 4 limit. Building on it is generally not advisable without a geotechnical assessment and slope works. Marking notes: (a) 2 marks, (b) 4 marks, (c) 4 marks; total 10 marks.

4. Weather station A at the foot of a hill is 20 m above sea level with a temperature of 28.5 C. Station B on the summit is 1,020 m above sea level. The lapse rate is 6.5 C per 1,000 m. (a) Find the temperature at B (1 decimal place). (b) At station A the air contains 17.3 g m<sup>-3</sup> of water vapour and the saturation value at 28.5 C is 23.0 g m<sup>-3</sup>. Find the relative humidity (1 decimal place). (c) At night the temperature falls to 20.0 C, when the saturation value is 17.3 g m<sup>-3</sup>. Find the relative humidity and state whether fog forms.

答案 : (a) Height difference = 1,020 - 20 = 1,000 m; fall = 1,000 / 1000 x 6.5 = 6.5 C; temperature at B = 28.5 - 6.5 = 22.0 C. (b) Relative humidity = 17.3 / 23.0 x 100% = 75.2%. (c) Relative humidity = 17.3 / 17.3 x 100% = 100.0%, at or above 100% (dew point about 20.0 C), so vapour condenses into tiny droplets and fog forms. Marking notes: (a) 4 marks, (b) 3 marks, (c) 3 marks; total 10 marks.

5. A farm of 24 hectares yields 5.5 tonnes of rice per hectare, sold at \$4,200 per tonne. Total annual production cost is \$310,000. (a) Find the annual output and total revenue. (b) Find the annual profit and the profit per hectare (whole dollars). (c) A new variety raises the yield by 20%; the price is unchanged but costs rise by 10%. Find the new profit and compare it with the original.

答案 : (a) Output = 24 x 5.5 = 132 tonnes; revenue = 132 x \$4,200 = \$554,400. (b) Profit = \$554,400 - \$310,000 = \$244,400; per hectare = \$244,400 / 24 = \$10,183. (c) New output = 132 x 1.20 = 158.4 tonnes; new revenue = \$665,280; new cost = \$310,000 x 1.10 = \$341,000; new profit = \$324,280, which is \$79,880 (32.7%) more than before. Marking notes: (a) 3 marks, (b) 3 marks, (c) 4 marks; total 10 marks.

## Section B (Questions 6 to 10, 50 marks)

Answer ALL questions. A calculator and the formula booklet may be used. Show your working, give numerical answers to the accuracy required, and state units in every final answer. All data are examples and this is not a past paper of any examination board.

6. Waves on a coast have a wavelength of 80 m and a period of 10 s. (a) Find the wave speed, and the factor by which wave energy rises when refraction increases the wave height from 0.8 m to 2.4 m. (b) Longshore drift averages 2.5 m per year. Find the total drift over 40 years. (c) A groyne is built there. Explain its effect on the beaches updrift and downdrift.

答案 : (a) Speed = wavelength / period = 80 / 10 = 8.0 m s<sup>-1</sup>; wave energy is proportional to the square of wave height, so the factor is (2.4 / 0.8)<sup>2</sup> = 9.0 times. (b) Drift = 2.5 x 40 = 100 m. (c) The groyne traps sediment moving in longshore drift: the updrift beach grows wider as sand accumulates, while the downdrift beach is starved of supply and erodes; beach nourishment is needed downdrift in the long run. Marking notes: (a) 4 marks, (b) 2 marks, (c) 4 marks; total 10 marks.

7. A manufacturer compares monthly costs in Hong Kong and the Pearl River Delta. Hong Kong: rent \$180,000, 120 workers at \$16,000 each per month. PRD: rent \$28,000, the same number of workers at \$4,500 each. (a) Find the total monthly cost in each place. (b) Find the monthly and annual saving from relocating, and the percentage saved (1 decimal place). (c) Apart from cost, give two reasons why a manufacturer may stay in Hong Kong or keep high-value activities there.

答案：(a) Hong Kong:  $\$180,000 + 120 \times \$16,000 = \$2,100,000$ ; PRD:  $\$28,000 + 120 \times \$4,500 = \$568,000$ . (b) Monthly saving =  $\$2,100,000 - \$568,000 = \$1,532,000$ ; annual saving =  $\$1,532,000 \times 12 = \$18,384,000$ ; percentage saved =  $\$1,532,000 / \$2,100,000 \times 100\% = 73.0\%$ . (c) Hong Kong still offers intellectual property protection, international finance, time-zone and logistics links with overseas buyers, and skilled labour, so design, branding, finance and order taking often stay while only labour-intensive production moves north. Marking notes: (a) 4 marks, (b) 4 marks, (c) 2 marks; total 10 marks.

8. A power station has a installed capacity of 1,200 MW and an average annual capacity factor of 65%. (a) Find the average output (MW) and the annual generation (MWh, 3 significant figures). (b) If a household uses 4,800 kWh a year, find the number of households served (3 significant figures). (c) If each kWh emits 0.70 kg of carbon dioxide, find the annual emissions in million tonnes (3 significant figures).

答案：(a) Average output =  $1,200 \times 0.65 = 780$  MW; annual generation =  $780 \text{ MW} \times 8,760 \text{ h} = 6,832,800$  MWh, that is 6.83 million MWh. (b) Households =  $6,832,800 \times 1,000 \text{ kWh} / 4,800 \text{ kWh} = 1,423,500$  households. (c) Emissions =  $6,832,800 \times 1,000 \times 0.70 \text{ kg} = 4,782,960,000 \text{ kg} = 4.78$  million tonnes. Marking notes: (a) 4 marks, (b) 3 marks, (c) 3 marks; total 10 marks.

9. A railway line is 32 km long with 16 stations. Trains average 34 km/h and stop for 0.5 minutes at each station. (a) Find the running time and the total journey time including stops (minutes, 1 decimal place). (b) The same trip by car averages 18 km/h. Find the driving time and the time saved by rail. (c) A rail ticket costs \$12 and driving costs \$28 per trip. A commuter makes a return trip on 22 working days a month. Find the monthly saving.

答案：(a) Running time =  $32 / 34 \times 60 = 56.5$  minutes; stops =  $15 \times 0.5 = 7.5$  minutes; total = 64.0 minutes. (b) Driving time =  $32 / 18 \times 60 = 106.7$  minutes; time saved =  $106.7 - 64.0 = 42.7$  minutes. (c) Saving per trip =  $\$28 - \$12 = \$16$ ; two trips on 22 days gives  $\$16 \times 2 \times 22 = \$704$  a month. Marking notes: (a) 4 marks, (b) 3 marks, (c) 3 marks; total 10 marks.

10. A class surveys plants on a 100 m<sup>2</sup> lawn using quadrats of 0.5 m by 0.5 m, 20 quadrats in total, with a mean of 6.4 plants per quadrat. (a) Find the area of one quadrat and the percentage of the site sampled (1 decimal place). (b) Find the plant density (plants per m<sup>2</sup>) and the estimated total for the whole site (whole number). (c) A second lawn has a mean of 4.8 per quadrat. Find its estimated total and the percentage difference between the two sites (1 decimal place).

答案：(a) Quadrat area =  $0.5 \times 0.5 = 0.25$  m<sup>2</sup>; total sampled =  $0.25 \times 20 = 5.00$  m<sup>2</sup>; percentage =  $5.00 / 100 \times 100\% = 5.0\%$ . (b) Density =  $6.4 / 0.25 = 25.6$  plants per m<sup>2</sup>; total =  $25.6 \times 100 = 2,560$  plants. (c) Second density =  $4.8 / 0.25 = 19.2$  plants per m<sup>2</sup>; total =  $19.2 \times 100 = 1,920$ ; difference =  $(2,560 - 1,920) / 1,920 \times 100\% = 33.3\%$ . Marking notes: (a) 3 marks, (b) 4 marks, (c) 3 marks; total 10 marks.