S5 Geography Practice Paper: Plate Tectonics, Rivers and Flood Management, Coastal Landforms, Weather and Climate, Urban Growth and Population, Agricultural and Industrial Location (100 marks)

S5 | Geography | Time: 60 minutes | Total: 100 marks | 24 questions

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Part 1: Plate Tectonics, Earthquakes and Volcanoes (16 marks)

Use geographical terms correctly. Show all working in calculations.

1. Describe two differences between a divergent boundary and a subduction boundary in magmatic activity and earthquake distribution. [5]

Answer: At a divergent boundary the plates move apart and magma rises along fractures to form mid-ocean ridges and basalt volcanoes, with mainly shallow earthquakes. At a subduction boundary one plate sinks beneath another, forming island arcs and andesitic volcanoes, and earthquakes occur in a dipping zone from shallow to deep foci. (2 marks per difference, 1 mark for accurate terms)

2. A seismic station records a 10 second difference between the arrival of P waves and S waves. Given a P wave speed of 6 km/s and an S wave speed of 3.5 km/s, find the distance to the epicentre. [4]

Answer: Let the distance be d, then d/3.5 - d/6 = 10, so d x 2.5 / 21 = 10 and d = 84 km. (2 marks for working, 2 marks for the answer)

3. Explain two reasons why the intensity of the same earthquake differs from place to place. [4]

Answer: Intensity decreases with distance from the epicentre; loose alluvium amplifies ground shaking and raises intensity; the resistance of buildings also affects the damage done. (2 marks each, explanation required)

4. State the plate tectonic reason for the formation of the Pacific Ring of Fire. [3]

Answer: The Pacific Plate subducts beneath the surrounding continental plates; the melted rock rises as magma and forms volcanic arcs, so volcanoes are arranged in belts along the subduction zones.

Part 2: Fluvial Processes and Flood Management (16 marks)

Answer in complete sentences and give units in calculations.

5. Compare the upper and lower courses of a river in valley shape and dominant erosion process. [5]

Answer: The upper course has a narrow, steep V-shaped valley dominated by vertical erosion, with waterfalls and rapids; the lower course has a wide, flat valley dominated by lateral erosion, with floodplains and meanders.

6. A river section falls from 320 m to 200 m over a horizontal distance of 4 km. Find the gradient as a percentage. [4]

Answer: Gradient = (320 - 200) / 4000 x 100% = 3%. (2 marks for working, 2 marks for the answer with unit)

7. A river channel has a cross-sectional area of 45 m2 and a mean velocity of 1.2 m/s. Find the discharge. [4]

Answer: Discharge = cross-sectional area x velocity = 45 x 1.2 = 54 m3/s. (2 marks for working, 2 marks for the answer with unit)

8. State two hard engineering measures used to reduce river flooding and one limitation of them. [3]

Answer: Embankments and flood storage reservoirs hold back and store flood water; a limitation is the high cost, and the reach downstream may flood more easily as the bed is raised.

Part 3: Coastal Landforms and Coastal Management (16 marks)

Explain with reference to geomorphic processes, not names alone.

9. Explain the formation of a wave-cut platform and a sea arch. [5]

Answer: Waves repeatedly attack the base of a cliff and erode a notch; the notch deepens and cuts through both sides of a headland to form a sea arch; as the cliff retreats, the flat rock surface in front is exposed as a wave-cut platform.

10. Twelve waves pass a point in 96 seconds and the wavelength is 88 m. Find the wave period and wave speed. [4]

Answer: Period = 96 / 12 = 8 s; wave speed = wavelength / period = 88 / 8 = 11 m/s. (2 marks each)

11. Compare hard and soft coastal management in two ways. [4]

Answer: Hard engineering such as sea walls blocks waves with concrete structures, is costly and interrupts longshore sediment transport; soft engineering such as planting and beach nourishment works with natural processes and costs less but needs maintenance.

12. State two functions of mangroves in coastal management. [3]

Answer: Mangrove roots bind sediment and reduce wave energy, protecting the coast from erosion; they also provide habitat and trap pollutants.

Part 4: Weather and Climate (16 marks)

Refer to monsoon systems and local climate data in your answers.

13. Explain why Hong Kong has cool dry winters and hot wet summers in terms of the monsoon. [5]

Answer: In winter the north-east monsoon brings continental air from a high pressure cell inland, which is dry and cool; in summer the south-west monsoon brings moist maritime air, and strong convection produces heavy rain.

14. Rainfall at a station over four days is 45.5, 12.0, 88.0 and 31.5 mm. Find the total and the daily mean. [4]

Answer: Total = 45.5 + 12.0 + 88.0 + 31.5 = 177.0 mm; daily mean = 177.0 / 4 = 44.25 mm. (2 marks each)

15. On a day the maximum temperature is 32 degrees C and the minimum is 24 degrees C. Find the daily range and the daily mean temperature. [4]

Answer: Daily range = 32 - 24 = 8 degrees C; daily mean = (32 + 24) / 2 = 28 degrees C. (2 marks each)

16. State one cause of the urban heat island effect and one way to reduce it. [3]

Answer: Cause: dense concrete absorbs heat and reduces evapotranspiration, while vehicles and air conditioners release heat; remedy: more green roofs and ventilation corridors.

Part 5: Urban Growth and Population (18 marks)

Show working and units in population calculations.

17. A district has a population of 480 000 and an area of 12 km2. Find its population density. [4]

Answer: Population density = 480 000 / 12 = 40 000 persons per km2. (2 marks for working, 2 marks for the answer)

18. A place has a birth rate of 12 per thousand and a death rate of 8 per thousand. Find the rate of natural increase as a percentage. [4]

Answer: Rate of natural increase = (12 - 8) / 1000 x 100% = 0.4%.

19. Explain two reasons for the segregation of commercial and residential land uses in a city. [5]

Answer: Commercial activity needs high accessibility and passing trade, so it concentrates at transport nodes and can pay high rent; housing needs more space and a better environment, so it moves outwards.

20. Explain two impacts of urban sprawl on commuting and the environment. [5]

Answer: Longer commuting distances raise travel time and energy use; farmland and green space in the suburbs are lost, and surface runoff and the heat island extend.

Part 6: Agriculture and Industrial Location (18 marks)

Name the factor and explain it in location questions.

21. Using locational factors, explain why horticultural farming is often located on the outskirts of large cities. [5]

Answer: Vegetables and cut flowers are perishable and must reach the market quickly, so farms locate near cities to cut transport time and cost; land rent on the urban fringe is lower than in the centre, and water and labour are available.

22. Explain two food security problems and one sustainable farming measure. [5]

Answer: Problems: rising population raises demand; extreme weather and loss of farmland make output unstable. Measure: crop rotation and drip irrigation maintain soil fertility and save water.

23. A farm of 400 hectares yields 2.5 tonnes of rice per hectare. Find the total output, and the output per person in kilograms if the local population is 5 000. [4]

Answer: Total output = 2.5 x 400 = 1 000 tonnes; per person = 1 000 / 5 000 = 0.2 tonne = 200 kg. (2 marks each)

24. Explain two reasons for the relocation of manufacturing from developed to developing countries. [4]

Answer: Labour costs are lower in developing countries, reducing production costs; environmental and safety regulations are less strict, and governments offer tax incentives to attract investment.