S4 Geography Practice Paper: Plate Tectonics and Earthquakes, River Processes and Basins, Population Structure and Migration, Agriculture and Food Supply, Urbanisation and Land Use, Manufacturing and Industrial Location

S4 | Geography | Time: 75 minutes | Total: 100 marks | 24 questions

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Part A - Plate Tectonics and Earthquakes (20 marks)

Show working with units and give answers to a sensible number of decimal places.

1. A station records P waves at 6.0 km/s arriving 30 seconds before S waves at 3.5 km/s. Find the distance from the station to the epicentre. [5]

2. A plate moves 6 cm per year on average. Find the distance moved in 2.5 million years, in km. [5]

3. Each step up the magnitude scale releases about 31.6 times more energy. Find the energy ratio from magnitude 6.0 to 7.0, to three significant figures. [5]

4. A tsunami travels over water 4,000 m deep with speed about the square root of (g x depth), where g is 9.8. Find the speed, and the time to reach a coast 500 km away in minutes. [5]

Part B - River Processes and Drainage Basins (18 marks)

Give runoff in cubic metres and show every step with units.

5. A basin covers 480 km2 with 2,200 mm of rain a year and a runoff coefficient of 0.35. Find the annual runoff in cubic metres. [5]

6. A river falls 900 m between the 60 km and 120 km points. Find the average gradient of that reach as a decimal and as a percentage. [4]

7. A reach is 25 m wide with a mean depth of 1.8 m and a velocity of 1.2 m/s. Find the discharge in m3/s and the daily flow in m3. [5]

8. A reservoir holds 24 million m3. With inflow at 54 m3/s and no outflow, find the number of days to fill it from empty, to two decimal places. [4]

Part C - Population Structure and Migration (17 marks)

State units clearly, either persons per km2 or per thousand.

9. A district has 684,000 people over 12.5 km2. Find the population density. [5]

10. A place has a mid-year population of 620,000, with 4,200 births and 3,100 deaths in a year. Find the rate of natural increase per thousand, to two decimal places. [4]

11. In a place there are 96,000 people aged 0-14, 84,000 aged 65 or above and 480,000 aged 15-64. Find the total dependency ratio. [5]

12. In the same place 12,400 people moved in and 9,600 moved out in a year. Find the net migration rate per thousand, to two decimal places. [3]

Part D - Agriculture and Food Supply (16 marks)

Give self-sufficiency and water share as percentages and explain what they mean.

13. A place has 2,400 ha of paddy field yielding 6.5 t per ha; 96,000 people each eat 130 kg of rice a year. Find total output, demand and the self-sufficiency rate. [5]

14. Fertiliser is applied at 180 kg per ha and costs 4,500 dollars per tonne. Find the tonnage and total cost for 2,400 ha. [4]

15. Irrigation needs 9,000 m3 per ha and the reservoir supplies 30 million m3 a year. Find the total irrigation need for 2,400 ha and its share of the reservoir supply. [4]

16. A place has a labour force of 380,000 with 1.8 percent in farming. Find the farm labour force and the average cropland per farmer in ha, to two decimal places. [3]

Part E - Urbanisation and Land Use (15 marks)

Give urbanisation rates as percentages and commuting time in person-hours.

17. A place has 5.6 million people; its urban population rises from 3.2 to 4.48 million. Find the urbanisation rate before and after and the rise in percentage points. [4]

18. A town has 45,000 people over 1.5 km2. Find its density, and the density if 6,000 people leave and the area stays the same. [4]

19. A city area of 240 km2 is used for housing 38 percent, commerce 9 percent, industry 6 percent, roads 14 percent and open space 10 percent, with the rest other uses. Find the other-use share and the housing area. [4]

20. In that town 60 percent of people are employed and 70 percent of them commute across districts, 35 minutes each way. Find the daily cross-district commuters and total commuting person-hours. [3]

Part F - Manufacturing and Industrial Location (14 marks)

Give unit cost per item and list each cost item.

21. A factory makes 60,000 units a year: raw material freight 12 dollars a unit, labour 18 dollars a unit and rent 2.4 million dollars a year. Find rent per unit, unit cost and annual total cost. [4]

22. Moving to a new district raises freight by 3 dollars and cuts labour by 4 dollars a unit, with rent down to 1.8 million dollars a year. Find the new unit cost and the annual saving. [4]

23. An industrial estate covers 3.2 km2 with 160 factories. Find the average site area per factory in km2, in ha and in m2. [3]

24. Manufacturing output is 84 million dollars with 58.8 million exported. Find the export share; if exports then rise 12 percent, find the new export value. [3]
