S5 Geography Practice Paper: Plate Movement and Earthquake Energy, Tsunami Speed, River Discharge and Gradient, Weather Data, Population Growth and Density, Urbanisation and Land Use, Farming and Industrial Location (100 marks)

Level: S5 | Subject: Geography | 75 minutes | 100 marks | 24 questions | answer key

Part 1 Plate Movement, Earthquakes and Tsunamis (18 marks)

Study the data and answer the questions.

#	Question	Answer	Marks
1	Earthquake A has a Richter magnitude of 5.0 and earthquake B a magnitude of 7.0. If each one-magnitude increase releases about 32 times more energy, how many times more energy does B release than A?	The difference is 2 magnitudes, so energy ratio = 32^2 = 1,024 times.	5
2	A station is 120 km from the epicentre. P waves travel at 6.0 km/s and S waves at 3.5 km/s. Find the arrival times of both waves and their time difference (one decimal place).	P: 120 / 6.0 = 20.0 s; S: 120 / 3.5 = 34.3 s; difference = 14.3 s.	5
3	A tsunami crosses ocean of mean depth 4 000 m with speed v = sqrt(g x d), g = 9.8 m/s^2. Find the speed (whole m/s) and the time to travel 1 000 km (minutes, one decimal place).	v = sqrt(9.8 x 4 000) = sqrt(39 200) = 198 m/s; time = 1 000 000 / 198 = 5051 s = 84.2 minutes.	4
4	A plate moves 4.5 cm per year. If two plate boundaries are 1350 km apart, how long does the plate take to cover that distance (million years, one decimal place)?	1350 km = 135,000,000 cm; 135,000,000 / 4.5 = 30,000,000 years = 30.0 million years.	4

Part 2 River Landforms and Discharge (17 marks)

Study the data and answer the questions.

#	Question	Answer	Marks
5	A river channel is 18 m wide, 2.5 m deep on average and flows at 1.4 m/s. Find the cross-sectional area and the discharge.	Area = 18 x 2.5 = 45.0 m2; discharge = 45.0 x 1.4 = 63.0 m3/s.	5
6	A catchment covers 480 km2 with annual rainfall of 2 100 mm; runoff is 35% of rainfall. Find the annual runoff volume (million m3, one decimal place).	Rainfall volume = 480 x 1 000 000 x 2.1 = 1,008 million m3; runoff = 352.8 million m3.	4
7	A river falls from 1 200 m to 200 m along an 80 km course. Find the average gradient (m/km and as a percentage).	Drop = 1000 m; gradient = 1000 / 80 = 12.5 m/km = 1.25%.	4
8	At one station discharge rises from 40 m3/s to 100 m3/s and stage from 1.2 m to 2.1 m. Find the percentage increase in discharge and explain what the rising stage shows.	Increase = (100 - 40) / 40 x 100 = 150.0%; stage rose 0.9 m, showing greater depth and a larger cross-section, hence higher discharge.	4

Part 3 Weather and Climate Data (17 marks)

Study the data and answer the questions.

#	Question	Answer	Marks
9	On a day of 30 C the relative humidity is 75%. Saturation vapour content at 30 C is 30.4 g/m3. Find the absolute humidity (one decimal place).	Absolute humidity = 30.4 x 0.75 = 22.8 g/m3.	5
10	A month has 30 days with 240 mm of rain, 12 of them wet. Find the mean daily rainfall and the mean rainfall per wet day.	Mean daily = 240 / 30 = 8.0 mm; per wet day = 240 / 12 = 20.0 mm.	4
11	A day records a maximum of 32.4 C and a minimum of 24.6 C. Find the daily range (one decimal place) and state how relative humidity usually changes as temperature rises.	Range = 32.4 - 24.6 = 7.8 C; warmer air holds more vapour, so relative humidity falls if vapour content is unchanged.	4
12	Temperature at the foot is 28.0 C and the summit is 1500 m high. If temperature falls 0.6 C per 100 m, find the summit temperature.	Fall = 1500 / 100 x 0.6 = 9.0 C; summit = 28.0 - 9.0 = 19.0 C.	4

Part 4 Population Growth and Density (16 marks)

Study the data and answer the questions.

#	Question	Answer	Marks
13	Population rises from 5 200 000 to 5 460 000. Find the growth rate (one decimal place).	Increase = 260 000; growth rate = 260 000 / 5 200 000 x 100 = 5.0%.	4
14	The same place has 5 460 000 people over 1 100 km2. Find the population density (people/km2, whole number).	Density = 5 460 000 / 1 100 = 4 963.6, i.e. 4,964 people/km2.	4
15	Birth rate is 12.5 per 1 000, death rate 7.8 per 1 000 and net migration +2.0 per 1 000. Find the natural increase rate and the total growth rate (per 1 000).	Natural increase = 12.5 - 7.8 = 4.7; total growth = 4.7 + 2.0 = 6.7 per 1 000.	4
16	If population grows 1.4% a year, use the rule of 70 to estimate the doubling time (one decimal place).	Doubling time = 70 / 1.4 = 50.0 years.	4

Part 5 Urbanisation and Land Use (16 marks)

Study the data and answer the questions.

#	Question	Answer	Marks
17	A country has 3 480 000 urban residents out of 5 800 000 people. Find the urbanisation rate (one decimal place).	Urbanisation rate = 3 480 000 / 5 800 000 x 100 = 60.0%.	4
18	Its urbanisation rate rose from 45% in 1990 to 60% in 2020. Find the rise over 30 years (percentage points) and the average annual rise.	Rise = 60 - 45 = 15 percentage points; average = 15 / 30 = 0.5 points per year.	4
19	A 12 ha urban site is divided into housing 5.4 ha, commercial 1.2 ha, open space 2.4 ha and roads 3.0 ha. Find the share of each use (%).	Housing 45.0%, commercial 10.0%, open space 20.0%, roads 25.0% (total 100.0%); housing takes the largest share.	4
20	An inner-city district falls from 18,000 to 15,300 people/km2. Find the percentage fall (one decimal place) and name the process.	Fall = (18,000 - 15,300) / 18,000 x 100 = 15.0%; the process is urban decentralisation (suburbanisation).	4

Part 6 Farming and Industrial Location (16 marks)

Study the data and answer the questions.

#	Question	Answer	Marks
21	A farm of 60 ha yields 4.8 tonnes of rice per hectare sold at $2 300 per tonne. Find total output and total revenue.	Output = 60 x 4.8 = 288.0 t; revenue = 288.0 x $2 300 = $662,400.	4
22	For the same farm, production costs $9 800 per hectare. Find total cost, total profit and profit per hectare.	Cost = 60 x $9 800 = $588,000; profit = $662,400 - $588,000 = $74,400; per hectare = $1,240.	4
23	Siting a factory near the raw material saves $12,000 a month in inbound freight but adds $4,500 in finished-goods freight. Find the net monthly and annual saving.	Net monthly = $12,000 - $4,500 = $7,500; annual = $90,000.	4
24	For a factory site, weights are land 30%, labour 25%, transport 20%, market 15% and policy 10%. Site A scores 8, 6, 7, 5, 9 and site B 6, 9, 5, 8, 8 (out of 10). Find both weighted totals and the better site.	A = 0.30x8 + 0.25x6 + 0.20x7 + 0.15x5 + 0.10x9 = 6.95; B = 0.30x6 + 0.25x9 + 0.20x5 + 0.15x8 + 0.10x8 = 7.05; B is higher, so choose B.	4