S6 Geography Practice Paper | runoff and peak discharge, dependency ratio, bid rent, rice yield, earthquake energy and carrying capacity

Senior Secondary Geography

S6 Geography practice paper with answers: runoff and peak discharge, dependency ratio, bid rent, rice yield, earthquake energy and carrying capacity. Free PDF.

Question 1 Catchment runoff and peak discharge

A catchment of 250 square kilometres receives 180 mm of rain in one storm. Its runoff coefficient is 0.35 and all runoff leaves the catchment within 6 hours.

#	Question
1	(a) Calculate the rainfall volume and the runoff volume in cubic metres.
2	(b) Assuming steady release, calculate the mean peak discharge in cubic metres per second.
3	(c) Urbanisation raises the runoff coefficient to 0.55. Calculate the new runoff volume and discharge.
4	(d) Find the percentage rise in discharge and suggest two drainage measures that reduce the flood peak.

Question 2 Dependency ratio and elderly services

A city has a population of 7,500,000. People aged 0 to 14 make up 12 per cent and those aged 65 or above make up 20 per cent.

#	Question
5	(a) Calculate the dependency ratio as a percentage.
6	(b) Find the number of people of working age.
7	(c) If the share aged 65 or above rises to 24 per cent while total population and the youth share stay the same, find the new dependency ratio.
8	(d) Find the increase in the number of elderly people and the extra subsidised places needed at 40 places per 1000 elderly.

Question 3 Bid rent curves and land use

In a city the commercial bid rent is R = 120 - 8d and the residential bid rent is R = 60 - 3d, where R is in thousand dollars per square metre per year and d is distance from the centre in kilometres.

#	Question
9	(a) Find the crossover distance of the two curves and the rent there.
10	(b) At 6 km, calculate both rents and state the land use there.
11	(c) At 15 km, find both rents and explain the change in land use.
12	(d) If the commercial intercept rises by 20 per cent, find the new crossover distance and its increase.

Question 4 Rice yield and food security

A farm has 40 hectares of paddy, each hectare yields 6.5 tonnes per crop, two crops are grown per year, post harvest loss is 15 per cent and each person consumes 0.13 tonnes a year.

#	Question
13	(a) Calculate the annual gross yield and the edible yield after losses.
14	(b) Calculate how many people the rice can feed.
15	(c) If the population rises by 20 per cent, find the paddy area needed, other things unchanged.
16	(d) If the loss rate falls to 8 per cent, find the extra people fed and the percentage rise in edible yield.

Question 5 Earthquake energy and wave travel time

An earthquake of magnitude 7.2 occurs; another in the same region has magnitude 5.2. P waves travel at 6.5 km per second and S waves at 3.7 km per second. At a station the P and S arrivals differ by 24 seconds.

#	Question
17	(a) Find the energy ratio and amplitude ratio of the two events, given that each magnitude step raises energy by about 31.622776601683793 times.
18	(b) Use the time difference to find the distance from the station to the focus.
19	(c) Find the travel time of the P wave and of the S wave.
20	(d) If the station is 160 km from the focus, find the time difference and explain its use in early warning.

Question 6 Tourism carrying capacity and revenue

A site has 12 hectares of usable ground and each visitor needs 15 square metres. It opens 10 hours a day, visitors stay 2 hours on average, the ticket is 60 dollars and daily operating cost is 48,000 dollars.

#	Question
21	(a) Calculate the instantaneous carrying capacity.
22	(b) Calculate the maximum daily visitor arrivals.
23	(c) Find the maximum ticket revenue and the net income after operating cost.
24	(d) To protect the site only 70 per cent of capacity is used. Find the daily visits, revenue and the fall in revenue against the ceiling.