3.1 Options and fieldwork

Name: _____ Class: _____ Date: _____ **Total: 25 marks**

KEY WORDS storm hydrograph • stratified sampling

Options and fieldwork

Objective

Use the option kits' anchor concepts (hydrograph, hazard risk, Butler, land-use models), choose fieldwork sampling strategies, and execute the inquiry cycle with a statistics decision (option themes + the fieldwork IA).

1 Key knowledge and worked examples

Options + fieldwork toolkit. Hydrograph: rising limb, peak, lag time (urban = short lag, high peak). Hazard risk = hazard × exposure × vulnerability (Tōhoku 9.0). Butler: exploration → involvement → development → consolidation → stagnation → decline or rejuvenation; carrying capacity (Venice). Epidemiological transition: infectious → chronic. Burgess concentric, Hoyt sectors; megacity 10 million plus. Sampling: random, systematic, stratified. For eight untied pairs, Spearman $r_s = 0.714$ (rounded) is below the exact two-sided 5% critical value 0.738: do not reject the null of no rank association. For an independence test on a 2×2 count table, with independent observations and sufficiently large expected counts, $\chi^2 = 5.2$ exceeds 3.84 (1 degree of freedom, 5%): reject independence.

2 Practice

2.1 Label a storm hydrograph: name the axis, the peak and the lag time. [2]

2.2 State the hazard-risk product and use it to explain why an earthquake of one magnitude can devastate one city and spare another. [2]

2.3 Place the first four stages of the Butler model in order. [2]

2.4 Classify each as random, systematic or stratified sampling: (a) a count every 50 m along a beach transect; (b) grid points drawn from a random-number table; (c) two quadrats per each of three known vegetation zones, in proportion. [3]

2.5 A study of 8 pairs with no tied ranks reports Spearman $r_s = 0.714$ (rounded). For an exact two-sided test at 5%, use the critical absolute value 0.738. State the statistical decision. [3]

3 Exam-style questions

3.1 *(Fieldwork design style.)* Design a fieldwork inquiry into whether pedestrian density falls with distance from a city-centre plaza: state the question, a directional hypothesis, the sampling strategy with a reason, and two evaluation points with their named modifications. [6]

3.2 *(Urban option style.)* A city's outlying district shows a ring of nineteenth-century terraced housing inside a sector of light industry. Explain how Burgess's and Hoyt's models each account for the pattern, and one limitation of using either model. [4]

3.3 *(Coasts option style.)* "Managed realignment is surrender." Evaluate realignment against continued hard defence for a low-value agricultural coastline. [3]