

※ 注意：請於試卷上「非選擇題作答區」標明大題及小題題號，並依序作答。

第一部分（1-10 題，每題 5 分），選擇題部分為多選題，答案可能是 1 個或多個：

1. Decomposers convert nitrogen compounds into ammonia is the definition of (a) Nitrogen fixation (b) Denitrification (c) Nitrogen assimilation (d) Nitrification (e) Ammonification
2. What are the negative interactions among species? (a) Allelopathy (b) Commensalism (c) Protocooperation (d) Mutualism (e) Competition
3. What are the main elements to define the texture of soils and commonly used for classification? (a) Silt (b) Colloids (c) Gravel (d) Sand (e) Clay
4. Net photosynthesis = Gross photosynthesis - Respiration. (a) True (b) False
5. A dominant species is also known as a keystone species that has a disproportionately large effect on its environment relative to its abundance. (a) True (b) False
6. What is the definition of allelopathy? A plant species produces chemical toxins to inhibit the growth of other species.
7. A weather station is at the sea level height (0 m). At this station, the air temperature is 25.0 °C, air pressure is 100 kPa, and the dew point temperature is 21.0 °C. Please calculate the relative humidity at this station. (I need to know how you derive the answer)

Hint: T (°C) is the air temperature. Saturated vapor pressure,  $e_s$  (kPa) is expressed as:

$$e_s = 0.611 \exp\left(\frac{17.27T}{237.3 + T}\right)$$

$$\text{Vapor pressure, } e = 0.611 \exp\left(\frac{17.27 \times 21}{237.3 + 21}\right) = 2.48 \text{ kPa}$$

$$\text{Saturated vapor pressure, } e_s = 0.611 \exp\left(\frac{17.27 \times 25}{237.3 + 25}\right) = 3.61 \text{ kPa}$$

見背面

8. The researchers conducted the experiment at a dry field covered by “clay”, and measured the following environmental parameters:

Mean incident/downward shortwave radiation =  $550 \text{ W m}^{-2}$

Mean downward longwave radiation =  $420 \text{ W m}^{-2}$

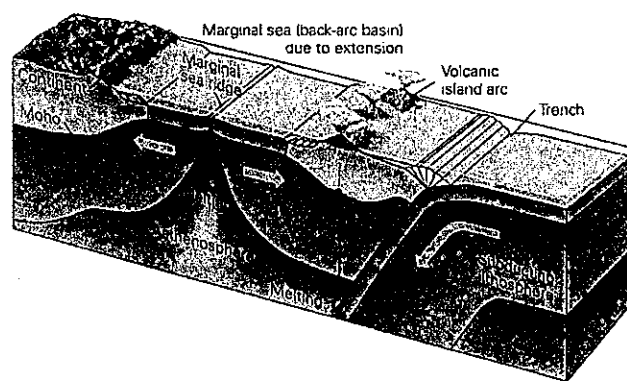
Air temperature =  $30 \text{ }^\circ\text{C}$

Surface temperature =  $35 \text{ }^\circ\text{C}$

If the surface albedo of clay is 0.2, the emissivity of clay is 0.95, the emissivity of the sky is 0.7, and Stefan-Boltzmann constant is  $5.67 \times 10^{-8} \text{ W m}^{-2} \text{ K}^{-4}$ , please calculate the net radiation at this station. (I need to know how you derive the answer)

Hint: Downward longwave radiation =  $335.2 \text{ W m}^{-2}$ ; upward longwave radiation =  $485.7 \text{ W m}^{-2}$

The figure shows the typical setting of a subduction zone. Please answer the following questions.



9. What kind of plate boundary is this tectonic setting?

- (a) Divergent plate boundary
- (b) Convergent plate boundary
- (c) Transform fault
- (d) None of above

10. In the area of Taiwan, which geographic area is a back-arc basin?

第二部分 (每題 25 分) :

11. 近幾年台灣重要城市與區域發展議題之一，就是空間不均等發展 (uneven development)，可以是所謂南北差距、東西部差距、本島離島差距、或六都直轄市內的城鄉差距等。請舉一個你熟悉的城市或區域為例，說明你如何觀察空間不均等的現象，以及造成這現象背後的結構性原因。

12. 高齡化是台灣社會亟需面對的挑戰。請你說明，你要用哪些地理學 (包含文化研究、人類學、與廣義社會科學) 等各種質化與量化資料收集的田野調查方法，來指認哪一個地方或社區具有哪些資源，堪稱已初步具備「高齡友善環境」的軟硬體條件。