19th International Geography Olympiad

FIELDWORK EXERCISE

Task 1
Observation Session – Marking Scheme

Student number

1	9				

Indonesia, 2023

SPOT 1

Observations (14 marks)

TIME LIMIT: 40 MINUTES.

Task Guideline

You are currently at SPOT 1 (see Map 1.1 on a separate sheet), the part of it you're looking at is built on the gentle slopes of Northern Bandung.

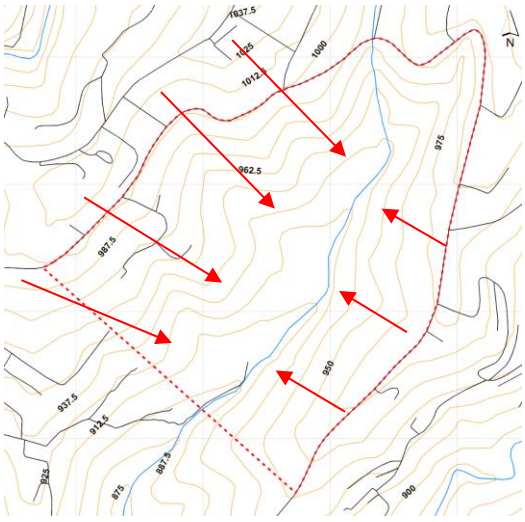
1. **Identify the current land use** of Bukit Pakar Area based on your observation and the satellite map (Map 1.1), **draw and label** the land use zoning on the blank map provided (Map 1.2 on a separate sheet) [2 marks]

   Correctly identified the land use of Bukit Pakar

   - Residential land use [0.25 marks]
   - Farm & agroindustry land use [0.25 marks]
   - Open land [0.25 marks]
   - Forested land [0.25 marks]

   Correctly point out and draw on the map each of the land use [1 mark]

2. **Draw arrows on Map 1.2** indicating where runoff water would flow inside the area bordered by the red line on map 1.2 [1 mark]



   Correctly identified the water flow direction and draw the arrows on the map [1 mark]

3. Based on your previous analysis, **identify which land use is more likely to have a higher runoff coefficient** i.e., when it rains, higher runoff coefficient means that more water will become runoff compared to being absorbed into the soil [1 mark]

Highest Runoff Coefficient Land Use : _____

Lowest Runoff Coefficient Land Use : _____

Highest runoff: Residential land use [0.5 marks]
Lowest runoff: Forested land use [0.5 marks]

4. **Point out 4 factors** that you think would be the most dominant in affecting the runoff coefficient in Bukit Pakar and **explain your reasoning** [4 marks]

   Point out the factors [0.5 marks] brief explanation of why it's dominant in Bukit Pakar [0,5 marks], for a maximum of 1 marks for every factor with explanation, and a total maximum of 4 marks.
   - Vegetation cover; Bukit Pakar is dominated by agricultural land use and forested area which will affect the runoff coefficient in the area
   - Topography/slope; Bukit Pakar is located on a sloping hill, greatly increasing it's runoff coefficient
   - Soil moisture; as agricultural land, Bukit Pakar's soil is heavily watered by the farmers, thereby increasing it's runoff coefficient due to the soil being saturated with water
   - Soil type; as agricultural land, Bukit Pakar's soil is heavily tilled and modified to improve permeability and aeration, thereby reducing it's runoff coefficient
   - Human modifications; Bukit Pakar is dominated by small scale farmers that use traditional techniques such as terracing and windbreak to reduce erosion and water runoff
   - Other relevant answers with sufficient explanation

5. Runoff water from upstream areas can be a blessing or a curse for communities further downstream. **Point out and explain one positive and one negative** impact of Bukit Pakar's runoff water for downstream communities in Bandung [2 marks]

   Positive impact:

   Point out the positive impact [0.5 marks] and explanation [0.5 marks]
   - Surface water supply for downstream communities via small rivers
   - Move nutrition from upstream areas via erosion and river transport to fertile alluvial downstream areas
   - Keeps lakes and river full, that might aid in local climate and provide environmental services

   Negative impact:

   Point out the negative impact [0.5 marks] and explanation [0.5 marks]
   - Water pollution in the runoff water due to farming, waste, etc.
   - Cause floods if high runoff for a long period of time
   - Clogs dams and cause river silting due to sediment transport
   - Can cause flash floods if coupled with high erosion and slope instability

6. **Explain vegetative and structural methods** that you think would be most appropriate for reducing the runoff water in Bukit Pakar based on your observations [4 marks]

Point out each method [0.5 mark] and Brief explanation of how it reduces runoff [1 mark]. Bonus marks if explaining the relevance to Bukit Pakar's specific condition [0.5 mark] for a maximum of 2 marks each for the structural method and the vegetative method, for a total maximum of 4 marks.

Structural Method

- Placing rainwater catchment barrels in the village and house roofs
  - Bukit Pakar observation zone has a lot of residential areas
  - Rainwater is caught and stored in barrels or tanks, this reduce the amount of runoff from residential areas
  - Other relevant explanation on how rainwater catchment barrels can reduce rainfall runoff
- Reducing impervious/impermeable surfaces
  - Bukit Pakar observation zone has a lot of residential areas
  - Permeable surfaces such as porous asphalt and gravel reduces the runoff from residential areas
  - Other relevant explanation on how permeable surfaces can reduce rainfall runoff
- Slow down and divert water to well vegetated areas by building swales, berms, or terrace on the slope
  - Bukit Pakar has a lot of open area and land used for farming
  - Water moving on less vegetated slope is fast, thus most likely will not infiltrate the soil, becoming runoff
  - Slow down water by building terrace, berms, or swales
  - Water can also be diverted to well vegetated forests to further improve infiltration
  - Other relevant explanation on how slowing down and diverting water can reduce runoff

Vegetative

- Planting more trees on the cropland and open spaces
  - Bukit Pakar observation zone has a lot of open land and agriculture
  - Trees can be planted in open areas, or as strip-cropping in croplands
  - Trees can reduce runoff via interception & storage by their leaves, and slowing down surface runoff by their roots, promoting infiltration
  - Other relevant explanation on how trees planted in open space and cropland can reduce runoff

SPOT 2

Observations (14 marks)

TIME LIMIT: 40 MINUTES

Task Guideline

You are now at the SPOT 2 Station (see Map 1A on a separate sheet).

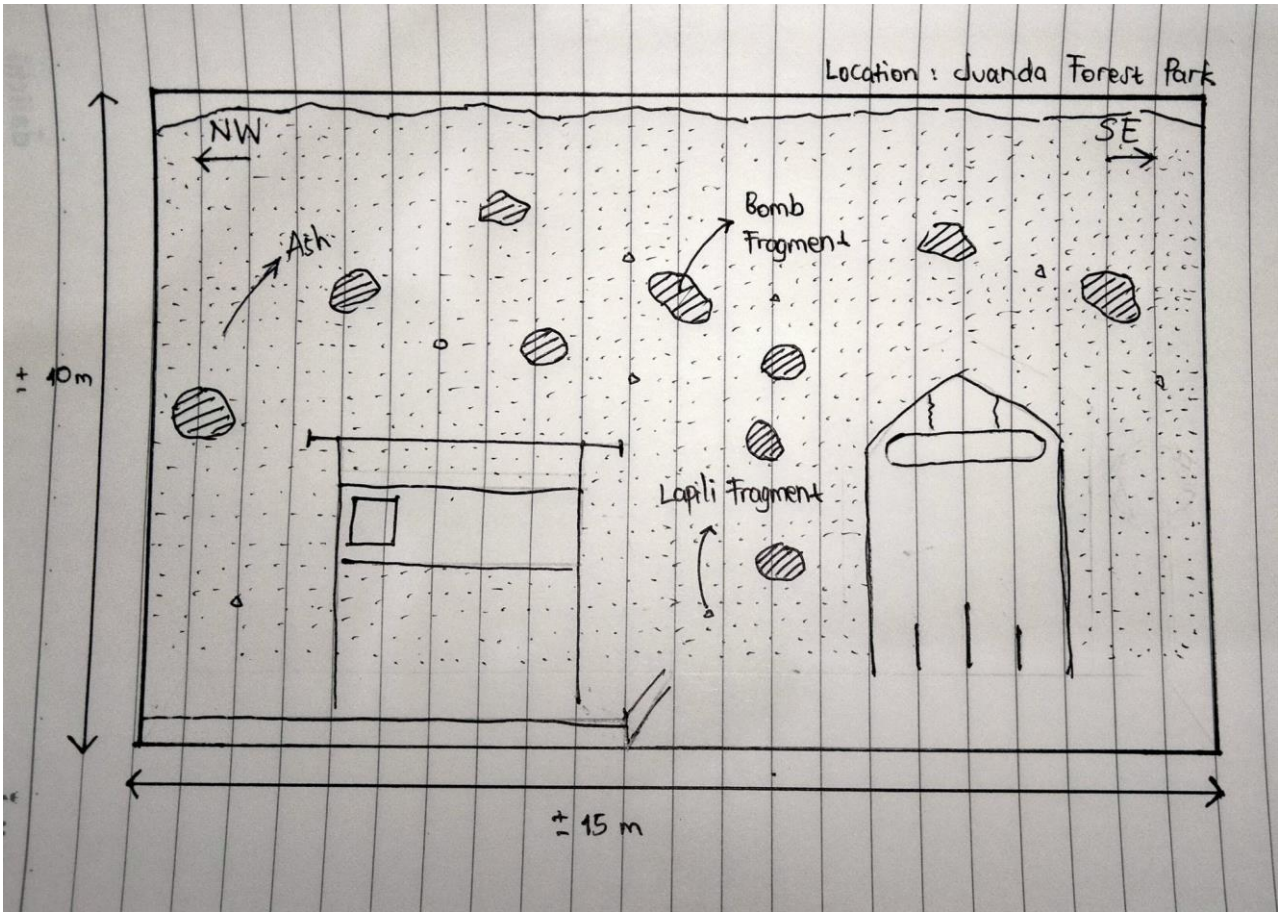
1. Draw a sketch of the geological outcrop in front of you. [5 marks]

   Hints:

   A good outcrop sketch is a sketch that is proportional to its original shape. Therefore, placement of the drawing space is an important thing to note. Furthermore, do not neglect the important elements of the sketch such as geographical location, drawing scale, outcrop dimensions, orientation, and labels of the rocks or geological structures found at the location.

   Answer (point marking – 1 mark for each correct evaluation below for a total of 5 marks)

   - Proportional sketch according to the condition of the outcrop in the field.
   - Relevant drawing scale based on the sketch.
   - Correct outcrop dimensions (including the 2-dimensional outcrop unit, such as length and width). If there is only one unit mentioned, it will be assessed for 0.5 point.
   - Correct outcrop orientations (the outcrop sketch needs two related orientations, for example north to the left and south to the right, so 0.5 for each cardinal direction mentioned).
   - All the correct labels of the rocks or geological structures in the sketch.



2. Based on your observation of the outcrop, **fill in** the blanks below. [2 marks]
   a. Outcrop condition:

      Answer (point marking – 1 point for correct answer)

      Weathered

   b. Outcrop color:

      Answer (point marking – 1 point for correct answer)

      Grey/brownish gray/blackish gray

3. Based on your observation of the rock outcrop, **identify** the different percentages of fragments and matrices of the outcrop [1.5 marks]

   Note for correction:

   The amount of fragment and matrix percentage may vary for each participant, due to qualitative observations that are prone to human error. Therefore, the given marking scheme will have a range percentage for each answer.

   Answer (point marking – 0.5 point for each correct answer)

ROCK DESCRIPTION		ANSWER
Fragment and Matrix (%)	**Block and Bomb** (>64 mm)	25 – 40%
	Lapilli (2 – 64 mm)	40 – 50%
	Ash (<2 mm)	20 – 25%

4. **Identify** the rock type at Spot 3. [1 mark]

   Answer (point marking – 1 point for correct answer)

   Tuff Breccia

5. Study your surroundings, then **fill in** the condition of the tropical rainforest's layers at the Juanda Forest Park. [4.5 marks]

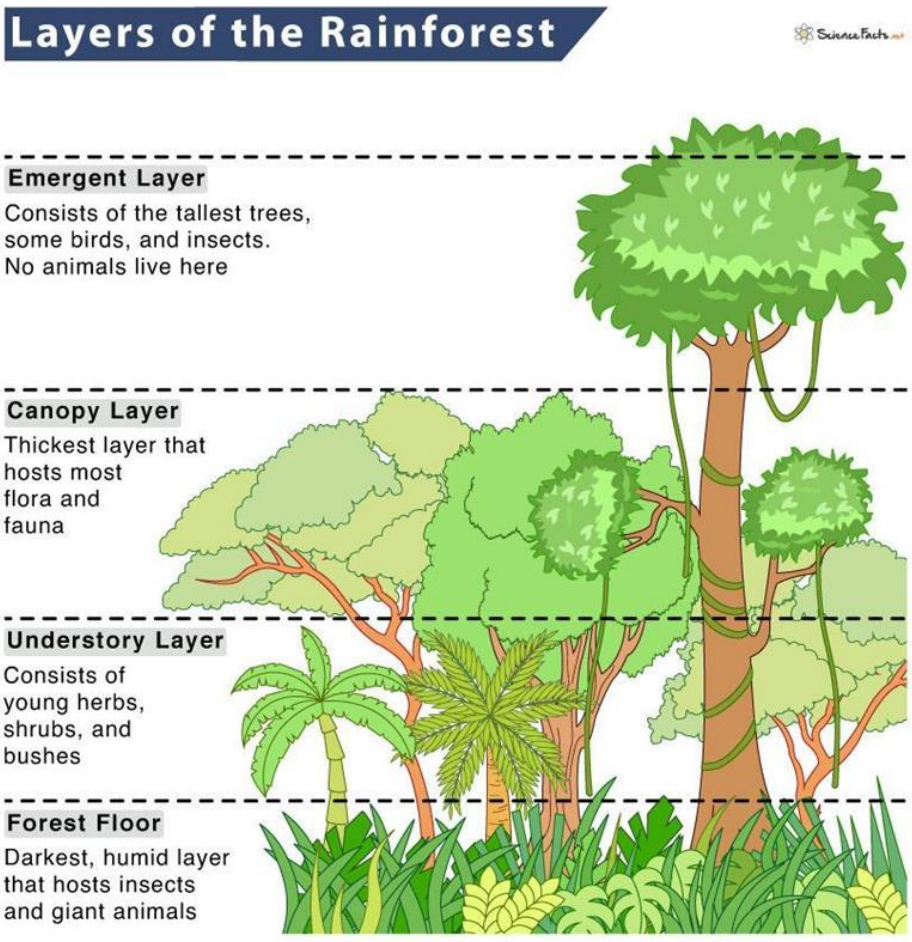


Figure 1. Rainforest layers (Source: https://www.sciencefacts.net/layers-of-the-rainforest.html).

Answer (point marking – 0. 5 point for correct answer for a total of 4.5 points)

LAYER NAME	**PLANT DIVERSITY** *(Homogeneous/Heterogeneous)*	**HUMAN INTERFERENCE** *(Exist/Non-Existent)*	**EPIPHYTE** *(Exist/Non-Existent)*
Forest floor	Heterogenous	Exist	Non-existent
Understory	Heterogenous	Non-existent	Exist
Canopy	Homogenous	Non-existent	Non-existent

SPOT 3

Observations (15 marks)

TIME LIMIT: 40 MINUTES.

Task Guideline

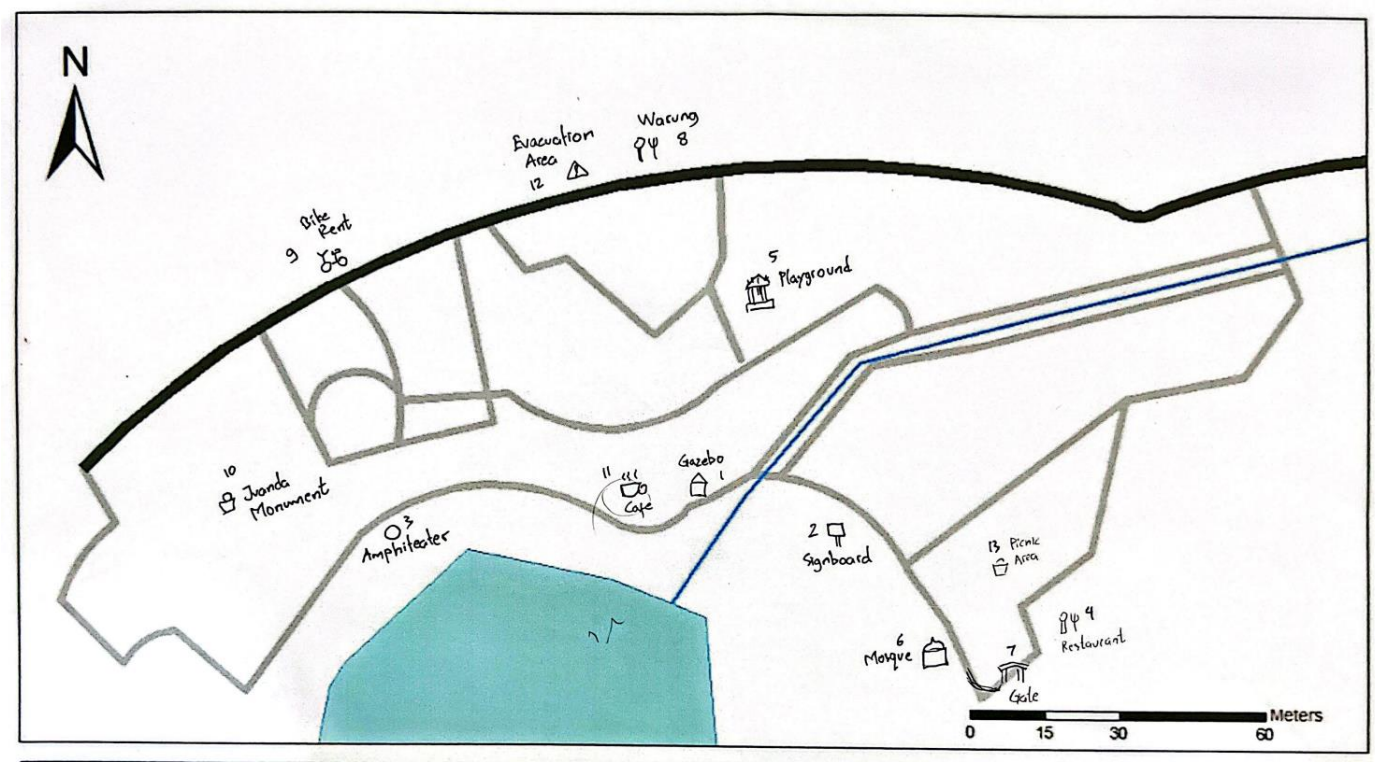
You are now at the SPOT 3 station (see Map 1A).

1. On Map 3.1 (on a separate sheet), **identify**, **map**, and **label** with numbers the facilities or buildings on the demarcated area. For all facilities and buildings, **write down** the name and their ideal purpose. **Estimate** their user capacity and report their existing condition using the table below. [9 marks]:

Building condition: **Good** - no or minor repair **Poor -** need major repair

	NAME	**PURPOSE**	**CAPACITIES**	**CONDITION**
	Gazebo	To provide resting place to visitors	8	Poor
	Signboard	To provide information about Juanda Forest Park trail route to visitors	-	Good
	Amphiteater	Large area for gathering people	200	Good
	Restaurant	To provide meals and resting place for visitors	100	Good
	Playground	Playing area for children	20	Poor

	NAME	PURPOSE	CAPACITIES	CONDITION
	Mosque	Praying area	20	Good
	Ticketing service	Visitor registration	-	Good
	Warung/Stalls/ Street vendors	Local stall that sells various food and beverages	15	Good
	Bike rent	Providing bicycle for rent to the tourists	15	Poor
	Juanda Monument	Landmark for Tahura Juanda	-	Good
	Cafe	Resting place and providing food and beverages	30	Good
	Evacuation Area	Emergency meeting spot for tourists	150	Good
	Picnic Area	Area for picnis	50	Poor



Example map, this map has been revised, there's a slight change and addition of landmark

2. On a weekly basis, an estimated number of 6,500 tourists visit Juanda Forest Park. Assume that 70 percent of them visit Juanda Forest Park on weekends (Saturday and Sunday). Based on your observations from Question Number 1, **Identify** two facilities/activities for each of tourism's 3As found in this area and **Evaluate** their capacity to accommodate the number of tourists on the weekends. [6 marks]

Students need to mention 2 answers for each As [each 0.5 points] and evaluation [each 0.5 points] for a maximum of 2 marks for each aspect of the 3A's of tourism (attraction, amenities, and activities) and a total maximum of 6 marks.

3As of tourism	**Answer**
Attraction	- Playground for children, however it cannot occupy all visitors, thus need enlargement and maintenance due to poor condition - Juanda Statue which is a statue to commemorate one of the hero of Indonesia, it is located in a relatively wide field thus there is sufficient capacity to handle the weekend crowd - Primary and secondary forest that provide amazing views, the forests are all over the Juanda forest park so it can be enjoyed by everyone - Wide open grass fields, the grass fields are very wide so it can accommodate most of the visitors that want to sit, run, and walk in the fields even during the weekends

Amenities	- There are three public toilets, the numbers are insufficient to service the weekend crowd and their conditions are below average thus needing maintenance - There are praying rooms for moslem, the capacity is relatively sufficient but might get overcrowded during the start of prayer hour - There are several cafes and restaurant to eat, the capacity is relatively sufficient for the weekend rush hour due to the spacious seating and large number of restaurants/café - There are several walking paths in the observation area, it's relatively small and some are damaged thus it might be dangerous during the weekend rush of visitors - There is a main road in the observation area, it's relatively large and can accommodate many cars and motorcycles along with pedestrians, thus there should be no problem during the weekend
Activities	- Walking around to catch fresh air, the main roads are sufficiently wide to enable multiple people hiking at the same time however the walking paths are quite small and some are damaged - Going on a picnic under the trees, the grass fields for camping are very wide so it can accommodate most of the visitors, even during the weekend - Dining on the restaurant, the capacity is relatively sufficient for the weekend rush hour due to the spacious seating and large number of restaurants/café in Djuanda forest park - Riding a bike by renting from the bike rental, insufficient due to the few number and poor quality of bikes available - Relaxing and talking on the Ampitheatre, sufficient capacity due to the large size of the Ampitheatre (est ~200 people capacity) and the open space near it