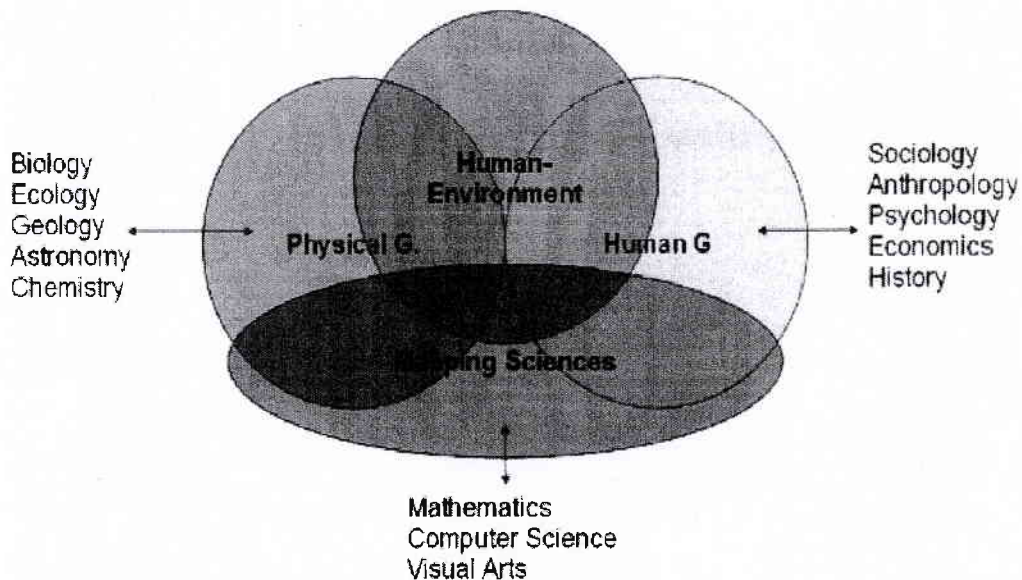




Department of Examinations - Sri Lanka
G.C.E. (A/L) Examination - 2018

22 - Geography

Marking Scheme



This document has been prepared for the use of Marking Examiners. Some changes would be made according to the views presented at the Chief Examiners' meeting.

Amendments to be included

ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව
இலங்கைப் பரீட்சைத் திணைக்களம்
අ.පො.ස. (උ.පෙළ) විභාගය/ க.பொ.த. (உயர் தர)ப் பரீட்சை - 2018

විෂය අංකය
பாட இலக்கம்

22

විෂය
பாடம்

Geography

ලකුණු දීමේ පටිපාටිය/புள்ளி வழங்கும் திட்டம்
I පත්‍රය/பத்திரம் I

ප්‍රශ්න අංකය வினா இல.	පිළිතුරු අංකය விடை இல.	ප්‍රශ්න අංකය வினா இல.	පිළිතුරු අංකය விடை இல.	ප්‍රශ්න අංකය வினா இல.	පිළිතුරු අංකය விடை இல.
01.	1	11.	1	21.	2
02.	2	12.	1	22.	3
03.	1	13.	1	23.	2
04.	2	14.	1	24.	4
05.	5	15.	1	25.	1
06.	2	16.	2	26.	5
07.	1	17.	2	27.	4
08.	3	18.	3	28.	2
09.	1	19.	2	29.	3
10.	2	20.	2	30.	3

❖ විශේෂ උපදෙස්/ விசேட அறிவுறுத்தல் :

එක් පිළිතුරකට/ ஒரு சரியான விடைக்கு 02 ලකුණු/புள்ளி வீதம்
 මුළු ලකුණු/மொத்தப் புள்ளிகள் 2 × 30 = 60

Geography I

Part II

Physical Geography

1. You are provided with a part of the 1 : 50,000 topographic map of Hanguranketa, published by the Survey Department of Sri Lanka. The contours are shown at 20 metre interval. Answer the following questions based on the map.

N.B.

- * **Answers should not be written on the map.**
- * You should clearly state the relevant **question number** and its **subsection** in the answer script.
- * Do **not** attach the provided map to your answer script.

- (i) Name the **two** drainage features shown in quadrilaterals **A** and **B** in the map. (02 marks)
- (ii) Name the **two** topographic features shown in quadrilaterals **C** and **D**. (02 marks)
- (iii) Discuss briefly, the salient features of topography and drainage in the map area. (04 marks)
- (iv) Name **four** public services available in the area within the quadrilateral **E**. (04 marks)
- (v) Comment on the distribution pattern of human settlements in the map area. (04 marks)
- (vi) Discuss in brief the geographical factors that affect the land use pattern in the map area. (04 marks)

Q. 1.

- (i) A – Braided river B - Radial drainage pattern
(02 Marks)

- (ii) C – Rock outcrop D – Escarpment
(02 Marks)

(iii) Salient Features of Topography and Drainage in the Map Area

Topography

- The map shows mainly a hilly area at higher elevation.
- In the southeast corner, there are places 1000m above mean sea level. The narrow valleys are found below 160m.
- The ridges extend in north-south direction. Steep slopes and escarpments can be seen.
- The main ridge in the middle of the map area is divided by a river valley.
- In the eastern part of the northeast quarter of the map area a lowland area can be seen.
- In the western part of the area, there is a varying topography with steep slopes, narrow and wide valleys.
- There are some rock outcrops in the north-north-western part.

Drainage

- Map area is well drained
 - The main river flows northward through middle of the area
 - Another river enters at the eastern boundary and flows northward
 - Adapting to the topography of the area, these two rivers flow creating meanders.
 - The main river is braided
 - The branches of the main river, flow short distance in narrow valleys
 - Dendritic and radial drainage patterns are seen in the area.
 - The main river flows in a narrow valley at the center of the map area. The river valley in the east is wide.
- (2+2 = 04marks)

iv) Public services available in the area within quadrilateral E

School
Police Station
Hospital
Assistant Government Agents Office/Divisional Secretariat
Buddhist Temple

(1x4 = 04 Marks)**(v) Distribution Pattern of Human Settlements in the Map Area**

- Human settlements are located as clusters in several places of the map area.
- More settlements are located in the area adjacent to crops cultivated lands in the eastern part of the map area.
- Two clusters of settlements are located along the main road of the map area.
- The settlements are rare in the highlands in the middle of the map area.
- The linear settlements are found along the river valleys and minor roads at the western part of the area.

(2+2 = 04 marks)**(vi) The Geographical factors that affect the Land Use Pattern of the Map Area**

- Rugged topography, slopes and high elevations have affected the land use in the area.
- Main land uses in the area include paddy cultivation, homesteads, tea cultivation, roads and location of services.
- Utilized lands are mainly in the low lands and valleys.
- Paddy cultivation is distributed along river valleys.
- Home gardens distributed in a very limited area.
- In the eastern part of the map area there are irrigated paddy lands.

- In general, the geographical factors that affect the land use in the map area are: drainage pattern, limited availability of low lands and valleys, high elevation and slopes, distribution of roads and location of junctions.

(2+2 = 04 marks)

2. (i) Define 'Global Positioning System' (GPS). (02 marks)
- (ii) Briefly explain the main segments of a Global Positioning System. (04 marks)
- (iii) Describe **three** factors which can affect the accuracy of Global Positioning System data. (06 marks)
- (iv) Explain **four** advantages of Global Positioning System based on their application. (08 marks)

Q. 2.

- I. Define GPS 2 Marks
- II. Briefly explain the main segments of a GPS? 4 Marks
- III. Describe three factors which can be badly influenced for the accuracy of GPS data 6 Marks
- IV. Explain four advantages of GPS based on their applications 8 Marks

(i) Define GPS

GPS is a navigation system which allows users to find the, exact location of any object/feature. The GPS constellation consists of minimum 24 earth orbit satellites that transmit radio signals and allow GPS receivers to determine current location. These satellites are high orbit, circulating at 14,000km/hr and 20,200km above the earth's surface. GPS works in any weather condition, anywhere in the world, 24 hours a day, and users do not have to pay subscription fees or setup charges.

(ii) Briefly explain the main segments of a GPS?

There are three main segments of GPS

- Space Segment
- Control Segment
- User Segment

Space Segment

The Space Segment of the system consists of GPS satellites and they are called man-made stars. The Space Segment - consists of a group of minimum 24 Satellites, each on its own orbit, approximately about 20,200 km, and send radio signals from space, which allow users to determine location. The satellite orbits repeat almost the same ground track twice each day.

There are six orbital planes equally spaced (4 satellites per orbit), and inclined at about 55° with respect to the equatorial plane.

Control Segment

The Control Segment (also referred to as Operational Control System) is responsible for the proper operation of the GPS system and it is controlled by the United States Army. The GPS Control Segment is composed by a Master Control Station (MCS), a Monitor Station (MS) and Ground Antennas.

User Segment

The GPS user segment consists of GPS receivers and the user community. GPS receivers are used for navigation, positioning, time dissemination and other research. Navigation in three dimensions is the primary function of GPS. Navigation receivers are made for aircraft, ships, and ground vehicles and for hand carrying by individuals. However, the accuracy of GPS depends on the quality of the GPS receiver. It is common today to have positions indicated on GPS receiver with 1cm to few meter position accuracy

(iii) Describe three factors what affect the accuracy of GPS data

Atmospheric Effects

Atmospheric conditions affect the speed of the GPS signals as they pass through the Earth's Atmosphere, especially the ionosphere (the uppermost part of the atmosphere). These effects can change due to the density of the atmosphere. Also, signal propagation delay errors caused by weather conditions in the lower atmosphere.

Multipath Transmission Errors

GPS signal does not pierce through the solid walls or structures. Moreover it is affected by large buildings or structures. Due to this, user will not be able to utilize GPS service indoors or under water or in dense tree regions or in underground stores. .

Receiver clock

GPS receivers are equipped with quartz crystal clocks that are less stable than the atomic clocks used in satellites. Receiver clock error can be eliminated, however, by comparing times of arrival of signals from two satellites.

Number of satellites visible

Obviously the more satellites that can be seen and can be used to provide readings, the more triangulation points are obtained and the greater the level of certainty and accuracy. Minimum 4 GPS satellites are needed for determination of ground location with the GPS Receiver.

Operator knowledge and awareness.

An awareness of the limitations in the design, controls, displays and software logic of GPS units can avoid potentially dangerous errors

- incorrect data entries
- incorrect interpretation of data
- inadequate cross-checking from alternative sources
- inappropriate decisions based on GPS output

(iv) Explain four advantages of GPS based on their applications

- i. Transport – Navigation, Find the destination/route, shortest path, Provide information about an approaching point of interest. With the help of GPS roads or paths available, traffic congestion and alternative routes, roads or paths that might be taken to get to the destination. If some roads are busy the best route to take, The location of food, banks, hotels, fuel, airports or other places of interests, the shortest route between the two locations, the different options to drive on highway or back roads.
- ii. Service Management – Find the customer location (Pickme, Uber, Taxiya)
- iii. Fisheries – Navigation, locate the fishing/harvesting sites,
- iv. Tourism – Find the routes,
- v. Utility Management – pipeline locations, Man hole locations,
- vi. Tracking – Protecting VPIs
- vii. Remote sensing - Ground Control Points
- viii. Surveying – Land boundary Management (Bimsaviya)

1. The GPS system gets calibrated by its own and hence it is easy to be used by anyone
2. It provides user with location based information
3. The GPS signal is available anywhere on the globe. Hence user will not deprive of GPS facility anywhere.
4. There is no charge for utilization GPS service. It is maintained and upgraded by US Department of Defense. It is cheaper compare to other navigational systems.

3. **Table 1** shows the average yield of paddy (kg per hectare) by districts in Sri Lanka for Maha Season in 2015. Answer the following questions based on the table.

Table 1

Serial No.	District	2015 Maha	Serial No.	District	2015 Maha
1	Colombo	3,431	14	Monaragala	3,993
2	Gampaha	3,594	15	Jaffna	3,096
3	Kalutara	3,644	16	Killinochchi	3,689
4	Galle	3,738	17	Vavuniya	4,816
5	Matara	4,266	18	Mullativu	3,330
6	Ratnapura	3,924	19	Mannar	5,489
7	Kegalle	3,857	20	Anuradhapura	4,802
8	Kurunegala	3,609	21	Polonnaruwa	5,306
9	Puttalam	4,028	22	Trincomalee	4,473
10	Kandy	4,203	23	Batticaloa	2,686
11	Matale	4,602	24	Ampara	4,078
12	Nuwara Eliya	3,717	25	Hambantota	6,134
13	Badulla	4,761			

Source: Department of Census and Statistics Colombo Sri Lanka, 2015

- Prepare a frequency distribution table using above data. Limit the number of classes to five (5). (06 marks)
- Calculate the mean paddy yield in Maha season, 2015 using the frequency distribution table prepared in (i) above. (05 marks)
- Construct a histogram and frequency polygon using the frequency distribution prepared in (i) above. (05 marks)
- Based on the exercises done in (ii) and (iii) above, briefly describe **two** major characteristics of the average paddy yields in the Maha season of 2015 in the districts of Sri Lanka. (04 marks)

Q. 3.

Table 01 shows the paddy average (kg/hectare) by Districts in Sri Lanka in 2015

Table 01:

Serial No.	District	2015 Maha	Serial No	District	2015 Maha
1	Colombo	3,431	14	Monaragala	3,993
2	Gampaha	3,594	15	Jaffna	3,096
3	Kalutara	3,644	16	Killinochchi	3,689
4	Galle	3,738	17	Vavuniya	4,816
5	Matara	4,266	18	Mullativu	3,330
6	Ratnapura	3,924	19	Mannar	5,489
7	Kegalle	3,857	20	Anuradhapura	4,802
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9	Puttalam	4,028	22	Trincomalee	4,473
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11	Matale	4,602	24	Ampara	4,078
12	Nuwara eliya	3,717	25	Hambantota	6,134
13	Badulla	4,761			

Source: Agriculture and Environmental Statistical Division, Department of Census and Statistics, Colombo, Sri Lanka, 2015

- I. Prepare a frequency distribution table using equal interval method. Limit the number of classes to 5. (6 Marks)
- II. Calculate the mean yield using of the frequency distribution table prepared in I above (5 Marks)
- III. Construct a Histogram and Frequency Polygon (5 Marks)
- IV. Interpret the results (4 Marks)

03. In the allocation of marks following steps should be considered

(i)

Six steps are:

LV – 2686

HV – 6134

Range – $6134 - 2686 = 3448$

Number of classes – 5

Interval - $3448/5 = 689.6 \text{ ---- } 690$

1 mark

No marks are allocated

1 mark

Class Interval	Tally	Frequency
2686 - 3376	///	03
3376 - 4066	/// ///	11
4066 - 4756	///	05
4756 - 5446	////	04
5446 - 6136	///	02
Total = N		25

4 Marks

(ii)

Class Interval	Frequency (f)	x	f(x)
2686 - 3376	03	3031	9093
3376 - 4066	11	3721	40931
4066 - 4756	05	4411	22055
4756 - 5446	04	5101	20404
5446 - 6136	02	5791	11582
N	25		104065

X field – 1.5 marks

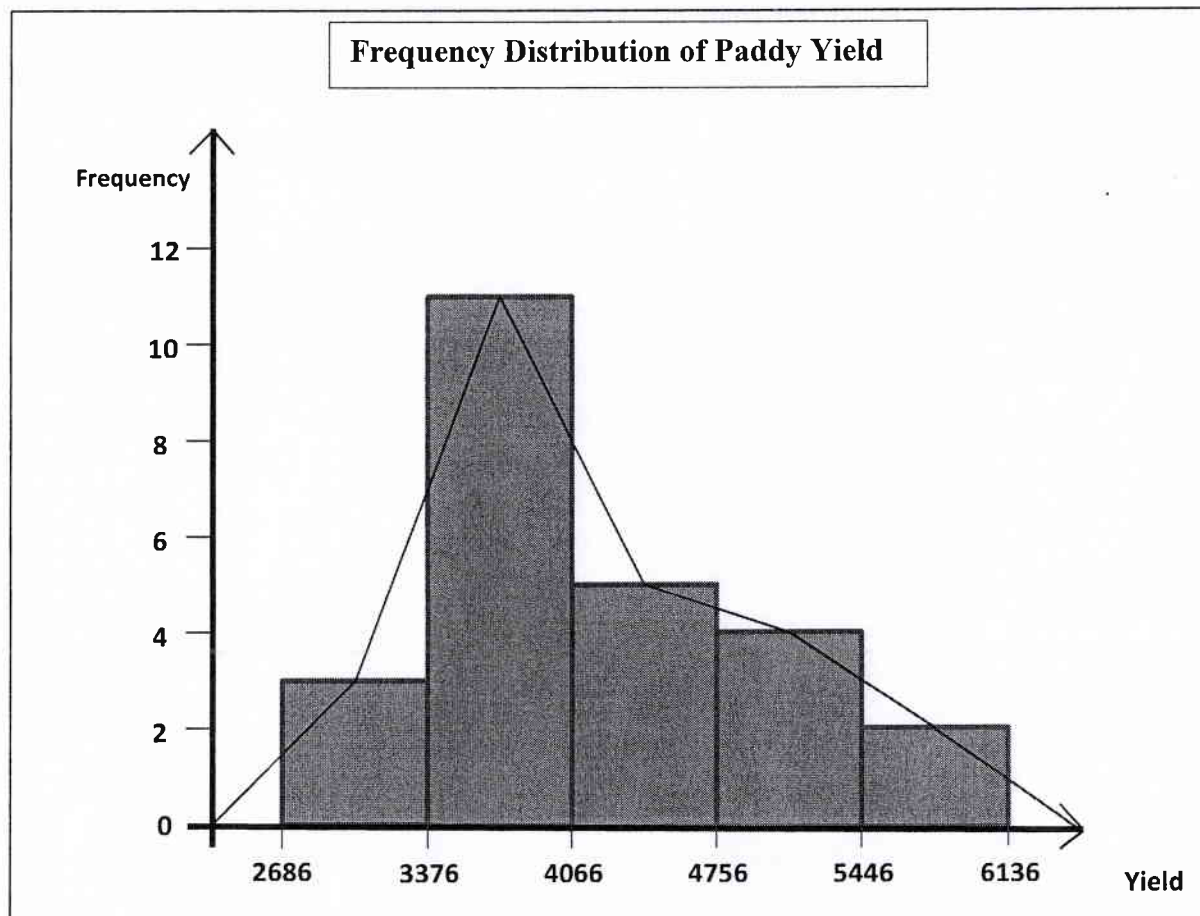
Fx – 1.5 marks

$$\text{Mean Yield} = \bar{x} = \frac{\sum fx}{\sum f} = \frac{104065}{25} = 4162.6 \text{ kg}$$

2 Marks

- (iii) Histogram – 4 Marks (2 marks for both axes, 2 marks for construction of bars – No gaps between bars, half a width of bar in both sides of graph)

Frequency Polygon – 1 Mark (Strait line connecting mid points of bars and ending up in the either corners of the graph)



Geography II - Part I

Physical Geography

1. (i) Name **four** major factors that affect the climate of Sri Lanka. (02 marks)
- (ii) Select any **two** from the factors you have mentioned in (i) above and explain how they affect the climate of Sri Lanka. (06 marks)
- (iii) Describe **three** main characteristics of the climate in the low country wet zone of Sri Lanka. (06 marks)
- (iv) Discuss **three** physical processes that induce climate change. (06 marks)

1. (i) Name four major factors that affect the climate of Sri Lanka

1. Sri Lanka is located within the Inter Tropical Convergence Zone (ITCZ)
2. location in the low pressure trough
3. Ocean currents
4. Located closed to the Indian continent
5. The influence of the Indian Ocean
6. Location as an island
7. Presence of local changes according to topographical features, water and soil conditions

(0.5 x 4= 02 Marks)

(ii) Select any two from the factors you have mention in (i) above and explain how they affect the climate of Sri Lanka

1. Sri Lanka lies on the path of north and south movement of the Inter Tropical Convergence Zone (ITCZ)

- The ITCZ which is located between 50 – 100 latitudes make a movement over Sri Lanka to the Asian continent in June and in January moves to about 100 south in the Indian Ocean
- Due to the movement in the ITCZ there is a variation in the mean pressure in the Island. (When the ITCZ moves southward pressure decreases from north to south in Sri Lanka in Jaffna it is 1012 milibars while in Galle it is 1011 milibars)

2. location in the low pressure trough

- There is an influence on the climate when winds blow from outside under low pressure condition is Sri Lanka
- The impact of the equatorial and sub-tropical jet stream
- That there are two air masses of high velocity which influence the south Asian zone

3. Ocean currents

- The influences of the North Equatorial current which flows corresponding to the trade winds from the Pacific Ocean to the Indian Ocean

4. Located closed to the Indian sub-continent

- The location of Sri Lanka in the Asiatic landmass including the Indian continent in the north
- Coming under the influence of winds that blow from the high pressure centers that from periodically in the Indian Thar desert and Central Asia
- Due to the relief features in India, the strength of the Trade winds that blow from north to south is reduced.

5. The influence of the Indian Ocean

- The influence of the moisture bearing winds
- Location of Sri Lanka relatively to Bay of Bengal
- Formation of low pressure centers very often on the surface of the Ocean

6. Location as an Island

- Coastal influences
- Having relief features with the height of land increasing gradually from the coast to the central parts and the presence of a Central Hill Country (Changes in temperature with increasing elevation, the Location of central hills influences rainfall)

7. Presence of local changes according to topographical features, water and soil condition

The influences of soil types, topographical features and drainage on local temperature variation in Sri Lanka (Sandy soil absorb much heat and releases excess heat, forest absorb more heat and release less heat, lowering of temperature by the cooling of air through evaporation in areas with an expanse of water)

(3x2 = 6 Marks)

(iii) Describe three main characteristics of the climate in the low country wet zone in Sri Lanka.

- Annual rainfall is more than 2000 mm
- Rainfall is distributed throughout the year but February and August are relatively dry month with low rainfall
- Get rainfall from the south west monsoon and conventional rainfall
- Bright sunlight prevails throughout the year
- Average annual temperature is 27°C
- Plant grow well due to heavy rain and high temperature

(3x2 = 6 Marks)

(iv) Discuss three physical processes that induce climate change

- Greenhouse effect
- Temperature changes in the ocean surface
- El-Nino phenomenon
- La-Nino phenomenon
- Sun Spot Cycles
- Volcanoes

(3x2 – Marks)

2. (i) What is meant by landslide? (02 marks)
- (ii) Explain **three** natural factors affecting landslides. (06 marks)
- (iii) Explain **three** major impacts of landslides on the physical environment. (06 marks)
- (iv) Explain **three** measures that have been taken by the government of Sri Lanka to minimize the damage caused by landslides. (06 marks)

(2) (i) What is meant by Landslide?**(02 Marks)**

The downward movement of rocks and other material along mountain slopes and steep slopes with loose soil due to gravity.

The intensity of this process is aggravated by human activities.

Intensity of rainfall, high level of weathering, lightening, earthquakes, relief of the land as well as human activities are the factors that cause landslides.

(ii) Explain three (3) natural factors affecting landslides. (06 Marks)

- **High rainfall.** Mass movements due to concentration of large volume of water on the surface with high rainfall during long periods of storm.
- **Higher rainfall intensity:** A large volume of water falling within a short period of time loosening the soil layer resulting in slow movement.
- Changing slopes of land due to geological events, glacier, running water etc.
- Loss of equilibrium of the top layer of the soil due to high weathering of rocks.
- Changes in the geological structure due to earthquakes
- Changes in the flowing pattern of ground water
- Snow melting. When snow is melted a large volume of water drains with the top layer of soil.

(iii) Explain three (3) major impacts of landslides on the physical environment.

- Soil degradation.
- Sedimentation of rivers.
- Sedimentation of reservoirs.
- Destruction of vegetation, forests cover of the earth's surface.
- Destruction of habitats of natural wildlife and animal species

(2 x3 = 6 Marks)