JC1 H2 GEOGRAPHY
MID-YEAR EXAMINATION 2023
MARKING SCHEME

Section A

Cluster 4: Fieldwork (15 marks)

1 A group of 25 Geography students undertook an investigation about the flood risk along the Pekan River in Pekan, Malaysia which experiences a tropical monsoon (Am) climate.

The students have decided to conduct the study at five sites which are selected at 500-metre intervals – Sites A, B C, D and E.

They decided to collect the data on a weekday in June at 10am.

The students were divided into five teams of five to collect data. At each site, the team gathered the primary data on channel cross-sectional area and river velocity with the following equipment:

- 1 x Unweighted tape measure
- 1 x Metre rule
- 1 x Stopwatch
- 1 x Orange (as floating device)
- 2 x Ranging pole

However, at Site A, the team lost their orange and used a leaf found at the river bank as a floating device instead. Furthermore, during the fieldwork a heavy rain occurred. All teams had to halt their fieldwork and only managed to measure for river velocity once at each site.

Resource 1 shows a map of the Sites A, B, C, D and E along Pekan River. Resource 2 shows a photograph of Site A.

(a)	With reference to Resource 1, suggest a research question for the geographical investigation. Explain your choice of research question.	[4]
	Possible RQs: • How will the level of urbanization along the Pekan River affect the channel discharge at each site? • How will channel discharge influence the level of flood risk at Sites A,B and C along the Pekan River? Explanation for choice of RQ: • [Suitable scale] The area of study only covers 2**km stretch along the Pekan River** which is a **suitable spatial scale** for students to investigate. There is also **sufficient manpower** to collect data from all five sites in a single day (i.e. 5 students per team/site). • [Capable of being researched] Students **possess the equipment needed** to **collect primary data on channel discharge** at all three sites. • [Clearly defined] Research question is **clearly defined**, seeking to investigate the relationship between **landuse type and channel discharge / channel discharge and flood risk**.	

(b)	With reference to Resource 1, identify the sampling method used in selecting the sites for data collection and explain two benefits of this sampling method.	[3]
	Identification of sampling method: • **Systematic sampling** was used as the sites were selected at regular intervals of 500m. Benefits of sampling method: • **Complete spatial coverage** of Pekan River, thus allowing for comprehensive investigation of flood risk variability along the river • **Ensures validity** of the data collected as it can **better capture spatial differences** along the Pekan River, as compared to other sampling methods like random sampling.	
(c)	With reference to Resource 2, suggest how the students could minimize potential risks during data collection.	[4]
	Award 1 mark for each suggestion on how the students could minimise potential risks during data collection. • Students should wear shoes with anti-slip soles when accessing the river channel to prevent any injuries when collecting data in the river channel. • Students should be in cooling and comfortable outfits when collecting data at the Site A since the site has minimal shade. • Students should bring along sufficient drinking water for hydration under the open sun. • Students should always ensure that they are not alone when collecting data at the sites, especially in the event of encounter with wild animals.	
(d)	Explain why data collected for river velocity at the various sites may not be accurate and reliable.	[4]
	Award 1 mark for each source of error identified. Award a maximum of 1 additional mark for further development of how the source of error contributes to inaccuracy/unreliability. Award a maximum of 2 marks for explanation of either inaccuracy or unreliability only. May not be accurate: • Team at Site A used a leaf as the floating device instead of an orange • This will lead to inaccurate measurements as surface velocity will be measured instead of the suspended load velocity. May not be reliable: • Only one measurement taken at each site due to the sudden heavy rain at Pekan. • The data collected may not be reliable because the river environment is highly dynamic and each round of measurement may not always be identical / depending on the path of movement by the floating orange, there is likely to be some difference in the time taken for the floating device to cover the 5-metre distance. **OR** • Measurement of channel velocity and discharge was only collected in one day. • The data collected may not be reflective of the channel discharge along Pekan River during other times of the year, as the region experiences a tropical monsoon climate – characterized by distinct wet and dry seasons.	

Section B

Cluster 2: Tropical Environments (30 marks)

2 Resource 3 shows the distribution of seasonally humid tropical savannah climates in Africa. Savannah climates can be subdivided into three categories – wet, dry and bush, depending on the length of the dry season. Resource 4 shows the relationship between temperature, rainfall and the type of weathering processes. Resource 5 shows the rainfall distribution and an aerial view of the Niger River Delta.

(a) With reference to Resource 3, describe the distribution of seasonally humid tropical savannah environments shown. [4]

- Note the need to frame your answers according to ***General, Specific and Anomalies***
- Answer ref from Syllabus (9696)

Question	Answer	Marks
1(a)	**Fig. 1.1 shows the distribution of seasonally humid tropical (savanna) environments in Africa.** **Describe the distribution of seasonally humid tropical (savanna) environments shown in Fig. 1.1.** Candidates should interpret the map to recognise the key features of the distribution, using map evidence. Features of the distribution may include: • Almost all within tropics • Anomalies in South Africa and Madagascar outside of tropics – extends further south in southern hemisphere • Sequence of bush-dry-wet is generally from the tropics to Equator • Anomaly in east around Equator and on Madagascar • None on the Equator in west • Dry savanna greatest extent • East-west pattern north of Equator, more complicated south of Equator **1 mark** for each relevant feature; map evidence required for max.	**4**

(b) Explain the temperature characteristics of Kisangani shown in Resource 4 [4]

- Characteristics: High Mean Annual Temperatures of 28-29 degrees + Low ATR (2-3 degrees)
- Low latitude – high angle of incidence, insolation is concentrated over a small area
- Distance travelled through the atmosphere by insolation is low, leading to less insolation reflected and dispersed by atmosphere
- LOW ATR explained by low latitude – not much variation between summer/winter. Amount of insolation received throughout the year does not vary very much.

(c)	With reference to Resource 4, distinguish the rainfall patterns of the three cities in Africa.	[6]
	[Amount of Annual Rainfall] 20cm in Tombouctou, compared to 80cm in Ouagadougou and 195cm in Kisangani. [Seasonality of Rainfall] – Presence of seasons (distinct wet and dry seasons in Tombouctou, with wet seasons during High sun period JJA 80%) of rainfall received), but rainfall received throughout the year for Kisangani. [Month of Highest Rainfall] - Tombouctou and Ouagadougou - Aug highest rainfall (but still differences) (give data). Kisangani highest is in October (give data)	
(d)	Using Resource 5, suggest how an increase in built-up areas in the Niger River Delta would affect its flows and storages within the drainage basin.	[4]

Flows: Overland and Subsurface Flows and Channel Flow, Infiltration, Percolation	· Less infiltration and subsurface flows of throughflows due to impermeable surfaces such as tarmac on concrete · More IEF and surface flows due to less infiltration. Greater volume and greater speeds (facilitated by drains and gutters found in urban areas). - Faster increase in Channel Flows
Storages: Interception, soil moisture, Ground Water	· More surface storages due to reservoirs, viaducts built by humans. Less interception Storage due to deforestation, loss of vegetation · Less soil moisture storage due to less infiltration with the changing of less permeable surfaces such as tarmac on concrete.

(e)	Account for the shape of the Niger River Delta, shown in Resource 5.	[6]
	(1) Arcuate/Cuspate Delta Shape - have a straighter appearance and are characterised by ridges of sand parallel to the shoreline • When waves approach the deltas, waves will **erode the deltaic deposits** and transport them along the shore • Transportation via **longshore currents / Longshore drift** • When waves approach the delta shoreline at an angle, **swash brings sediments** up at an angle • Under the influence of gravity, the **backwash** will bring the sediments vertically down and back into the seawaters • Process repeats and **sediments are transported along the shore, in the same direction as the longshore currents**	

(f)	Explain the impact of human activities on the ecosystem services provided by deltas, such as the Niger Delta.	[5]

[Each impacts with elaboration on how specific eco system services are impacted will receive 2 marks] E.g.

Provisioning Services	**Dam construction upstream will reduce sediment supply downstream as the eroded sediments are often trapped behind the dams.** This will reduce soil fertility as there is now a lack of nutrient-rich sediments being deposited on the delta plain. Plant growth will be hindered as a result. This will undermine agricultural productivity and food security, also affecting the livelihoods of fishery and aquaculture industry.
Regulating Services	The clearance of mangrove forests in developed areas of the delta region and sea level rise, the delta is more vulnerable to riverbank and **coastal erosion as a result.** **Carbon Cycle, Hydrological Cycle, Nutrient Cycles**
Cultural Services •	**Cultural services** as the delta become affected by pollution affect the recreational activities and other economic activities e.g. eco tourism. Example: Mekong River Delta where tourists visit to understand the livelihoods of people living there. (note that elaborated examples will also be credited)

Section C

Answer EITHER Question 3 OR Question 4.

Cluster 2: Tropical Environments (20 marks)

3	'Human factors are most significant in contributing to fluvial floods in the humid tropics.' Evaluate this statement.	[20]
	Levels marked using Generic Level Descriptors for 20m H2 essays Possible approach: Candidates could approach the question by evaluating human causes against natural causes of fluvial floods in the humid tropics. The responses may consider how **human factors such as landuse changes can alter the natural landscape** in a region and therein alter the **flows and storage**, subsequently discharge. At the same time, students may incorporate management of floods by human communities to highlight the significance of human factors. Another approach could surface the greater significance of natural factors instead. Candidates may argue that **natural factors are more significant than human factors,** in terms of its **provision of input** into the drainage basin system and **also the geographical scale** at which they operate on.	
4	**'**Climate is the most important factor influencing weathering processes.' Evaluate this statement.	[20]
	Levels marked using Generic Level Descriptors for 20m H2 essays Possible approach: Candidates could approach the question by making a judgement on whether climate is indeed the most important factor influencing weathering processes through a consideration of the natural and human factors influencing weathering. One criterion for evaluation that students can consider would be that of scale; the scale of influence of climate in influencing weathering processes in comparison to other factors. Candidates could evaluate whether a confluence of different factors are critical to influencing weathering processes (e.g. the interplay between climate and geology). Example, **climate provides the necessary conditions that can catalyse the rate of weathering, but geology affects the form and type of weathering products.**	