

TEMASEK JUNIOR COLLEGE
JC2 PRELIMINARY EXAMINATION
Higher 1



H1 GEOGRAPHY

Paper 1

8834/01

29 August 2025

Additional Materials: Insert

3 hours

READ THESE INSTRUCTIONS FIRST

An answer booklet will be provided with this question paper. You should follow the instructions on the front cover of the answer booklet. If you need additional answer paper ask the invigilator for a continuation booklet.

Answer Question 1 in **Section A**.

Answer both questions in **Section B**.

Answer **two** questions in **Section C**.

The number of marks is given in brackets [] at the end of each question or part question.

Section A

Cluster 2 Fieldwork

- 1 A group of four students conducted fieldwork to investigate how the installation of solar panels contributes to community-level responses to climate change in Singapore. Their research question was:

'To what extent does the installation of solar panels influence local microclimate and community attitudes towards solar energy as a climate change response in Singapore?'

The students first consulted secondary sources and obtained a base map showing the distribution of solar panel installations across Singapore. They selected two Housing Development Board estates, Bukit Panjang and Punggol, as their study sites.

At each site, they identified one HDB block equipped with rooftop solar panels, selected based on convenience. They measured ground-level microclimatic conditions (e.g., temperature and relative humidity) near the selected block and compared them with data from nearby blocks without solar panels.

To examine community perceptions, they also administered a questionnaire survey to 20 residents per site on a weekday afternoon. They approached any available individuals to ask if they were willing to participate in the questionnaire survey. The survey explored residents' awareness, perceived benefits, concerns, and observations of environmental changes linked to the solar panels.

Resource 1 shows the locations of the two sampled sites on a basemap, with the number of solar energy installations in Singapore. Resource 2 show photographs taken by the students of the Bukit Panjang and Punggol study sites. Resource 3 shows some of the equipment used to measure and record weather variables, as well as other notes made during the investigation. Resource 4 shows the questionnaire survey used in the investigation. Resource 5 shows collated data for the questionnaire survey on residents' support for the use of solar energy in public housing estates.

- (a) Explain why the research question is appropriate for the investigation. [3]
- (b) With reference to Resource 2, suggest how the students could minimise potential risks and ethical issues when conducting their fieldwork. [4]
- (c) Suggest why the two pieces of equipment shown in Resource 3 would be important for the student to use while conducting the fieldwork. [3]
- (d) Using Resource 4, explain how the design of the survey questionnaire could be improved. [5]
- (e) Use a suitable data representation technique to represent the data shown in Resource 5. [5]
- (f) The students concluded that the installation of solar panels is positively viewed as a climate change response by residents in Singapore. Evaluate the validity of their conclusion. [10]

Section B

Cluster 1 Sustainable Future and Climate Change

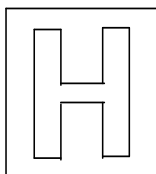
Answer both questions

- 2** Resource 6 shows e-waste generated per person in 2019. Resource 7 shows the number of households reporting diseases at different distances from unplanned waste sites in Islamabad, Pakistan in 2021. Resource 8 shows a photograph of Allerton Waste Recovery Park in North Yorkshire, UK.
- (a) Using Resource 6, describe the distribution of countries with 15.0 kg and above of e-waste generated per person. [5]
 - (b) Explain the demand that urban areas with large ecological footprints place on natural environments. [3]
 - (c) Using Resource 7, describe the relationship between diseases and distance from unplanned waste sites in Islamabad, Pakistan. [4]
 - (d) Explain how contemporary urban population trends in developed countries might affect progress towards sustainable development. [4]
 - (e) Using Resource 8, explain the possible strengths and weaknesses of Allerton Waste Recovery Park as a waste management strategy. [6]
- 3** Resource 9 shows the role of human and natural drivers in global temperature change from 1850 to 2020. Resource 10 shows emissions of CO₂ and the average national vulnerability of population to climate change, by country in 2019. Resource 11 shows the wide variations of future climate change predicted by modelling.
- (a) Explain how Resource 9 supports the view that human activities are the main cause of recent global warming. [5]
 - (b) Explain how changes in thermohaline circulation could influence temperature variability during the Quaternary period. [4]
 - (c) Using Resource 10, describe the relationship between emissions of CO₂ and the average national vulnerability of population to climate change. [4]
 - (d) Explain **two** reasons why some countries are more vulnerable to the impacts of climate change than others. [4]
 - (e) With reference to Resource 11, explain why there might be uncertainty over present and future impacts of contemporary climate change. [5]

Section C

Answer two questions

- 4** Evaluate the success of strategies used to improve the lives of slum dwellers. [13]
- 5** Evaluate the issues faced by women living in the city. [13]
- 6** 'It is easier to adapt to the effects of climate change than to mitigate them.'
Evaluate this statement. [13]



TEMASEK JUNIOR COLLEGE

JC2 PRELIMINARY EXAMINATION

Higher 1



TEMASEK
JUNIOR COLLEGE

H1 GEOGRAPHY

8834/01

Paper 1

29 August 2025

INSERT

3 hours

READ THESE INSTRUCTIONS FIRST

This Insert contains all the Resources referred to in the questions.

Resource 1 for Question 1

Locations of sampled sites on basemap showing number of solar energy installations in Singapore



Resource 2 for Question 1

Study Sites in Bukit Panjang and Punggol



Bukit Panjang Sample Site



Rooftop solar panel in Bukit Panjang



Punggol Sample Site



Rooftop solar panel in Punggol

Resource 3 for Question 1

Equipment used to measure and record weather variables



A weather tracker to measure microclimatic variables

Site	Ground Temperature (Degrees Celsius- °C)	Air Temperature (Degrees Celsius- °C)	Wind Speed (Kilometres per hour - kph)	Wind Direction (Compass Directions)
A				
B				

Notes: Several residents voiced frustration that while panels were visible on the rooftops, they hardly noticed any reduction in their household energy bills. The reflective glare from certain angles was reported to be uncomfortable for residents on higher floors in adjacent blocks

Clipboard with recording and observation sheet

Resource 4 for Question 1

Survey Questionnaire

Age: _____ Gender: M / F

Estate: ☐ Bukit Panjang ☐ Punggol

1. How aware are you of solar panels being installed on some HDB blocks in your estate?
☐ Very aware ☐ Somewhat aware ☐ Not aware
2. To what extent do you support the use of solar energy in Singapore's public housing estates?
☐ 1 – Strongly agree
☐ 2 – Agree
☐ 3 – Neutral
☐ 4 – Disagree
☐ 5 – Strongly disagree
3. In your opinion, what are the main benefits of installing solar panels on HDB rooftops?
(Select up to two)
☐ Reduces electricity bills
☐ Helps fight climate change
☐ Reduces dependence on fossil fuels
☐ Increases property value
☐ Other: _____
4. What concern, if any, do you have about installing solar panels on HDB blocks?
(Select only one)
☐ Cost of installation and maintenance ☐ Visual appearance / aesthetics
☐ Limited effectiveness in Singapore's climate ☐ Safety / structural concerns
☐ No major concern
5. Would you be willing to pay slightly higher service and conservancy charges if solar panels were installed on your block?
☐ Yes ☐ No
6. Have you noticed any changes in the environment around your block since the installation of solar panels?
☐ Yes ☐ No
7. If yes, what kind of changes have you observed?
(Select all that apply)
☐ Cooler temperatures at void deck or around the block during the day
☐ Hotter rooftop levels or stairwells
☐ Reduced glare or more shade
☐ No noticeable difference
☐ Other: _____

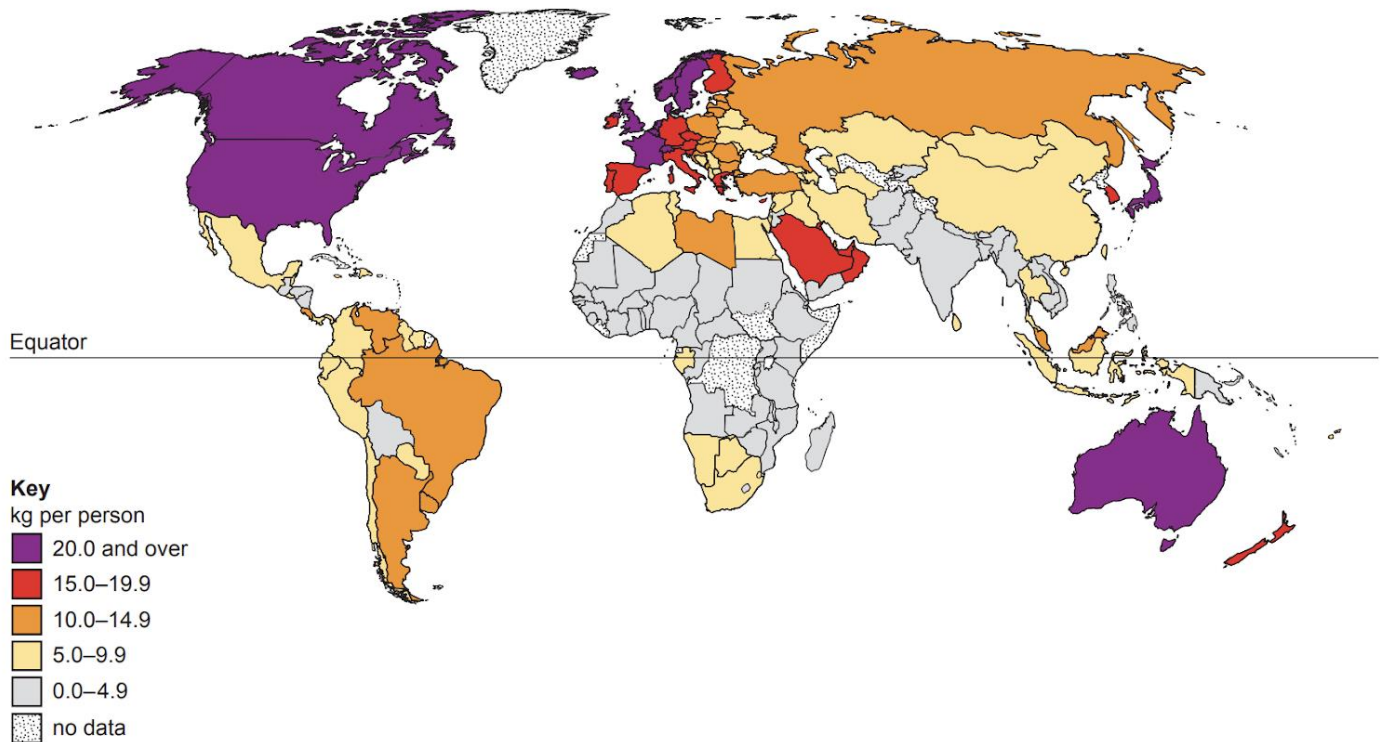
Resource 5 for Question 1

Collated data on the survey question 'To what extent do you support the use of solar energy in Singapore's public housing estates?'

	1 – Strongly agree	2 – Agree	3 – Neutral	4 – Disagree	5 – Strongly disagree
Bukit Panjang	6	7	4	2	1
Punggol	10	6	2	1	1

Resource 6 for Question 2

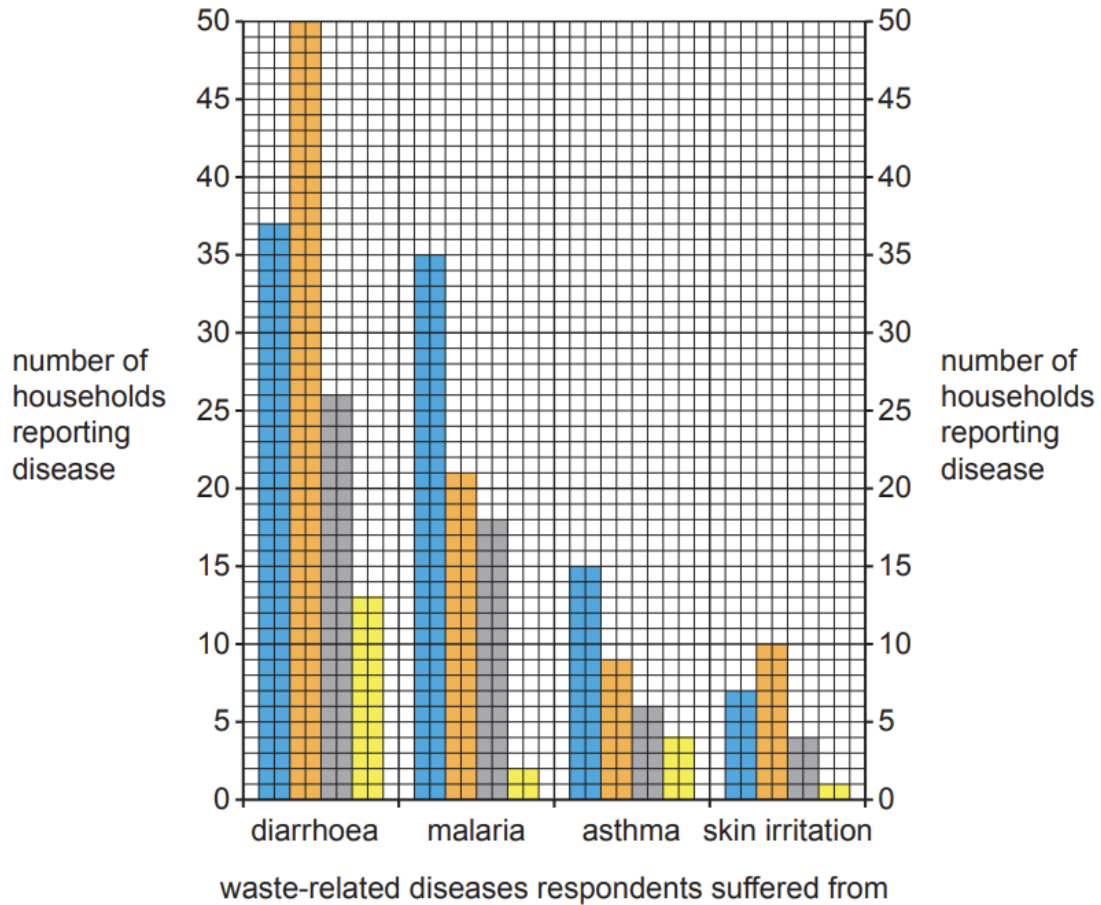
E-waste* generated per person, 2019



* Electronic waste or 'e-waste' describes discarded electrical or electronic devices, such as televisions, computers, mobile phones and any type of household device from air conditioners to children's toys.

Resource 7 for Question 2

Number of households* reporting diseases at different distances from unplanned waste sites in Islamabad, Pakistan, 2021



Key

distance of household from an unplanned waste site



* 850 households in total were interviewed for the survey.

Resource 8 for Question 2

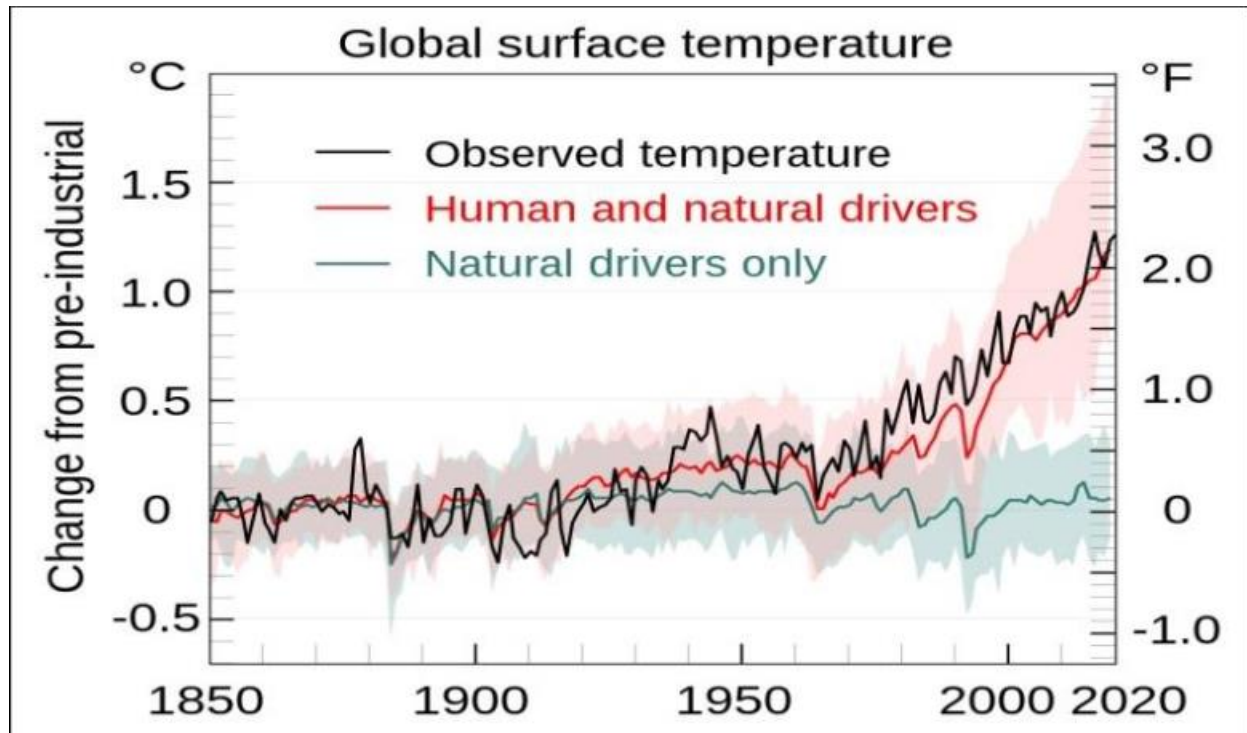
Photograph of Allerton Waste Recovery Park in North Yorkshire, UK



Allerton Waste Recovery Park in North Yorkshire is a £1.4 billion facility that processes up to 320,000 tonnes of waste annually using mechanical sorting, anaerobic digestion (the breaking down organic waste in the absence of oxygen to produce biogas and fertilizer), as well as energy-from-waste incineration. It diverts over 90% of household waste from landfill while generating enough electricity to power around 40,000 homes.

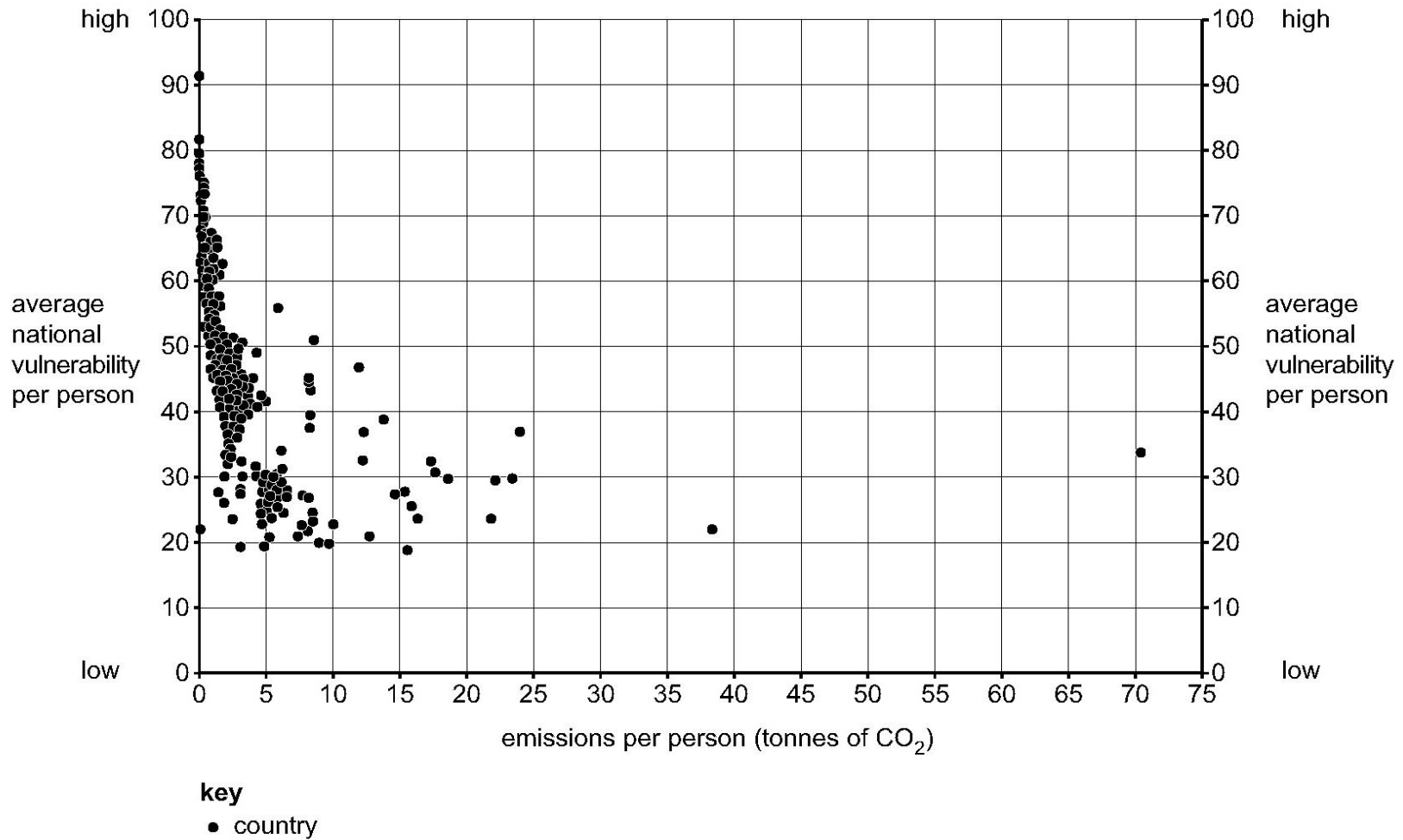
Resource 9 for Question 3

Role of Human and Natural Drivers in Global Temperature Change (1850-2020)



Resource 10 for Question 3

Emissions of CO₂ and average vulnerability of population to climate change, by country, 2019



Resource 11 for Question 3

Wide variations of future climate change

(RCPs = representative concentration pathways using climate change modelling)

