SERANGOON JUNIOR COLLEGE
JC2 PRELIMINARY EXAMINATIONS 2015
Higher 2

GEOGRAPHY 9730/01

Paper 1 Physical Geography

Wednesday
19 Aug 2015
3 hours

Additional materials: Writing Paper
1 Insert

READ THESE INSTRUCTIONS FIRST

Write your name and civics group on all the work you hand in.
Write in dark blue or black pen on both sides of the paper.
You may use a soft pencil for any diagrams, graphs, or rough working.
Do not use staples, paper clips, highlighter, glue or correction fluid.

Section A
Answer **all** questions.

Section B
Answer **two** questions, each from a different topic.

The Insert contains all the Figures referred to in the question paper.
Diagrams and sketch maps should be drawn whenever they serve to illustrate an answer.
The world outline map may be annotated and handed in with relevant answers.
You are reminded of the need for good English and clear presentation in your answers.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

Section A

Answer **all** the questions in this section.
Questions 1, 2 and 3 carry 12 marks. Question 4 carries 14 marks.
You should allocate your time accordingly.

Lithospheric Processes, Hazards and Management

1 Fig. 1A shows a limestone feature in Florida (USA). The entire state of Florida is underlain by limestone. Fig. 1B illustrates how the limestone feature was formed.

(a) Identify the limestone feature shown in Fig. 1A. **[1]**

(b) With reference to the Figs 1A and 1B, and your own knowledge, explain the factors contributing to the development of the limestone feature you have identified in (a). **[5]**

(c) Describe how the form and nature of a tower karst landscape differs from a limestone pavement. **[6]**

Atmospheric Processes, Hazards and Management

2 Fig. 2 shows warm and cool ocean currents in the Atlantic Ocean and the mean monthly temperatures of the warmest and coolest months of some coastal locations.

(a) Suggest the role of ocean currents in the global energy budget. **[2]**

(b) Describe and explain the pattern of ocean currents shown on Fig. 2. **[5]**

(c) Using examples from Fig.2, explain how warm and cool ocean currents can affect temperatures and precipitation in coastal locations. **[5]**

Hydrologic Processes, Hazards and Management

3 Fig. 3 depicts the Hjulstrom diagram.

(a) With reference to Fig. 3 :

(i) Identify the largest size of material that can be eroded at the velocity of 100cm/s. **[1]**

(ii) Describe what would happen to the material you have identified in (a) (i), when the velocity drops from 100cm/s to 10cm/s. **[3]**

(b) Suggest **one** reason why critical erosion velocity is represented by a band rather than a single line. **[2]**

(c) Explain the importance of critical erosion velocity in the transportation of the load within a river channel. **[6]**

Lithospheric and Hydrologic Processes, Hazards and Management

4 Fig. 4A shows the tectonic plates and the epicentre of the 2011 Tohoku, Japan earthquake. Fig. 4B shows the effects of the tsunami on the Kitakami river. The Kitakami river is the largest river in the Tohoku region.

(a) Using Fig. 4A, comment on the nature of the plate boundary and plate movement leading to the 2011 Tohoku earthquake. **[2]**

(b) With reference to Fig. 4B, describe and explain the effects of the tsunami on the morphology of the Kitakami river over time. **[3]**

(c) Suggest the effects of earthquakes on channel flow and morphology. **[4]**

(d) Imagine that you are a government official working for the Japanese Seismic Research Center. Discuss how you would map an earthquake hazard map for Japan. **[5]**

Section B

Answer **two** questions, each from a different topic. Each question carries 25 marks.

Lithospheric Processes, Hazards and Management

5 EITHER

(a) Describe the role of plate tectonics in the rock cycle. **[9]**

(b) Compare the volcanic hazards at convergent and divergent plate boundaries. Discuss the challenges associated with managing these hazards at the different plate boundaries. **[16]**

5 OR

(a) Compare the features, usefulness and limitations of Peltier's model and Strakhov's model. **[9]**

(b) "A knowledge of deep weathered profiles enables us to understand the form and formation of granitic landforms." Discuss. **[16]**

Atmospheric Processes, Hazards and Management

6 EITHER

(a) With the use of diagram(s), how and where can El Nino influence the development of droughts? **[9]**

(b) "Hazards arising from tropical cyclones are immediate, whereas those arising from droughts are longer term." Discuss the validity of the statement. **[16]**

6 OR

(a) Compare the features of the day-time and night-time energy budget. **[9]**

(b) Assess the role of anthropogenic factors in influencing the earth's energy budget. **[16]**

Hydrologic Processes, Hazards and Management

7 EITHER

(a) Explain the meaning of the terms: *hydraulic radius*, *channel discharge* and *channel competence* in relation to a river channel. **[9]**

(b) Assess the extent to which an understanding of hydraulic radius leads to successful flood management strategies. **[16]**

7 OR

(a) With the aid of a diagram, describe and explain how sub-surface flows and stores may contribute to surface flows and stores. **[9]**

(b) With reference to one or more examples, discuss how humans influence storages within the drainage basin. **[16]**

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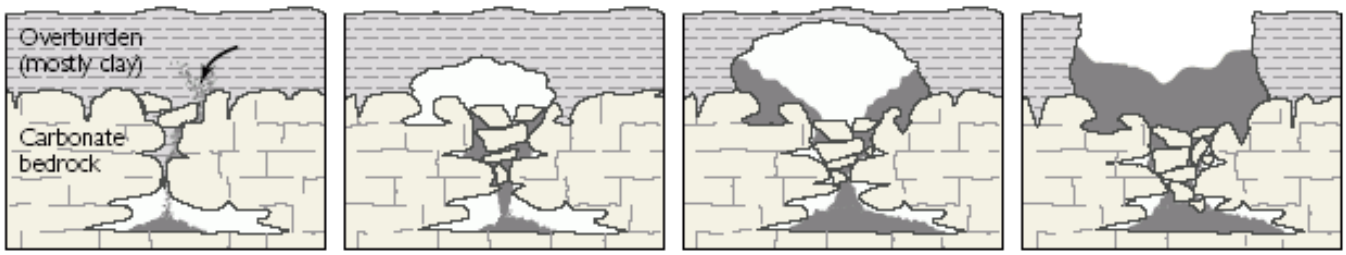
This insert contains all the Figures referred to in the question paper.

Figs 1A and 1B for Question 1

Fig. 1A Limestone feature in Florida (USA)

Source: Southwest Florida Water Management District

Fig. 1B Formation of the limestone feature



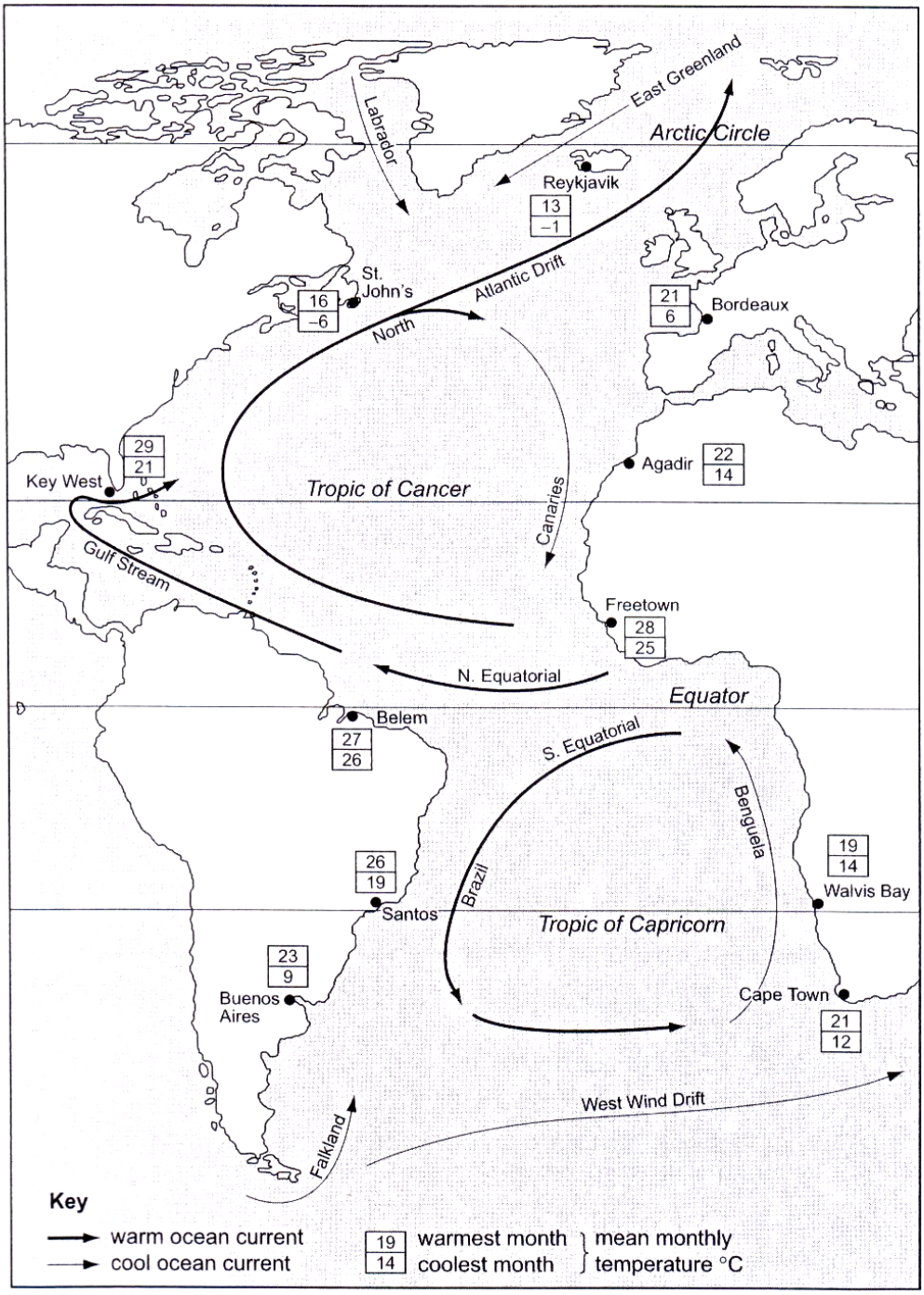
Formation of a cavity within carbonate bedrock

Widening of the cavity via successive roof collapse

The cavity eventually breaches the ground surface

Fig 2 for Question 2

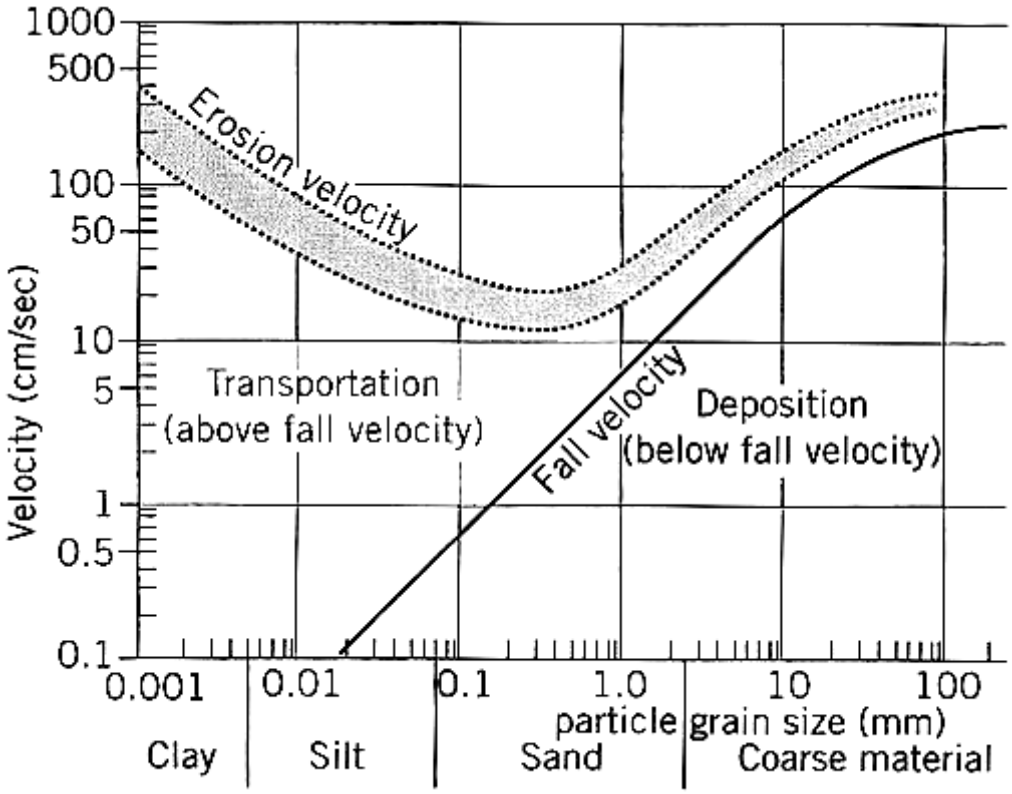
Fig. 2 Warm and Cool ocean currents in the Atlantic Ocean and mean monthly temperatures of the warmest and coolest months of some coastal locations



Source: CIE

Fig. 3 for Question 3

Fig. 3 Hjulstrom Diagram



Figs 4A and 4B for Question 4

Fig 4A Tectonic plates and the epicentre of the 2011 Tohuku, Japan earthquake

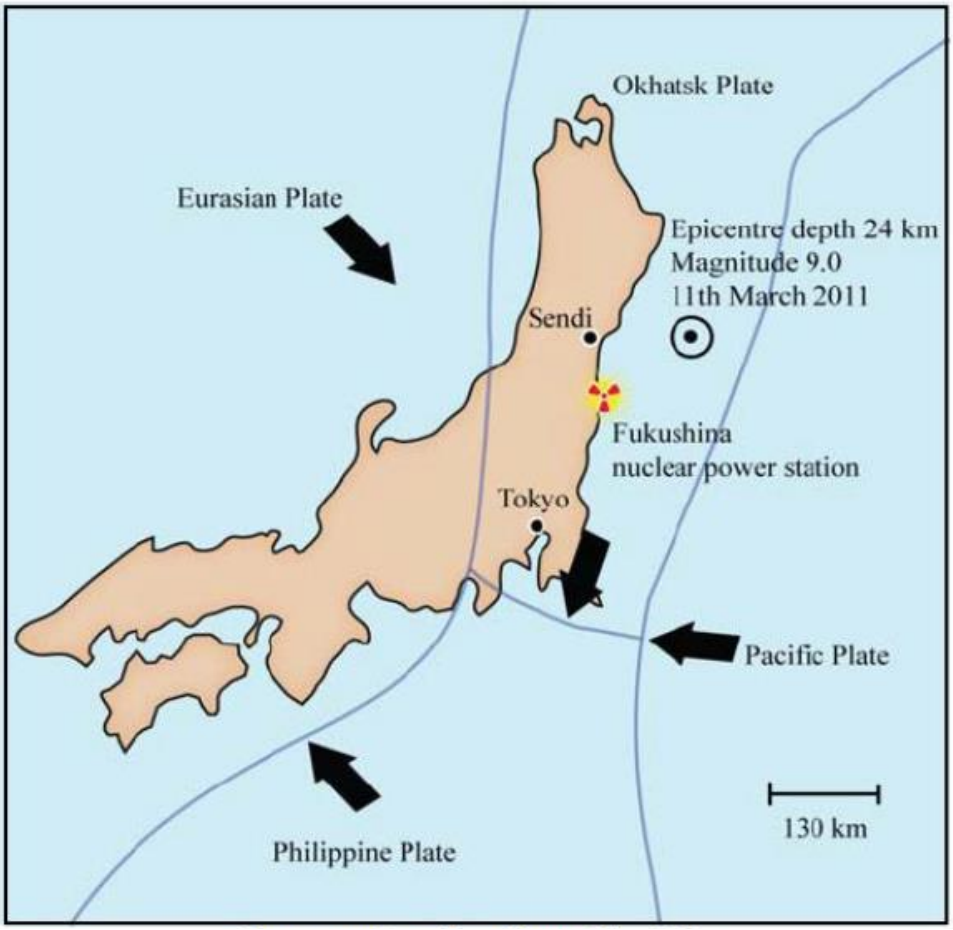
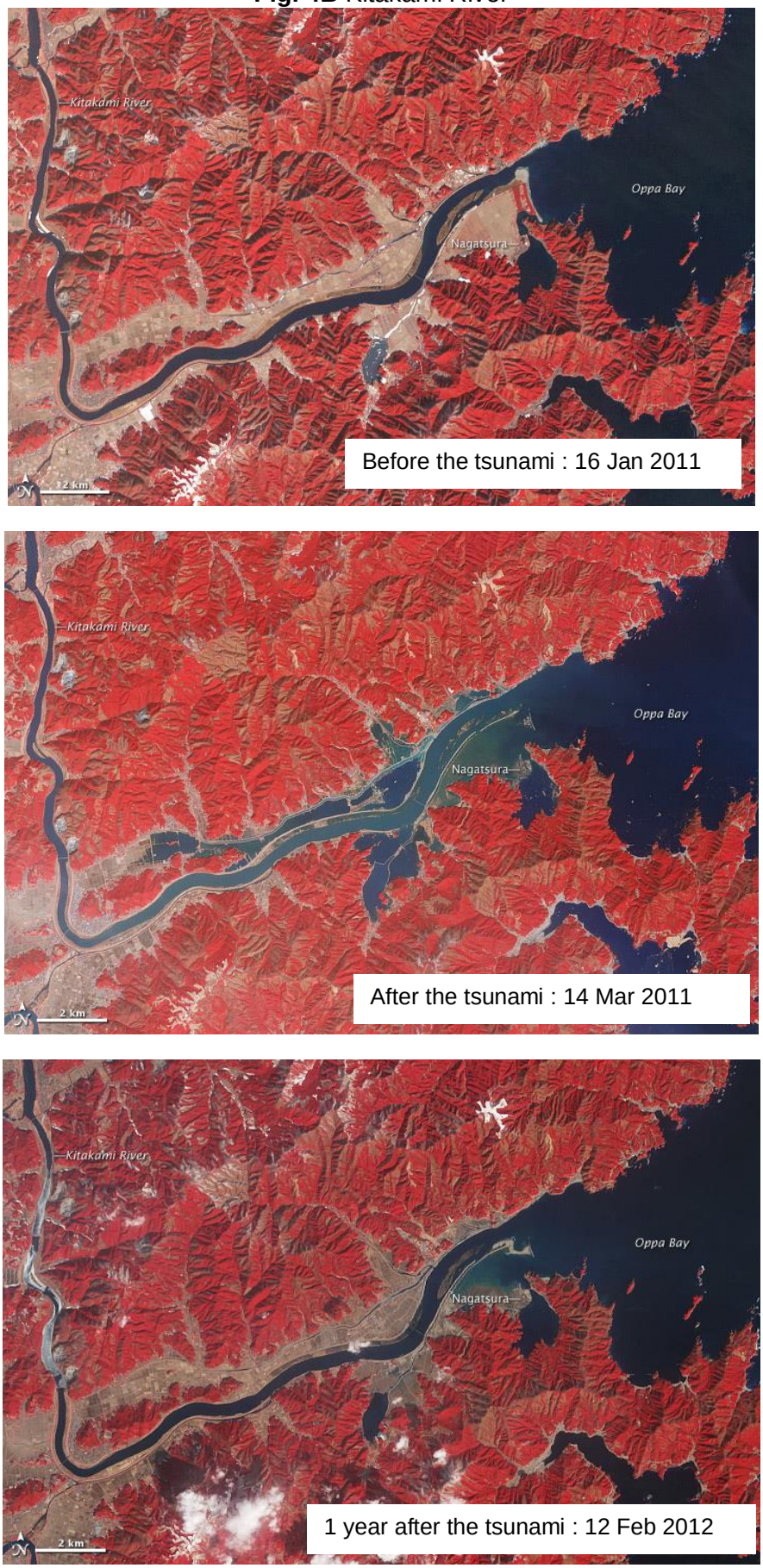


Fig. 4B Kitakami River



Source: http://earthobservatory.nasa.gov/NaturalHazards/view.php?id=77379

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