Module Title: The Physical Environment
Level: Four
Time Allowed: One hour

Instructions to students:

- Answer all questions.
- Neither books nor notes may be taken into the examination.
- Students are not permitted to remove this examination paper from the examination room. For all purposes the examination paper remains the property of the University of Northampton.
- Insert your student number in the space below:

Student Number: .........................................................

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1. In each case identify the odd one out:
   a. Breccia, Basalt, Sandstone, Conglomerate
   b. Cumulus, Stratus, Nimbus, Cirrus
   c. Devonian, Mesozoic, Triassic, Silurian
   d. Polar Maritime, Tropical Maritime, Arctic, Polar Continental
   e. Pacific, North American, Eurasian, North African
   f. Lava dome, Batholith, Laccolith, Sill

(6 marks)

2. List four reasons why an air parcel might rise in the atmosphere.

(4 marks)

3. What two forces account for the direction and strength of geostrophic flow in the upper atmosphere?

(2 marks)

4. What type of volcanic eruption might arise from magma with high silica and gas content?

(2 marks)

5. What type of volcanic eruption may arise from very high temperature magma?

(2 marks)
6. Approximately what percentage of volcanoes are found over lithospheric hotspots?

   a. 1%
   b. 5%
   c. 25%

(1 mark)

7. Define the following terms and then annotate Figure 1 with the correct letter (i.e. a., b., c.,)

   a. The Law of Superposition
   b. The Principle of Cross-Cutting Relationships
   c. Angular Unconformity

(2 marks)

Figure 1
8. Which geological principle is represented by Figure 2? (2 marks)

a. What is the name of the original structure? (2 marks)

b. What type of force originally acted upon the surface layers? (2 marks)
9. Explain the information shown on Figure 3.  
   (4 marks)

10. Explain the difference between aphelion and perihelion and their potential impact on our climate.  
   (6 marks)
11. What effect does the precession of the equinoxes have on global climate? (4 marks)

12. What is the difference between internal and external climatic forcing? (2 marks)

13. List two examples of external climatic forcing. (2 marks)

14. Explain why the saturated adiabatic lapse rate can never be a greater rate than the dry adiabatic lapse rate. (3 marks)

15. List two examples of internal climatic forcing. (2 marks)

16. At what temperature is water at its greatest density? (1 mark)
17. Identify any **two** of the three primary factors that influence slope movement.  
(2 marks)

18. What happens when two continental plates collide?  
(1 mark)

19. Explain the difference between Saturation and Hortonian Overland Flow.  
(4 marks)

20. Identify **one** primary factor that lowers resistance to mass movement.  
(1 mark)
21. With the help of Figure 4 (Bowen’s Reaction Series) under what conditions do basalt and granite form (temperature and environment), and what is their typical composition?

(6 marks)

22. Define ‘Atmospheric Stability’ with reference to the relevant lapse rates.

(3 marks)
23. On Figure 6 (on page 10) label the following:

a. a warm front
b. a warm sector
c. a tropical maritime air mass
d. an area of strong winds
e. the point of inclusion
f. an area of stability

(6 marks)

24. On Figure 6 (on page 10), what is the LWT for that day?

(1 mark)
25. On the day of Figure 6 and with respect to the seasonal mean, how would you describe current (daytime) temperature and likely 24-hour rainfall at Northampton?

(3 marks)