KATHMANDU UNIVERSITY
End Semester Examination
18, January 2024

Marks Scored:

Level : B.Sc.
Year : IV
Course : ENVS 423
Semester : I

Exam Roll No. :
Time: 30 mins.
F. M. : 20

Registration No.:
Date :

SECTION "A"
[20Q. × 0.5 = 10 marks]

Mark "√" in the most appropriate box.

1. Snow transforms in to firn through
[ ] melting
[ ] sublimation
[ ] further compaction
[ ] percolation

2. The line on a glacier surface which separates dry and wet snow zones is called
[ ] snow line [ ] equilibrium line [ ] dry snow line [ ] wet snow line

3. A snow tube gives
[ ] snow depth
[ ] water equivalent
[ ] snow depth and water equivalent
[ ] snow density

4. The uppermost part of an accumulation area of a glacier is called the
[ ] dry snow zone [ ] wet snow zone [ ] ablation area [ ] accumulation area

5. A granular porous medium consisting of ice crystals and pore spaces is called
[ ] glacier [ ] snow [ ] ice [ ] hail

6. If we need a pencil to penetrate the snow pack then the snowpack is called
[ ] hard [ ] soft [ ] medium hard [ ] very hard

7. Interglacial period is a
[ ] warm period
[ ] warm and hot period
[ ] cold period
[ ] very cold period

8. Superimposed ice is found at
[ ] accumulation area
[ ] inside the glacier
[ ] ablation area
[ ] equilibrium line

9. Density of depth hoar is
[ ] 100-300 kg m^{-3} [ ] 830-917 kg m^{-3} [ ] 700-800 kg m^{-3} [ ] 50-70 kg m^{-3}

10. Which oxygen isotope is very less in nature?
[ ] ^{16}O [ ] ^{17}O [ ] ^{18}O [ ] ^{19}O

11. The Last Glacial Maximum (LGM) was before about
[ ] 10,000 years [ ] 1,000 years [ ] 20,000 years [ ] 100,000 years

12. The percentage of air bubble in glacier ice is about
[ ] 10 % [ ] 12 % [ ] 15 % [ ] 20 %

13. Most of the Nepalese glaciers are
[ ] valley type [ ] maritime type [ ] polar type [ ] hanging type

14. Oxygen isotope ratio is used to know past
[ ] air temperature [ ] humidity [ ] rainfall [ ] snowfall

15. Dry snow zone is found on glaciers in
[ ] Tibet [ ] Himalayas
[ ] Karakoram [ ] Antarctica and Greenland

16. Total number of glaciers in Nepal is
[ ] 1466 [ ] 2466 [ ] 3808 [ ] 466

17. Surface melt water may reach to the englacial hydraulic system through
[ ] moulin [ ] supra-glacial lakes
[ ] conduits [ ] sub-glacial channel

18. An open fissure in the glacier surface is called
[ ] crevasse [ ] moulin [ ] ice cut [ ] ice cave

19. Any part of a glacier which has ceased to flow and usually covered with moraine is called
[ ] active ice [ ] dead ice [ ] blue ice [ ] dirty ice

20. Firn becomes ice at about 66 m depth in Greenland Ice Sheet in around
[ ] 66 years [ ] 100 years [ ] 1,000 years [ ] 10,000 years

SECTION "B"

[10Q. × 1 = 10 marks]

Define in one sentence.

21. Moulin

22. Snow water equivalent (w.e.)

23. Depth hoar

24. Calving

25. Glacier terminus

26. Glacier lake outburst flood

27. Strain

28. Mountain glacier

29. Supra-glacier lake

30. Moraine

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F. M. : 55

SECTION "C"
[3 Q. × 7 = 21 Marks]

Attempt *ANY THREE questions*.

1. How are glaciers and glacial lakes formed?

2. Explain in detail how snow is transformed into ice in a glacier. List densities of different types of snow.

3. How do glaciers reflect climate change?

4. Describe a method of measuring accumulation and ablation of a glacier in the field.

SECTION "D"

7. Differentiate between *ANY FOUR* [4 Q. × 4 = 16 marks]
   a. Glacier and permafrost
   b. Valley glacier and ice sheet
   c. Heat budget and statistical methods for estimating glacier ablation
   d. En-glacial and sub-glacial hydraulic systems
   e. Polar glacier and sub-polar glacier

8. Write short notes on *ANY THREE* [3 Q. × 4 = 12 marks]
   a. Snow, firn, ice and their densities
   b. Importance of ice core study
   c. Glacier surge
   d. Causes of the earth's glaciation

9. Give reasons why [2 Q. × 3 = 6 marks]
   a. the ice core study has taken as a very useful tool in glaciology.
   b. polar glaciers are suitable for ice coring.