

UNIVERSITY OF RUHUNA, FACULTY OF AGRICULTURE  
FIRST EXAMINATION IN BSc. AGRICULTURAL RESOURCE MANAGEMENT AND  
TECHNOLOGY

FIRST EXAMINATION IN BSc. GREEN TECHNOLOGY (PART I)

August – 2022

APPLIED HYDROLOGY AND CLIMATOLOGY – EN1102



M.C.Q. Type

TIME: 30 Minutes

Index Number

Answer all (25) questions.

Encircle the most accurate answer among the five alternatives.

Only one answer should be marked in each question.

Only non-programmable calculators are permitted

Mobile phones are not permitted.

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- The areas of 4 rain gauge stations A, B, C and D are 0.15, 0.25, 0.30 and 0.3 km<sup>2</sup> respectively. If the average depth of rainfall is 5 cm and rainfall recorded at B, C and D are 5, 4 and 5 cm respectively, what is the rainfall of A in cm?  
a) 5            b) 6            c) 7            d) 8            e) 4
  - The coefficient of variation of the rainfall for 6 rain gauge stations in a catchment was found to be 32.52%. If the admissible error in the estimation of the mean rainfall will be 11%, the optimum number of stations in the catchment would be;  
a) 3            b) 6            c) 8            d) 9            e) 12
  - The method used for estimating missing rainfall is;  
a) Station year method  
b) Normal ratio method  
c) Plotting position method  
d) Rational method  
e) Isohyetal method
  - Which of the following is an endothermic process?  
a) Deposition  
b) Deposition and melting  
c) Freezing  
d) Sublimation  
e) Evaporation and freezing
  - The observed annual runoff from a basin of area 500 km<sup>2</sup> is 150 km<sup>3</sup> and the corresponding annual rainfall over the basin during the same year is 750 mm. The runoff coefficient would be;  
a) 0.2            b) 0.3            c) 0.4            d) 0.5            e) 0.67

6. Major component of the Venus's atmosphere

- a) Methane
- b) Carbon\_dioxide
- c) Nitrogen
- d) Argon
- e) Nitrous oxide

7. The surface runoff is the quantity of water;

- a) Absorbed by soil
- b) Intercepted by buildings and vegetative cover
- c) Required to fill surface depressions
- d) That reaches the stream channels
- e) Evaporated by the soil surface.

8. Hydrograph is a plot of;

- a) rainfall intensity against time
- b) stream discharge against time
- c) cumulative rainfall against time
- d) cumulative runoff against time
- e) rainfall against time

9. Match the following and find the most relevant answers for A, B, C and D respectively

A. Permanent, greatest, and influencing weather	I. Land breeze
B. When solar radiation warms the land more than water	II. Trade winds
C. Movement of air towards the water from land	III. Sub polar jet
D. Air descending to earth's surface near 30-degree latitude creates steady winds that blow in tropical regions	IV. Sea breeze

- a) II, I, IV, and III
- b) III, I, IV, and II
- c) III, IV, I, and II
- d) II, III, IV, and I
- e) II, IV, I, and III

10. A unit hydrograph has

- a) One unit of peak discharge
- b) One unit of rainfall duration
- c) One unit of direct runoff
- d) One unit of the time base of direct runoff.
- e) One unit of baseflow

11. A gas mixture contains 30% CO<sub>2</sub>, 40% O<sub>2</sub> and 30% N<sub>2</sub>. If the partial pressure of CO<sub>2</sub> is 9Pa, what is the total pressure of gas mixture?

- a) 9Pa
- b) 10Pa
- c) 20Pa
- d) 60Pa
- e) 90Pa

12. Which statement is false?

- a) The density of a gas is constant as long as its temperature remains constant.
- b) Gases can be expanded without limit.
- c) Gases diffuse into each other and mix almost immediately when put into the same container.
- d) The molecular weight of a gaseous compound is a non-variable quantity.
- e) Pressure must be exerted on a sample of a gas in order to confine it.

13. The pressure is changed from 500 kPa to 250 kPa. What would you expect the new temperature to be if the initial temperature is 200 K?

- a) 100 K
- b) 200K
- c) 300K
- d) 400K
- e) 500K

14. The observed runoff from a basin area of  $500 \text{ Km}^2$  is  $150 \text{ Mm}^3$  and the corresponding annual rainfall over the basin during the same year is 750 mm. The run off coefficient would be?

- a) 0.20
- b) 0.67
- c) 0.40
- d) 0.36
- e) 0.50

15. Specific Humidity is?

- a) the maximum mass of moisture that a specific amount of air can hold
- b) the actual mass of moisture present in a specific amount of air
- c) the ratio of the mass of moisture contained in a specific amount of air to the maximum amount of moisture this specific amount of air can contain
- d) the mass of moisture present in a specific amount of air at that absolute temperature
- e) a specific amount of air saturated with moisture

16. An adiabatic process is one in which the

- a) altitude of the air parcel remains constant
- b) heat exchanged with the surroundings is zero
- c) pressure on the air parcel remains constant
- d) temperature remains constant
- e) work done is zero

17. Which of the following is not a cloud at low height?

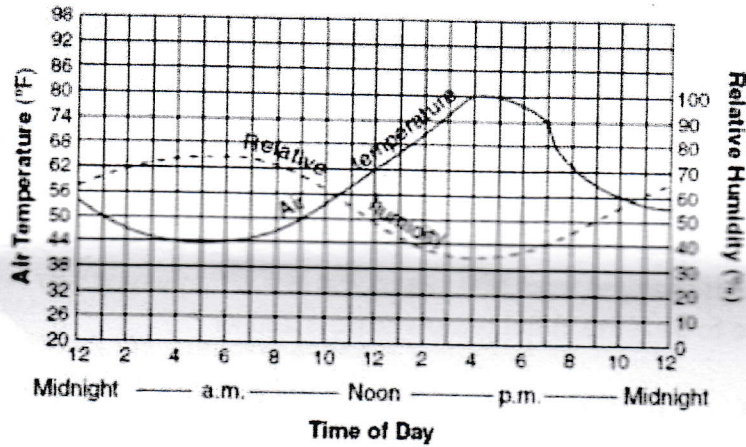
- a) Nimbo stratus
- b) Cumulonimbus
- c) Stratus
- d) Cirro startus
- e) Cumulus

18. If water vapor comprises 3.5% of an air parcel whose total pressure is 1000 mb, the water vapor pressure would be:

- a) 1035 mb
- b) 35 mb
- d) 965 mb
- e) 1000 mb

c) 350 mb

19. The graph shows air temperature and relative humidity at a single location during a 24-hour period.



What was the approximate change in relative humidity from 12 noon to 4p.m.?

- a) 10%      b) 15%      c) 20%      d) 25%      e) 30%

20. Main components of the hydrological cycle would be best explained by;
- Condensation, Infiltration, Runoff, Transpiration, Precipitation
  - Infiltration, Runoff, Transpiration, Evaporation, Infiltration
  - Condensation, Runoff, Precipitation, Infiltration, Transpiration
  - Condensation, interception, Infiltration, Runoff, Evaporation, transpiration Precipitation
  - Runoff, Precipitation, Infiltration, Transpiration, Evaporation

21. Which of the following is not used to measure the weather?

- Actinometer
- Altometer
- Barograph
- Psychrometer
- Ceilometer

22. Identify the matching pair for A, B, C, D, and E respectively

A. satellite	I. Thermosphere
B. Space shuttle	II. Mesosphere
C. 50-80 km	III. Troposphere
D. 75% of atmospheric gases	IV. Ionosphere
E. Radio wave transmission	V. Exosphere

- IV, I, II, III, and V
- I, IV, II, III, V
- V, I, II, III, and IV
- IV, V, II, III, and I

- d) II, V, III, I, and IV
23. Which of the following is not true about carbon cycle?
- a) Biodegradation is used to treat carbon containing compounds in hazardous wastes.
  - b) Hydrocarbons in crude oil and all synthetic hydrocarbons are degraded by micro-organisms through crucial biochemical reactions
  - c) Photosynthetic algae are the predominant carbon fixing agents in water
  - d) convert hydrocarbons to xenobiotic compounds with functional groups containing halogens, oxygen, nitrogen, phosphorus, or sulfur
  - e) Organic, or biological, carbon is contained in energy rich molecules that can react biochemically with molecular oxygen to regenerate carbon dioxide and produce energy
24. What happens during the mineralization process in phosphorous cycle?
- a) Plants uptake the soluble forms of P
  - b) Weathering of primary minerals of P such as apatite
  - c) Secondary compounds such as Cap, FeP, MnP, and AlP are produced from soluble P
  - d) Soluble P produced from organic P such as plant and animal residues
  - e) Soluble P is adsorbed into mineral surfaces such as clay, Fe, Al oxides and carbonates
25. Present carbon dioxide concentration of the atmosphere
- a) 385 ppm
  - b) 525 ppm
  - c) 412 ppm
  - d) 453 ppm
  - e) 398 ppm

@@@GOOD LUCK@@@