



UNIVERSITY OF RUHUNA

FIRST EXAMINATION IN B.Sc GREEN TECHNOLOGY (PART I)

September – 2022

Environment and Pollution – ID 1101

M.C.Q. Type

TIME: 30 Minutes

Index Number

Answer all questions.

Mark your answers by placing “✓” against the selected alternative among the five alternatives provided in each question.

Only one answer should be marked in each question, if more than one answer is marked for a question, that question will not be evaluated.

Only non-programmable calculators are permitted.

Mobile phones are not permitted.

1. Select the correct statement

- i. The environment consists of lithosphere, atmosphere, chemosphere, and hydrosphere.
- ii. All organic materials on the surface of the earth belong to the lithosphere.
- iii. Environment is static in nature.
- iv. Biosphere includes all microbes except fungi.
- v. All types of water present in the earth belong to the hydrosphere.

2. A contaminant is

- i. Any substance introduced into the environment that adversely affects the usefulness of a resource.
- ii. Any substance or energy introduced by the human into the environment that adversely affects the usefulness of a resource.
- iii. Any substance or energy introduced into the environment that beneficially affects the living beings.
- iv. Any substance or energy introduced into the environment that adversely affects the usefulness of a resource.
- v. Any substance or energy introduced into the environment that beneficially affects the natural resources.

3. Select the correct answer based on the given statements.

- A. The amount of dissolved gases in the aqueous solutions depends on the atmospheric pressure and the temperature
 - B. Dissolved oxygen concentration in water increases with the decreasing temperature.
 - C. The photosynthesis and the decomposition of organic matter can be considered as a very important dissolved oxygen source and a sink respectively.
- i. All statements are incorrect
 - ii. All statements are correct
 - iii. Only statements "A" and "B" are correct
 - iv. Only statements "A" and "C" are correct
 - v. Only statements "B" and "C" are correct

4. Carbon dioxide

- i. Solubility in water is less than that of oxygen.
- ii. Solubility in water is almost 30 times less than that of oxygen.
- iii. Absorbed by the oceans is estimated as 1/2 of carbon dioxide emitted by the human activities.
- iv. Concentration in deep water bodies is higher than the shallow water bodies.
- v. Concentration in water makes influences on the pH

5. The list "I" and "II" show the names of processes and the changing phases (in water), respectively. Select the correct answer that shows correct match of two lists.

List I

- A- Melting
- B- Evaporation
- C- Sublimation
- D- Condensation
- E- Freezing

List II

- 1- Solid to liquid
- 2- Liquid to gas
- 3- Liquid to solid
- 4- Gas to liquid
- 5- Solid to gas

- i. A-5, B-4, C-1, D-2, E-3
- ii. A-5, B-4, C-2, D-1, E-3
- iii. A-2, B-3, C-4, D-1, E-5
- iv. A-5, B-4, C-2, D-3, E-1
- v. A-1, B-2, C-5, D-4, E-3

6. Select the correct answer based on the given statements

- A. Consistent water motion in ocean can be measured using a current meter.
- B. Clod cards can be used to measure the water velocity.
- C. Watershed area of natural lakes is comparatively lower than reservoirs.

- i. All statements are incorrect
- ii. All statements are correct
- iii. Only statements "A" and "B" are correct
- iv. Only statements "A" and "C" are correct
- v. Only statements "B" and "C" are correct

7. Select the **correct** answer based on the given two statements

Statement A: Persistent, bioaccumulative toxic chemicals pose increased risk to human health because they are toxic, persistence and bioaccumulative chemicals.

Statement B: There are 12 persistent organic pollutants, at present, and they are included into PBT list also.

- i. Both statements A and B are individually true and B is the correct explanation of A
- ii. Both statements A and B are individually true but B is not the correct explanation of A
- iii. Statement A is true and B is false
- iv. Statement B is true and A is false
- v. Both two statements are false

8. Gravitational and pressure head of a well is 5 m and 15 m, respectively. Hydraulic head of the well is
- 20 m
 - 75 m
 - 3 m
 - 10 m
 - 15 m
9. Select the correct answer
- Vadose zone is the geological zones bellow the subsurface groundwater table.
 - Vadose zone is unsaturated zone and has a direct with ground water.
 - Vadose zone is generally anaerobic zone.
 - Vadose zone is not so important for the disposal of wastes.
 - Only anaerobic microorganisms are active in vadose zone.
10. A 150 g sample of a moist soil initially has a moisture content of 16% on a dry weight basis. What is the new moisture content (dry weight basis) if 15.5 g of water is uniformly mixed into the soil sample?
- 20.70%
 - 21.87%
 - 78.13%
 - 10.33%
 - 27.99%
11. Select the correct answer
- Particles in air and water are generally considered as physical contaminants and they are generated due to only human activities.
 - Organic particles in water reduce the BOD.
 - Particles in water can easily be removed by the addition of Na^+ .
 - Flocculation power of flocculants increases with the decreasing of its valence.
 - Flocculation is the main reason for the formation of river deltas.
12. Select the incorrect statement
- Exposure concentration of a chemical may differ from dose
 - Daphnia* may frequently be used in testing for the toxicity of potential aquatic pollutants.
 - Once a toxicant enters to the body, the actual effect of a toxic chemical on the target organ determine by absorption, distribution, excretion, and metabolism
 - Mutagens affect the DNA in a developing foetus, often causing gross abnormalities or severe deformities such as the shortening or absence of arms or legs.
 - Toxicity of a chemical is decided by its molecular shape or structure

13. The list "I" and "II" show types of pollutants and names of pollutants, respectively. Select the correct answer that shows correct match of two lists.

List I

- A- Physical
- B- Organic
- C- Biological
- D- Radioactive
- E- Inorganic

List II

- 1- Bacteria, virus, fungi
- 2- Nitrate, Cadmium, Mercury
- 3- Clay, asbestos, organic particle
- 4- DDT, PCB, CFC
- 5- Radon, Cobalt, Uranium

- i. A-3, B-5, C-1, D-4, E-2
- ii. A-3, B-4, C-1, D-2, E-5
- iii. A-2, B-3, C-4, D-5, E-1
- iv. A-3, B-4, C-1, D-5, E-2
- v. A-4, B-1, C-1, D-5, E-3

14.is the "ability" of the chemical to contaminate the medium of interest (soil, water, and air).

- i. Persistence
- ii. Pollution potential
- iii. Harmful effect
- iv. Advection
- v. Dispersion

15. is the process of transferring the contaminants from their original phase to other phases.

- i. Advection
- ii. Dispersion
- iii. Mass transfer
- iv. Degradation
- v. Volatilization

16. The major mass-transfer processes are

- i. Dissolution, Evaporation, Volatilization and Sorption.
- ii. Dissolution, Evaporation, Dispersion and Sorption.
- iii. Dissolution, Evaporation, Dispersion and Adsorption.
- iv. Dissolution, Evaporation, Advection and Sorption.
- v. Dissolution, Evaporation, Advection and Adsorption.

17. Velocity of water (V_w) divide by velocity of contaminant (V_c) is known as

- i. Adsorption factor
- ii. Henry's factor
- iii. Desorption factor
- iv. Separation factor
- v. Retardation factor

18. LD50 used for the evaluation of toxicity of chemicals is defined as

- i. the lethal dose for 50% of population of living beings
- ii. the lethal dose for 50% of an exposed population of living beings
- iii. the time taken to destroy 50 % of exposed population of living beings
- iv. the survival rate of fish exposed to inorganic contaminants
- v. the lethal dose of DDT, which is used for controlling mosquitoes

19. Select the correct answer based on the given statements

- A. Major steps in risk analysis are risk assessment, risk management and risk communication.
 - B. Major steps in risk assessment are hazard identification, dose response assessment, exposure assessment, and risk characterization.
 - C. It is accepted that there is a threshold chemical concentration for carcinogens, below which the chemical is not harmful.
- i. All statements are incorrect
 - ii. All statements are correct
 - iii. Only statements "A" and "B" are correct
 - iv. Only statements "A" and "C" are correct
 - v. Only statements "B" and "C" are correct

20. Select the correct statement

- i. A non-carcinogen health risk is expressed in terms of hazard quotient (HQ)
- ii. A carcinogen health risk is expressed in terms of hazard index (HI)
- iii. If the hazard quotient (HQ) is less than 10, no significant health risk can be expected.
- iv. Bioconcentration factors (BCFs) of chemicals are determined by the multiplication of the pollutant concentration in each animal by the contaminant concentration in water.
- v. If chronic daily intake (CDI) of a chemical is less than the reference dose (RfD), the health risk is significant.

21. Select the correct answer based on the given statements

- A. The first step in remediation of a contaminated site is the site characterization.
 - B. Containment is one of the important remediation process in which contaminant movement is restricted to a specified location to prevent further spreading
 - C. The pump-and-treat process can be used to remediate the contaminated groundwater.
- i. All statements are incorrect
 - ii. All statements are correct
 - iii. Only statements "A" and "B" are correct
 - iv. Only statements "A" and "C" are correct
 - v. Only statements "B" and "C" are correct

22. If microorganisms capable of biodegrading the target contaminants are not present in the subsurface at the site, specific microorganisms are injected into the subsurface. This process is known as

- i. Bioventing
- ii. Biodegradation
- iii. Vitrification
- iv. Biosparging
- v. Bioaugmentation.

23.is the process of irreversible loss of fertile top soil, vegetation, and nutrient cycling from the soil of the world due to the overuse of land.

- i. Deforestation
- ii. Overgrazing
- iii. Salinization
- iv. Desertification
- v. Reclamation

24. National environmental protection act of number 47 was enacted in

- i. 1948
- ii. 1978
- iii. 1980
- iv. 2000
- v. 2005

25. Select the correct answer based on the given statements

- A. Major concerned groups in environmental pollution and prevention are general public, non-governmental organization, and governmental institutions.
- B. Human health improves when the environmental pollutions are reduced.
- C. Multidisciplinary research approach is more suitable for the environmental researches.

- i. All statements are incorrect
- ii. All statements are correct
- iii. Only statements "A" and "B" are correct
- iv. Only statements "A" and "C" are correct
- v. Only statements "B" and "C" are correct

@@@@@@@@@@@@@@@@