KATHMANDU UNIVERSITY
End Semester Examination
September 2024

Marks Scored:

Level : B.E.
Year : I

Course : MNEG 102
Semester : II

Exam Roll No. :

Time: 30 mins.

F. M. : 10

22 SEP 2024

Registration No.:

Date :

SECTION "A"
[20Q. × 0.5 = 10 marks]

Choose and encircle the most appropriate answer.

1. Nitrogen fixation from the atmosphere occurs mainly due to process of
   a. nitrification and denitrification processes
   b. electrochemical and photochemical fixations
   c. ammonification
   d. immobilization

2. The principle of ecology based on which accumulation of various elements and compounds occurs along the food chain can be well explained by the principle of
   a. homoeostatis b. tolerance c. biomagnification d. limiting factor

3. In environmental engineering, tools for modelling the production, transport and fate of pollutants in the environment has been developed primarily with the concept of
   a. mass balance b. energy balance
   c. principles of thermodynamics d. dynamism

4. The physical environment is divided into following spheres
   a. Atmosphere, Hydrosphere and Biosphere
   b. Hydrosphere, Lithosphere and Biosphere
   c. Atmosphere, Lithosphere and Hydrosphere
   d. Atmosphere, Lithosphere and Biosphere

5. In a streamflow, the dry weather flow that result from the seepage of groundwater out to stream banks is called
   a. base flow b. abstraction c. overflow d. interception

6. A mass curve of rainfall is always a rising curve and may have some horizontal sections which indicates periods of
   a. constant rainfall b. maximum rainfall c. varying rainfall d. no rainfall

7. Which of the following water quality parameter is determined by the chemical analysis?
   a. Turbidity b. Colour c. Hardness d. odour

8. The key oxygen demanding water pollutants are
   a. dissolved salts b. fungicides
   c. inorganic suspended particles d. biodegradable organic matter

9. The most common method of sewerage system adopted in context of Nepal is
   a. combined system b. partially combined system
   c. partially separate system d. separate system

10. Which of the following is not the source of grey water?
a. Urinals b. Kitchen c. Bathroom d. Laundry

11. The cyclone unit used for the removal of particulate matter from the polluted air mainly relies on
a. imparting centrifugal force to particles
b. inducing charge to the particles
c. reversing the direction of flow of particles
d. absorption and adsorption properties of particles

12. Which of the following gas is the principal photochemical oxidant?
a. CO_2 b. CO c. NH_3 d. O_3

13. The reference sound intensity level taken for the calculation of sound intensity level during sound measurement is
a. 10^{-12} W b. 12^{-10} W c. 10^{-12} W/m^2 d. 12^{-10} W/m^2

14. Which of the following method of hazardous waste management will not produce potential harmful by-products such as chemicals or air pollutants?
a. Encapsulation b. Incineration c. Autoclave d. Safe Burial

15. Which type of waste collection system is commonly used in urban areas of Nepal?
a. Door to door b. On time c. Communal d. Road based

16. Which of the following dangerous gas escaped during the Bhopal gas tragedy?
a. Arsine b. Carbonyl sulfide c. Methyl isocyanate d. Ethylene oxide

17. Minamata disease is mainly caused by poisoning of mercury by the consumption of large quantity of
a. polluted water b. contaminated vegetables
c. polluted air d. fish and shellfish

18. Which of the following mathematical model will not predict the degree to which a random events and effects play a major role in the target system?
a. Deterministic model b. Inverse mode model
c. Stochastic model d. Probabilistic model

19. Which of the following is the key demerit of bioengineering?
a. Requires skill manpower for implementation
b. Takes times to reach the maximum strength
c. Requires variety of species
d. Overall process is expensive

20. In GIS system, which of the following data describes both geospatial and attribute data?
a. Alpha data b. Beta data c. Delta data d. Meta data

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Level : B.E.
Year : I
Time : 2 hrs. 30 mins.

22 SEP 2024

Course : MNEG 102
Semester : II
F. M. : 40

SECTION "B"
[8Q. × 5 = 40 marks]

Attempt *ANY EIGHT* questions. *Elaborate the answer with the use of appropriate examples.*

1. Define the term ecosystem. Explain the nitrogen cycle in detail. [1+4]

2. Briefly explain the material balance in an environmental system. Explain the environmental economics in relation to the mining projects. [2+3]

3. Draw a well labelled diagram showing a complete hydrological cycle. A lake with average surface area of 4000 hectare had a water surface elevation of 303.600 m above datum. In that month the lake received an average inflow of 4.2 m^3/s from surface runoff sources and outflow from the lake had an average value of 4.6 m^3/s. Further, in that month, lake received a rainfall of 152 mm and evaporation from the lake surface was estimated as 590 mm. Write the water budget equation for the lake and calculate the water surface elevation of the lake at the end of the month. [1+4]

4. List out the key objectives of any water supply project. Draw a schematic diagram showing the various processes involved in a surface water purification plant. The population of a locality as obtained from census report is as follows: [3+2]

Year	1992	2002	2012	2022
Population	1,50,000	3,50,000	7,60,000	16,90,000

Estimate the population of the town in the year 2052 AD by projecting the population by the geometric increase method.

5. Explain in brief the decentralized approach for the wastewater treatment. Explain the subsurface type of constructed wetlands with the help of appropriate figures. [2+3]

6. Explain any one of the key air pollutant that will be regularly generated during the mining process. What control measure will you suggest for it control? Explain the measures in brief. [2+3]

7. Explain L_N concept used in noise rating system. What measures could be taken in order to control the noise pollution from the mining plant to the workers and nearby community? Explain the measures in brief. [2+3]

8. One should promote the composting process for solid waste management. List out the possible reasons behind it. How would you manage the hazardous waste generated during the mining process? Explain one of the most appropriate method for it. [3+2]

9. Explain the significances of environmental mathematical modelling in mining engineering. Explain the acid deposition process in brief. [2+3]

10. Briefly explain the key functions of bioengineering structures.Explain how you would apply the remote sensing system during the various stages of mining project for making overall project efficient and economic. [2+3]