U.G. 6th Semester Examination-2021

ENVIRONMENTAL SCIENCE

[HONOURS]

Discipline Specific Elective (DSE)

Course Code : ENVS-H-DSE-L-03B

(Instrumental Techniques for Environmental Analysis)

Full Marks : 40 Time : $2\frac{1}{2}$ Hours

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

1. Answer any **five** of the following: 2×5=10
   a) Differentiate between BOD and COD.
   b) State the principle of flame photometry.
   c) What do you mean by noise threshold limit?
   d) What are the two steps for treating auto emissions in a catalytic converter?
   e) How is the pH of water/ soil sample measured?
   f) What is gravimetric analysis?
   g) What do you mean by cold trapping?
   h) State the significance of Carbon-14 dating.
2. Write short notes on any **two** of the following: 5×2=10
   a) Noise abatement and control techniques
   b) SO_2 monitoring
   c) Winkler method – Principle and application
   d) Gel electrophoresis – Principle and application
3. Answer any **two** of the following: 10×2=20
   a) Discuss the principle of operation of Geiger-Muller counter with a neat sketch/ block diagram. In 8 hours of environmental noise study the following steady noise levels were observed for the period indicated as; 1 hour at 66 dB(A), 2 hours at 58 dB(A), 2 hours at 50 dB(A), 1 hour at 45 dB(A) and 2 hours at 63 dB(A). Calculate the equivalent continuously sound pressure level (L_{eq}) for the given 8 hours period. What do you mean by noise pollution level (L_{NP})? 4+4+2=10
   b) What are the different categories used to classify air pollutants for measurements? How is NO_x monitored through spectrophotometric technique? Explain the most common technique for sampling air particulate matter. 3+4+3=10
   c) What are the sample preservation techniques for the following water quality parameters : phosphate, nitrate, sulphide and cyanide? State and explain the principle of estimation of total

hardness (Ca & Mg) of water. Describe the spectrophotometric method for estimation of fluoride in water/ soil sample.

4+3+3=10

d) Explain the AAS method for estimation of As with an appropriate schematic arrangement for the determination. Sketch and explain the gas chromatographic determination of carbon monoxide. 5+5=10

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