

**U.G. 5th Semester Examination-2021****ENVIRONMENTAL SCIENCE****[HONOURS]****Discipline Specific Elective (DSE)****Course Code : ENVS-H-DSE-L-02B****(Waste and Wastewater Management)**

Full Marks : 40

Time : 2½ 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:  $2 \times 5 = 10$
- State two main differences between domestic and industrial wastewater.
  - Why wastewater reuse is important for environmental protection?
  - What is the aerobic method of mechanical composting practised in India?
  - Categorize the following types of solid wastes under municipal, industrial, hazardous and biomedical :
    - kitchen waste, (ii) construction waste,
    - sharps and (iv) paints and solvents

- What is meant by 'resource recovery'?
- Mention the processing steps required to produce RDF.
- What is the environmental significance of composting?
- Why "close looping" is significant in waste management?

2. Answer any **two** of the following:  $5 \times 2 = 10$ 

- When a waste can be considered as hazardous? Briefly describe the transportation of hazardous waste under Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2016  $2+3=5$
- What do you mean by Waste Management Hierarchy? Write about principles of integrated waste management.  $2+3=5$
- Write the principle of anaerobic digestion in solid waste treatment. Illustrate with suitable reactions how reductive dehalogenation helps to convert toxic organochlorine pesticides into less toxic forms.  $2+3=5$
- Differentiate between hazardous and non-hazardous wastes.  $5$

3. Answer any **two** of the following:  $10 \times 2 = 20$
- a) What do you mean by 4R concept in resource recovery of waste? State the objectives of advanced green technologies for wastewater treatment. How wastewater is treated with the help of bioreactors?  $3+4+3=10$
  - b) Briefly describe the thermal treatment processes of waste materials. Mention two drawbacks in industrial waste management techniques.  $8+2=10$
  - c) Elaborate on the impacts of landfill leachate on soil characteristics and groundwater pollution.  $10$
  - d) Why is treatment of wastewater necessary? Describe some secondary wastewater treatment processes. Mention the different water quality criteria under designated best use classes as recommended by CPCB, 2017.  $2+4+4=10$
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