

## Model Question Paper -1 with effect from 2020-21(CBCS Scheme)

USN

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### Fifth Semester B.E. Degree Examination INDUSTRIAL POLLUTION CONTROL

TIME: 03 Hours

Max. Marks: 100

- Note:
1. Answer any FIVE full questions, choosing at least ONE question from each MODULE.
  2. Draw sketch, flow diagrams wherever required.
  3. Additional details, if needed, maybe suitably assumed.

| Module – 1        |            |  |    |
|-------------------|------------|--|----|
| <b>Q.1</b>        | <b>(a)</b> | Explain the effect of environmental pollution on man, animal, and plant life.  | 10 |
|                   | <b>(b)</b> | Explain the biosphere and layers of the atmosphere. What are the factors influencing the hydrological and nutrient cycles?   | 10 |
| <b>OR</b>         |            |  |    |
| <b>Q.2</b>        | <b>(a)</b> | Why treat water and wastewater? List the effects of sewage on receiving surface water body.  | 10 |
|                   | <b>(b)</b> | Mention six important environmental legislations Write a note environmental (protection) act, (1986).  | 10 |
| <b>Module – 2</b> |            |  |    |
| <b>Q.3</b>        | <b>(a)</b> | Write a note on the chemical treatment of industrial effluents. (Adsorption and Ion Exchange)  | 10 |
|                   | <b>(b)</b> | Briefly explain nutrient removal and stabilization ponds.  | 10 |
| <b>OR</b>         |            |  |    |
| <b>Q.4</b>        | <b>(a)</b> | Explain with a neat sketch activated sludge treatment used in industrial effluent treatment.   | 10 |
|                   | <b>(b)</b> | Write a note on the effluent treatment plant essential components at an integrated pulp and paper manufacturing plant.   | 10 |
| <b>Module – 3</b> |            |  |    |
| <b>Q.5</b>        | <b>(a)</b> | Classify air pollutants. Describe sources of different air pollutants explain with suitable examples.  | 10 |
|                   | <b>(b)</b> | Discuss the impacts of air pollution on human health and vegetation.   | 10 |
| <b>OR</b>         |            |  |    |
| <b>Q.6</b>        | <b>(a)</b> | What are the different types of plume behavior?  | 10 |
|                   | <b>(b)</b> | A Phthalic anhydride $C_6H_4(CO)_2O$ manufacturing plant uses a venturi scrubber to remove maleic anhydride vapors from the stack gases. With the help of a neat sketch, explain the constructional features, advantages, and disadvantages of venture scrubber. | 10 |

| <b>Module – 4</b>    |            |   |            |            |                 |            |          |                 |      |          |           |    |    |    |    |    |   |   |                      |      |       |       |       |      |       |     |
|----------------------|------------|---|------------|------------|-----------------|------------|----------|-----------------|------|----------|-----------|----|----|----|----|----|---|---|----------------------|------|-------|-------|-------|------|-------|-----|
| <b>Q.7</b>           | <b>(a)</b> | A wood processing industry employs a band saw for cutting logs (Timber wood). During cutting operation, the sawdust is scattered in the entire area around the sawmill, and the employees suffer from respiratory problems. A consultant has suggested cyclone separator as pollution control equipment for control of sawdust as air pollution. With the help of a neat sketch, explain the construction of cyclone separator and the advantages of using cyclone separator for sawdust collection.  | 10         |            |                 |            |          |                 |      |          |           |    |    |    |    |    |   |   |                      |      |       |       |       |      |       |     |
|                      | <b>(b)</b> | Explain different methods of sampling (ambient air sampling and stack sampling) of air pollutants. Explain with neat diagram working of a high volume sampler.  | 10         |            |                 |            |          |                 |      |          |           |    |    |    |    |    |   |   |                      |      |       |       |       |      |       |     |
| <b>OR</b>            |            |   |            |            |                 |            |          |                 |      |          |           |    |    |    |    |    |   |   |                      |      |       |       |       |      |       |     |
| <b>Q.8</b>           | <b>(a)</b> | Explain the problems due to emissions of petrol-driven vehicles and diesel-driven vehicles briefly.   | 10         |            |                 |            |          |                 |      |          |           |    |    |    |    |    |   |   |                      |      |       |       |       |      |       |     |
|                      | <b>(b)</b> | Suggest suitable air pollution control equipment for air pollution control for the Fluidized Bed Combustion Boiler (FBC) boiler used in the cement industry.  | 10         |            |                 |            |          |                 |      |          |           |    |    |    |    |    |   |   |                      |      |       |       |       |      |       |     |
| <b>Module – 5</b>    |            |   |            |            |                 |            |          |                 |      |          |           |    |    |    |    |    |   |   |                      |      |       |       |       |      |       |     |
| <b>Q.9</b>           | <b>(a)</b> | What is meant by generation rates? Discuss the estimation (Load count & Mass Volume analysis) & list any four factors affecting generation rates.   | 10         |            |                 |            |          |                 |      |          |           |    |    |    |    |    |   |   |                      |      |       |       |       |      |       |     |
|                      | <b>(b)</b> | Write a note on engineering and administrative noise controls in process industries.  | 10         |            |                 |            |          |                 |      |          |           |    |    |    |    |    |   |   |                      |      |       |       |       |      |       |     |
| <b>OR</b>            |            |   |            |            |                 |            |          |                 |      |          |           |    |    |    |    |    |   |   |                      |      |       |       |       |      |       |     |
| <b>Q.10</b>          | <b>(a)</b> | Explain the factors that must be considered in evaluating potential landfill sites. With neat sketch explain the construction and operation of engineering landfill with advantages and disadvantages   | 10         |            |                 |            |          |                 |      |          |           |    |    |    |    |    |   |   |                      |      |       |       |       |      |       |     |
|                      | <b>(b)</b> | Estimate the energy content of the solid waste sample with the following composition. Assume moisture content = 21%, Ash content = 5%. What is the energy content on a dry basis and on an ash-free dry basis?<br><table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Component</th> <th>Food waste</th> <th>Paper</th> <th>Card board</th> <th>Plastic</th> <th>Garden trimming</th> <th>Wood</th> <th>Tin cans</th> </tr> </thead> <tbody> <tr> <td>% by mass</td> <td>15</td> <td>45</td> <td>10</td> <td>10</td> <td>10</td> <td>5</td> <td>5</td> </tr> <tr> <td>Energy content KJ/Kg</td> <td>4650</td> <td>16750</td> <td>16300</td> <td>32600</td> <td>6500</td> <td>18600</td> <td>700</td> </tr> </tbody> </table> | Component  | Food waste | Paper           | Card board | Plastic  | Garden trimming | Wood | Tin cans | % by mass | 15 | 45 | 10 | 10 | 10 | 5 | 5 | Energy content KJ/Kg | 4650 | 16750 | 16300 | 32600 | 6500 | 18600 | 700 |
| Component            | Food waste | Paper   | Card board | Plastic    | Garden trimming | Wood       | Tin cans |                 |      |          |           |    |    |    |    |    |   |   |                      |      |       |       |       |      |       |     |
| % by mass            | 15         | 45  | 10         | 10         | 10              | 5          | 5        |                 |      |          |           |    |    |    |    |    |   |   |                      |      |       |       |       |      |       |     |
| Energy content KJ/Kg | 4650       | 16750   | 16300      | 32600      | 6500            | 18600      | 700      |                 |      |          |           |    |    |    |    |    |   |   |                      |      |       |       |       |      |       |     |

| Table showing Bloom's Taxonomy Level, Course Outcome, and Programme Outcome |  |   |   |                 |
|---|--|---|---|-----------------|
| Question  |  | Bloom's Taxonomy Level attached                     | Course Outcome                                | Program Outcome |
| Q.1   | (a)  | L1, L2, L3  | CO1   | 1,7             |
|   | (b)  | L1, L2, L3  | CO1   | 1,7             |
| Q.2   | (a)  | L1, L2, L3  | CO1   | 1,7             |
|   | (b)  | L1, L2, L3  | CO1   | 1,7             |
| Q.3   | (a)  | L1, L2, L3  | CO2   | 1,7             |
|   | (b)  | L1, L2, L3  | CO2   | 1,7             |
| Q.4   | (a)  | L1, L2, L3  | CO2   | 1, 7            |
|   | (b)  | L1, L2, L3  | CO2   | 1, 7            |
| Q.5   | (a)  | L1, L2, L3  | CO3   | 1,7             |
|   | (b)  | L1, L2, L3  | CO3   | 1,6,7           |
| Q.6   | (a)  | L1, L2, L3  | CO3   | 1,7             |
|   | (b)  | L1, L2, L3  | CO3   | 1,2,6,7         |
| Q.7   | (a)  | L1, L2, L3. L4                                      | CO4   | 1,2,7           |
|   | (b)  | L1, L2, L3  | CO4   | 1,2,6,7         |
| Q.8   | (a)  | L1, L2, L3  | CO4   | 1,7             |
|   | (b)  | L1, L2, L3. L4                                      | CO4   | 1,2,6,7         |
| Q.9   | (a)  | L1, L2, L3  | CO5   | 1,7             |
|   | (b)  | L1, L2, L3  | CO5   | 1,7             |
| Q.10  | (a)  | L1, L2, L3  | CO5   | 1,6,7           |
|   | (b)  | L1, L2, L3. L4                                      | CO5   | 1,2,7           |
| Bloom's Taxonomy Levels   | <b>Lower order thinking skills</b>             |   |   |                 |
|   | Remembering( knowledge): <i>L</i> <sub>1</sub> | Understanding Comprehension): <i>L</i> <sub>2</sub> | Applying (Application): <i>L</i> <sub>3</sub> |                 |
|   | <b>Higher-order thinking skills</b>            |   |   |                 |
|   | Analyzing (Analysis): <i>L</i> <sub>4</sub>    | Valuating (Evaluation): <i>L</i> <sub>5</sub>       | Creating (Synthesis): <i>L</i> <sub>6</sub>   |                 |

