Ex/PG/PE/T/1210B/2024

M. E. Power Engineering 1st Year 2nd Semester Examination. 2024

Subject: Environmental Engineering

Time Three Hours **Full Marks : 100**

Question 1. (CO1):

1a) Answer Any Ten **10x2= 20**

1. What is typical MRF operation for solid waste?
2. What are the different sizes of SPM?
3. Write down the sources of the following air pollutants: H_2S, NO, HF, H_2O_2, Hydrocarbon.
4. What are the effects of air pollution on human health?
5. What are the different control mechanisms to combat air pollution?
6. What are the different compositions of aerosol?
7. What are the different Ozone precursors gases?
8. How metals present in aerosol are detected?
9. What is Kyoto Protocol?
10. What is ICP?
11. What are the sources of lead in air and water?
12. What is Adsorption of air pollution by solids?
13. What is Catalytic oxidation?
14. How tower diameter is calculated?
15. How absorption by liquid is utilized for control of gaseous emissions?
16. What are the different types of wet scrubbers?
17. What is the expression of collection efficiency of ESP?
18. What is Incineration or Thermal Volume Reduction?
19. What is Pyrolysis or Destructive Distillation?
20. What are the different types of filters used in air pollution control?
21. What is Cyclone Separator?
22. What is Grab Sampling?
23. How particulate sampling is done?
24. How Sulphur Dioxide (SOx) measurement is done in stack gas?
25. What are the sources of Carbon Monoxide measurement in ambient air?
26. How Ozone measurement is done in Ambient Air?
27. How Hydrocarbons measurement is done in ambient air?
28. What are the chemical compositions of photochemical smog?
29. What is Eutrophication?
30. What are methods of controlling thermal pollution?

[Turn over

1b) Answer any One **1x15 = 15**

1. An electrostatic precipitator for use with standard air containing dust particles of 1.5 µm diameter is in the form of a cylinder 0.3 m diameter and 2.5 m long. The volumetric flow rate of air is 0.085 m^3/s. If the electric field strength is 1,10,000 V/m and if the particle charge is 0.3 * 10^{-15} coulomb, compute the collection efficiency.
2. A plate-type electrostatic precipitator for use in a cement plant for removing dust particles consists of 10 equal channels. The spacing between the plates is 0.125m, and the plates are 2.5 m high and 2.5 m long. The unit handles 10,000 $m^3/hr.$ of gas. What is the efficiency of collection? What should be the length of the plates for achieving 99% collection efficiency if other conditions are the same?

Question 2. (CO2):

Answer Any Ten **10x2 = 20**

1. What is Water Table?
2. What is Ground Water Yield?
3. What are Aquifers or Water Bearing Strata?
4. What is Unconfined Aquifer?
5. What is Confined Aquifer?
6. What is Yield of Well?
7. What is Spacing of well?
8. What is Cone of Depression?
9. What is Circle of Influence?
10. What is Constant level Test or Pumping Test?
11. What are the sources of water pollution?

12. What are the effects of physical impurities in water?
13. What are the causes of chemical impurities of water?
14. How turbidity test is done?
15. How pH- value or Hydrogen-ion Concentration is measured in water?
16. What is Total Count Test?
17. What is the formula for Sedimentation?
18. What is Theory of Coagulation?
19. What is Theory of Flocculation?
20. What are the different chemicals used as Coagulants?
21. What are the different types of water filters?
22. What are the methods of disinfection of water?
23. What are the different forms of Chlorination?
24. How the temporary hardness of water is removed?
25. How permanent hardness can be removed from water?
26. What is Activated Carbon?
27. What is Electro-dialysis?

Question 3. (CO3):

3 a). Answer any Five **5x2 = 10**

1. What are the different methodologies of EIA?
2. What are different environmental attributes for ecology?
3. What are different environmental attributes for resources?
4. What are different environmental attributes for Human aspects?
5. What are different environmental attributes for Economics?
6. What are the different methods for preparation of Environmental Impact Statement (EIS)?
7. What are environmental impacts of urbanization?
8. What are the environmental impacts of industrialization?

3 b). Answer Any Two **10x2 =20**

1. Write down the general factors for EIA of a big Hydro-Electric project in mountain region.

2. Write down the general pathways for EIA of a big Pumped Storage Hydro project.
3. Write down the general methodologies for EIA for coal based supercritical thermal power plant.
4. Write down the general methodologies for EIA for a big nuclear power plant.

Question 4. (CO4):

Answer Any Five **5x3 = 15**

1. What is Spray Ponds?
2. How ammonia is arrested in a Thermal Power Plant?
3. How SOx and NOx is arrested in the Thermal Power Plant?
4. How the height of a chimney is determined?
5. How waste heat recovery is made inside a coal-based power plant to make the efficiency higher?
6. What is radiation shield for a Nuclear Plant?
7. What are the different techniques to minimize nuclear radiation?
8. What are the different control mechanisms to abating marine pollution?
9. How solid wastes are disposed of from a Thermal Power Plant?
10. What are the methods of controlling the high temperature water disposal from thermal power plant?
11. What are the methods of disposal of Nuclear waste?
12. How scrubber performance and efficiency correlation are made?