

**DIPLOMA IN SMART CITY
DEVELOPMENT AND MANAGEMENT
(DSCDM)**

**Term-End Examination
December, 2023**

**MIO-005 : SMART CITIES : SAFE WATER,
SANITATION AND SUSTAINABILITY**

Time : 3 Hours

Maximum Marks : 70

Note : *Answer any **seven** questions. All questions carry equal marks.*

1. (a) Discuss the major issues in smart city water supply. 5
- (b) Explain *five* layers model of SWAN. 5
2. (a) What is water auditing ? What are the components of water audit ? 5
- (b) Explain the various types of settling in sedimentation tank. 5
3. (a) Discuss combined and separate sewerage system. 5
- (b) List and explain the factors affecting the quantity of Dry Weather Flow (DWF). 5

4. (a) Discuss BOD and COD for sewage. 5
(b) What are the objectives of sewage treatment system ? 5
5. (a) Explain briefly design considerations related to the setting up of a sewerage system. 6
(b) Write environmental aspects to be considered while planning and designing a sewerage system. 4
6. Explain in detail the components that determine the physical characteristics and chemical characteristics of solid waste. 10
7. (a) Explain briefly different types of solid waste collection system. 5
(b) Define composting. Write the factors affecting composting process of solid waste components. 5
8. (a) What are the operational principles involved in landfills ? 5
(b) How can the biogas be made from the landfills ? 5
9. (a) What is the economical importance of value added products ? 5
(b) Write the advantages and disadvantages of biopesticides. 5

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10. Write short notes on any *four* of the following :

$$4 \times 2 \frac{1}{2} = 10$$

- (a) Bioethanol
- (b) Biofertilizers
- (c) Enzymes
- (d) Refuse Derived Fuel (RDF)
- (e) SCADA in water management