

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

Term-End Examination

December, 2022

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

Time : 3 hours

Maximum Marks : 70

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

1. (a) Explain four-fold path to be followed to meet the demand for potable water supply in a city. 6
- (b) What are the steps to be taken to manage the water shortages during drought ? 4
2. (a) Explain the steps to be taken to counter the threat conditions of water supply ? 4
- (b) What are the minimum standards of residual chlorine and turbidity in drinking water for emergency response ? 4
- (c) What is water auditing ? 2

- 3.** Explain unit operations and unit processes in water treatment in detail. 10
- 4.** (a) What is the purpose of planning and designing a sewage collection scheme ? Explain. 5
- (b) Discuss the factors to be considered while calculating quantity of Dry Weather Flow (DWF). 5
- 5.** Discuss any four chemical parameters of wastewater (sewage) in detail. 10
- 6.** (a) Discuss the purpose of providing sanitation facilities. 4
- (b) Explain the steps involved in the planning and design of a sewerage system. 6
- 7.** (a) Explain the need of solid waste management. State the problems which occur due to improper solid waste management. 7
- (b) Write a brief note on the role of ragpickers in Municipal Solid Waste Management (MSWM). 3

8. Compare the different chemical conversion technologies for solid waste management by discussing the principle involved, advantages and disadvantages. 10
9. (a) What are the different types of bio-fuels that can be obtained from solid waste ? 4
- (b) Discuss how syngas is converted to ammonia. 4
- (c) What is bio-hydrogen ? 2
10. (a) Discuss the design parameters to be considered while planning the landfill. 6
- (b) What are the benefits and limitations of value-added products ? 4
11. (a) What is bio-diesel ? What are the benefits of bio-diesel over fossil fuels ? 5
- (b) What are the applications of volatile fatty acids ? 3
- (c) What are enzymes ? 2
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