# B.M.S. College of Engineering, Bengaluru-560019

**Autonomous Institute Affiliated to VTU**

## August 2024 Supplementary Examinations

**Program: B.E.**                                                **Semester: IV**
**Branch: Civil Engineering**                         **Duration: 3 hrs.**
**Course Code: 19CV4PCWSE**                   **Max Marks: 100**
**Course:  Water Supply Engineering**

**Instructions**:  1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

| | | | **UNIT - I** | CO | PO | Marks |
|---|---|---|---|---|---|---|
| 1 | a) | | With the help of following data, estimate the future population of town in the year 2001,2011 and 2021 using Arithmetic, Geometrical and incremental increase method | 1 | 1 | **10** |

| Year | 1931 | 1941 | 1951 | 1961 | 1971 | 1981 | 1991 |
|---|---|---|---|---|---|---|---|
| Population | 12000 | 16500 | 26800 | 41500 | 57500 | 68000 | 74100 |

| | | | | CO | PO | Marks |
|---|---|---|---|---|---|---|
| | b) | | Define Per capita demand. Explain the factors affecting per capita demand | 1 | 1 | **10** |
| | | | **UNIT - II** | | | |
| 2 | a) | | Briefly explain the various surface and sub-surface sources of water | 1 | 1 | **06** |
| | b) | | Define intake structure. Explain the factors to be considered for selection of site for locating a intake structure. | 1 | 1 | **06** |
| | c) | | A Centrifugal pump is driven by electric motor which lifts water to a total height of 50 m from the reservoir to discharge end. The pump efficiency is 77 % and the motor efficiency is 85 %. The lift is 300 m long and 10 cm diameter pipe and the pumping rate is 1500 L/min. If 4f = =0.025 and power cost is 25 paisa/ KW, what is the cost of power for pumping 4 ML of water. | 1 | 1 | **08** |
| | | | **UNIT - III** | | | |
| 3 | a) | | Mention maximum acceptable limits for the following and also explain their undesirable health effects, if the limit is exceeded in drinking water supply<br><br>(i)pH (ii) Turbidity (ii) Chlorides (iv) Nitrates (v) Fluoride | 2 | 1 | **10** |
| | b) | | Explain the objectives of water quality management | 2 | 1 | **04** |

| | | | | 2 | 1 | **06** |
|---|---|---|---|---|---|---|
| | | c) | Define (i) Safe and wholesome water (ii) Potable water (iii) Palatable water. | 2 | 1 | **06** |
| | | | **OR** | | | |
| 4 | a) | | Explain the various types of sampling | 2 | 1 | **06** |
| | b) | | Define Hardness. Explain in detail Temporary and Permanent hardness | 2 | 1 | **06** |
| | c) | | Briefly explain Water borne disease. | 2 | 1 | **08** |
| | | | **UNIT - IV** | | | |
| 5 | a) | | The average daily demand at a town has been estimated as 8 million litres per day. Design a suitable sedimentation, tank assuming a detention period of 5 hours and velocity of flow as 22 cm per minute. | 3 | 1 | **10** |
| | b) | | With neat diagram, explain the working principle of Circular sedimentation tank | 3 | 1 | **10** |
| | | | **UNIT - V** | | | |
| 6 | a) | | Explain the operational and maintenance problems in rapid sand filters | 3 | 1 | **10** |
| | b) | | Define (i) Post chlorination (ii) Pre chlorination (iii) Residual Chlorine (iv)De Chlorination | 3 | 1 | **04** |
| | c) | | With a neat sketch explain break point chlorination | 3 | 1 | **06** |
| | | | **OR** | | | |
| 7 | a) | | What is De Fluoridation? Explain any two methods of De Fluoridation | 3 | 1 | **05** |
| | b) | | Explain Grey water recycling and rain water harvesting techniques in detail | 3 | 1 | **10** |
| | c) | | Explain Microfiltration and Ultrafiltration. | 3 | 1 | **05** |

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