**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI**
**(END SEMESTER EXAMINATION)**

**CLASS: MUP** **SEMESTER : I**
**BRANCH: ARCHITECTURE AND PLANNING** **SESSION : MO/2025**

**SUBJECT: AR609 URBAN INFRASTRUCTURE PLANNING**

**TIME: 3 Hours** **FULL MARKS: 50**

**INSTRUCTIONS:**
**1. The question paper contains 5 questions each of 10 marks and total 50 marks.**
**2. Attempt all questions.**
**3. The missing data, if any, may be assumed suitably.**
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
**5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.**

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| Q.1(a) | List the various components and sub-components of 'Urban Infrastructure'. | [5] | 1 | 1 |
| Q.1(b) | Explain the role of PPP Model in the development of urban infrastructure projects, with a suitable example. | [5] | 2 | 3 |
| Q.2(a) | Explain with the help of a flowchart, the treatment process of turbid surface water with organics for a metropolitan city. | [5] | 2 | 2 |
| Q.2(b) | Settlement houses a population of 6,000 stretched over 2.0 kms having a population density of 250 persons per acre. Calculate-<br>(i) the diameter of the water supply pipe and<br>(ii) the height of the overhead water reservoir, making required considerations so that water may be supplied at the same rate to all parts. The type of distribution system and the related data may be suitably assumed. Assume the following:<br>water demand= 150 lpcd, water supplied 2 times for 2 hours daily,<br>velocity of water in pipes= 0.9 m/sec, minimum pressure= 15.0 $N/cm^2$<br>gravitational constant=9.81 $m/sec^2$<br>frictional coefficient =0.01<br>Density of water= 9810 $N/m^3$ | [5] | 4 | 5 |
| Q.3(a) | Write a short note on the 'trickling filter' with reference to the wastewater treatment process. | [5] | 2 | 2 |
| Q.3(b) | Explain the UASB (Upflow Anaerobic Sludge Blanket) method of wastewater treatment process for a medium size city, with the help of a proper flow diagram. | [5] | 2 | 3 |
| Q.4(a) | Discuss the various functional elements associated with the solid waste management of a city. | [5] | 2 | 2 |
| Q.4(b) | Discuss the various factors to be considered while selecting the dumping site for solid waste for a city. | [5] | 3 | 4 |
| Q.5(a) | Discuss the basic approach to general distribution of electric power in towns and cities. | [5] | 2 | 2 |
| Q.5(b) | Calculate the average spacing of streetlights of average lux 6, having illumination of 600 lumen, for a road with a crown, having right of way width of 7.5 m, for a mounting height of 10.0 m. Assume the value of coefficient of utilization= 0.50 and maintenance factor= 0.75. | [5] | 4 | 5 |

**::::::25/11/2025::::::E**