

"Heaven's Light is Our Guide"

Rajshahi University of Engineering & Technology

Department of Civil Engineering

4th year 7th semester examination 2016



CE-441

Environmental Engineering-II

MEJBAUL ISLAM

CE-120003

SEC: A

Environmental Engineering-II

CE-441

Wastewater collection, Primary treatment, Secondary treatment

1. Describe the procedure of estimation of waste water design flow according to Melbourne and Metropolitan Board of Works. **14**
2. Briefly describe the separate system and combined system of sewerage. Write down the conditions favorable for separate system. **14**
3. Write down the conditions which are favorable for a separate system and favorable for a combined system. **12**
4. What are the basic elements of conventional sewerage system? Compare the merits and demerits of separate sewerage system. **08**
5. Compare the merits and demerits of separate and partially combined/combined sewerage system for waste water collection. Which method do you suggest for Rajshahi City? Explain. **07,06,05**
6. As you an environmental engineer, do you think combined sewerage system is suitable for Rajshahi City Corporation? Give reasons on your opinion. **08,07**
7. Differentiate between conventional sewerage system and small bore sewerage system. Justify the scope of introducing small bore sewerage system in Bangladesh. **11,08**
8. What are the technical advantages of small bore sewerage systems over a conventional sewerage system? **10,08,05**
9. What do you mean by Dry Weather flow (DWF)? What are the factors that affect DWF? **05**
10. What factors bring in significant cost savings in small bore sewerage system? **10**
11. Briefly describe the factors are to be carefully considered for selection of sewers materials. **14**
12. Why the sewers are to be laid at continuous gradient in downward direction? **09**
13. Briefly describe the factors that must be considered in the selection of sewerage system. Which system do you suggest for RUET & why? **10**
14. Briefly discuss the factors that influence the estimation of wastewater flows for the design of sanitary sewer system. Outline the procedure of estimating design wastewater flow. **12**
15. Write short notes on: (i) Sullage & (ii) Peak factor. (iii) Screens. (iv) Grit chamber (v) Skimming tank. (vi) lamp holes. (vii) clean outs. (viii) Comminutor. **10,07,06,05**
16. Differentiate between influent and effluent. **07,06**
17. What do you mean by 30-20 standard sewage effluent? **05**
18. Briefly discuss sewers of different materials. **13**
19. What do you mean by sewer? Describe the different sewer sections with necessary sketches. **11,06**
20. Why circular section is considered better than other sections? **06**
21. What are the factors which are considered while determining the quantity of dry weather flow? **11**
22. Describe the laying and testing procedures of sewers and state the points to be carefully attended during this process. **14,13**
23. Why sewage needs treatment? What are different phases of sewage treatment? **06**

24. What are the various treatment processes of waste water? Write down the basic features of composting latrine. **08**
25. Describe with special references the purpose, nature of grit, number & location of grit chamber in primary treatment of wastewater. Discuss briefly the design aspects of it. **13,11**
26. What do you mean by detritus tanks? What are the uses of detritus tanks? **06**
27. What is industrial waste? Mention the important characteristics of industrial waste. **11,10,09,08,07,04**
28. How the problems of treatment of industrial wastes are tackled? **07,04**
29. Describe the biological treatment process of industrial waste. **09**
30. What are the objectives of plain sedimentation? Discuss the various aspects of primary clarifiers. **13,12,08**
31. Briefly discuss the sedimentation process. **12,08**
32. What are the factors that affecting sedimentation process? **10**
33. What do you mean by sludge? What is the necessity of sludge disposal? How is the sludge disposal off by method of disposal on land? **13,09,08,07**
34. Enumerate the various methods of sludge disposal. **07**
35. Draw a net sketch of lagoon and explain lagooning as a method of sludge disposal. **08**
36. Introduce the micro-organisms important for wastewater treatment. **13**
37. What are the purpose of installing sedimentation tank in the sewage treatment plant? **11,10**
38. What is coagulation? Critically examine the process of coagulation of sewage. **10,09**
39. What is coagulant and coagulation? **09,04**
40. Write down the advantages and disadvantages of coagulation process in sewage treatment plant. **11,06**
41. Draw a flow diagram of complete sewage treatment plant and describe the activities of its various units. **04**
42. Write down the role/importance of micro-organisms in wastewater treatment. Classify them based on their energy and carbon source. **12,10**
43. Discuss the various phases of bacterial growth with growth curve/in terms of cell number. **13**
44. Write down the technical advantages and economic considerations SBS system. **14,13**
45. What is SBS system? Why self-cleansing velocity is not required in SBS system? **12,08**
46. What is self-cleaning velocity and non-scouring velocity? What are the basic of providing self-cleaning velocity and non-scouring velocity in the design of sewers? **09,07,06**
47. What is the importance of self-cleaning velocity? **07,06**
48. Briefly discuss the aerobic, anoxic and anaerobic decomposition of organic matter. **12**
49. How does trickling filter works? **10,07,06,05**
50. Explain the principles of biological waste treatment process. Out line the differences between aerobic oxidation and anaerobic digestion processes of waste treatment. **05,04**
51. What is meant by secondary treatment of sewage? Mention the design aspects of trickling filters. **11**
52. Discuss about the trickling filter with its advantages and disadvantages. **14,10,07**
53. Describe the working principle of two-stage trickling filter with flow diagram. **13,10,09**

54. Draw the flow diagram of single stage and two stage trickling filter treatment plant. **07,06,05**
55. Briefly discuss the objectives of biological treatment of wastewater. Describe the processes of decomposition. **14**
56. What is the difference between unit operation and unit process? **04**
57. What is activated sludge process? **10**
58. Explain the basic operations involved in the activated sludge process with the help of a flow diagram. **14,10,09,07,04**
59. Write down the advantages and disadvantages of activated sludge process. **13**
60. Explain the factors that affect the sludge digestion process in brief. **13**
61. Write short note on aquaculture in wastewater treatment. **13**
62. What do you mean by aquaculture? Describe the significance of aquaculture from engineering point of view. **09,07,06,05,04**
63. Describe the skimming tanks with special reference to their purpose, design aspects and disposal of floating substances. **12,09**
64. What do you mean by sludge bulking? What are the influencing factors for the development of sludge bulking? **08,07,06,05**
65. Write down the reasons of sludge bulking. What are S.V.I and S.D.I? **12,08**
66. Compare the activated sludge process and trickling filter system. **12**
67. State the properties of activated sludge. **11**
68. Write down the advantages and disadvantages of oxidation pond. **08**
69. Discuss the various types of waste stabilization ponds. **12,11,04**
70. Write short notes on: (i) Imhoff tank (ii) SVI.
71. Define a grease and oil trap. Explain its principle of working and mention the reasons for excluding grease and oil from sewage. **08**
72. What is biogas? **05,04**
73. Discuss in brief the factors that affect fermentation process in the biogas fermentation. **07,05,04**
74. What do you mean by Biogas digester? Name the different types of Biogas digester with sketches. **06**
75. Explain the symbiotic relationship between bacteria and algae in a facultative stabilization pond. **06**
76. State and prove Marai's theorem? **04**
- Introduction & Sanitation**
77. What are the principal objectives of sanitation? Briefly describe the various problems of sanitation faced in Bangladesh. **14,10,08,07,05,04**
78. Describe the sanitation practice at rural areas in Bangladesh. How can it be improved? **07,04**
79. "The topic of environment has gained extraordinary importance in the recent past"-why? **08**
80. What is sanitation? How sanitation can improve the quality of living in a community? **09**
81. What are the objectives of sanitation? Describe the route of transmission of excreta-related diseases. **11**

82. Explain the role of sanitation in controlling the transmission of excreta-related diseases. **11,10**
83. How do socio-economic aspects influence the water supply, sanitation and health education facilities? **13**
84. Explain the role of water, sanitation & hygiene education in improvement of public health. **12**
85. Give five examples of water related diseases and discuss their causes of occurrence and routes of transmission. **12**
86. What is environmental sanitation? How sanitation can improve the quality of living in a community? **12,07,05**
87. List some common infectious diseases that are transmitted due to lack of proper sanitation. **05**
88. What is environmental sanitation? Briefly describe the sanitation systems with respect to human waste management. **11,10**
89. What is meant by hygienic education? Hygiene education is an important component of water supply and sanitation system. Explain it. **09,07,04**
90. What are the differences between conventional and more successful hygienic education program. **07**
91. Relate sanitation system with the availability of water supply system. **04**
92. Give three examples of faecal-disease transmission. **04**
- On-site human waste management**
93. Briefly discuss the technical aspects of compost latrines. What factors may restrict its successful application in Bangladesh? **14,13,10,05**
94. Briefly discuss the various types of compost latrines. **04**
95. Describe with example the on-site and off-site sanitation system. **08,07,04**
96. Distinguish between communal sanitation and public toilet facilities. What is the primary reason for failure of such communal and public sanitation facilities? How can these services be made sustainable? **14,12,11,07,05**
97. What are the advantages and disadvantages of communal sanitation system? **10,07**
98. How can you solve the problems of single-pit VIP latrines by the alternating twin-pit VIP latrines? **10,09**
99. Describe the VIP latrine with its design consideration. **14,13,10**
100. Briefly discuss the suitability of a conventional pit latrine. How can the main disadvantages of a simple pit latrine be improved in a VIP latrine system? **12**
101. What are the basic elements of a VIP latrine technology? How can the main disadvantages of simple pit latrine be improved in a VIP latrine system? **11,08,05**
102. What variations does the ROEC have from the VIP technology? Briefly describe the merits and demerits of ROEC. **11,07,06,05**
103. Classify the various types of pour-flash sanitation systems and discuss their relative advantages and disadvantages and their applicability. **12,10**

104. What are the basic improvement made in the pour flash sanitation technology compared to simple pit and VIP technology? What are the general consideration for pour flash latrines? **07**

Septic tank

105. Prepare a schematic diagram showing various components of a septic tank. Position the inlet and outlet devices carefully and explain how these can influence the septic tank operation. **14**
106. Discuss the various important processes that take place in a septic tank with neat sketches. Briefly describe the design procedure of a septic tank. **12,11,07,06,05**
107. What are the objectives of providing manholes in sewer line? Where is it located? **12,09,08**
108. What is manhole?**09**

Environmental Management

109. What do you mean by environmental management? **14,13,09**
110. What is global warming? **14,13,08**
111. How you can achieve the proper management of environment? **09**
112. What do you mean by environmental pollution? Briefly discuss the various steps in order to keep the environment friendly? **08**
113. Discuss in brief the preventive measures should be taken to have an effective control for pollution of water. **14,11**
114. Define air pollution. Explain the effects of air pollution in brief. **13**
115. “The air pollution has become one of the vital and challenging environmental problems of the modern society”- explain it. **09**
116. What do you mean by air pollution? Discuss the various sources of air pollution. **11**
117. Show the characteristic differences between air pollution and noise pollution. **09**
118. Describe briefly the effect of air pollution on the environment. **11**
119. What is environmental management? What are the main components of environmental management? **12**
120. What is pollutant? Classify the pollutants from ecosystem point of view. **10**
121. Explain in detail the concept of Green House Effect. **09**

Quality of Sewage

122. Define BOD & COD. What are the limitations of BOD test? **14,13,12,10,09,08,07,06,05**
123. Why BOD is always less than COD? **08**
124. How can you work out BOD of a sewage sample? **13**
125. Why BOD test is carried out? / Importance of BOD test? **12,10,09**
126. Why COD of sewage is higher than its BOD in general? Write the limitation of BOD test. **13,12,09**
127. What do you understand by first stage BOD? Deduce an expression for it. **14,06,05**