

B.E. (CIVIL) Part IV 7th Semester Examination, 2007

Environmental Engineering II (CE – 706)

Time : 3 hours

Full Marks : 100

Use separate answerscript for each half

Two marks are reserved for neatness in each half

FIRST HALF

Answer question 1 and any three questions from the rest.

1. (a) Draw the flow diagram of a water treatment plant treating turbid surface water. Mention briefly the purpose of each unit.
(b) Draw the flow diagram of a sewage treatment plant treating municipal sewage.
2. (a) What are known as 'free chlorine' and 'combined chlorine' in disinfection of water supply?
(b) Why efficiency of disinfection with chlorine is dependent on pH of the system?
(c) Compare chlorine and ozone as water disinfectants. (4+3+5)=12
3. (a) What type of ion exchange resin may be used for softening? How such resin may be regenerated?
(b) Why complete removal of hardness is not achievable by chemical precipitation method?
(c) What are the merits of ion exchange method of softening over chemical precipitation method? (5+3+4)=12
4. (a) What is stable suspension? How destabilisation can be achieved by addition of alum?
(b) Compare between alum and iron salts as coagulants in water treatment. (6+6)=12
5. (a) Why aeration is adopted in water treatment plants? Do you expect any change in pH during aeration?
(b) Distinguish between Type-I and Type-II sedimentation.
(c) "Depth is not a factor in determining the smallest particle that will be completely removed in a rectangular tank handling Type-I suspension" – Justify. (5+3+4)=12



- 6. (a) What benefits can be achieved by use of multi-media filters over single medium filters?
- (b) What are the differences of the sand bed (filter bed) used for slow sand and rapid sand filters?
- (c) Why better removal of microorganisms is achieved in slow sand filters compared to rapid sand filters?

$(4+5+3)=12$

SECOND HALF

Answer any three questions.

- 7. (a) List the various types of intake works. State the site selection criteria for intake works.
- (b) Draw the various types of joint and level them -
 - i) Spigot and socket joint, ii) Tyton joints, iii) Flanged joints.

$(7+9)=16$

- 8. (a) Classify the different distribution system based upon their methods.
- (b) Distinguish between 'Dead End System' and 'Grid Iron System'.
- (c) Show with sketches the 'pressure relief valves' and 'air relief valves'

$(5+4+7)=16$

- 9. (a) Define 'shallow well' and 'deep well'
- (b) Explain with sketches the 'inverted cone of depression' and 'circle of influence'.
- (c) List the common well development methods.

$(4+6+6)=16$

- 10. (a) Distinguish between separate and combined sewerage system.
- (b) Show with sketches the various pattern of collection system.
- (c) What do you understand by 'time of concentration'?

$(6+6+4)=16$

- 11. (a) Show the various types of 'drain sections' and 'sewer section'.
- (b) Draw the section of a 'drop man hole' and 'combined gutter and curb inlet with catchpit'.
- (c) What are the purpose of 'inverted syphon' and 'leaping weir'.

$(4+6+6)=16$

