KATHMANDU UNIVERSITY
End Semester Examination
July/August, 2024

Marks Scored:

Level : B.Arch.
Year : III

Course : CIEG 332
Semester : I

Exam Roll No. :

Time: 30 mins.

F. M. : 10

Registration No.:

Date : 07 AUG 2024

SECTION "A"

[20 Q. × 0.5 = 10 marks]

Choose and encircle in the most appropriate option from each set of choices

1. Out of Earth's total fresh water reserve, Ground water reserves contribute:
   a. 20% b. 25% c. 30%. d. 35%.

2. A simple and cheaper tube well that draws water from its all sides is:
   a. Strainer type tube well. b. Slotted type tube well.
   c. Cavity type tube well. d. Infiltration gallery.

3. The least allowable limit of (0.003mg/l) in our drinking water standard of Nepal is for:
   a. Cadmium. b. Lead c. Cyanide. d. Fluoride.

4. Diarrhea, dysentery and Typhoid are:
   a. Water borne diseases. b. Water washed diseases of.
   c. Water vector diseases d. Water based diseases.

5. 'Anthracite' is also used in water 'pressure filters' to remove:
   a. Flocks of colloids. b. Suspended ions.
   c. Odour, taste, and colour. d. Harmful chemicals.

6. To avoid cavitation in pump, the pressure at the suction pipe must be:
   a. Greater than vapour pressure. b. Greater than absolute pressure.
   c. Greater than the atmospheric pressure. d. Greater than delivery head.

7. For a constant rate of flow of water, friction increases:
   a. With increase in diameter of pipe. b. With decrease in diameter of pipe.
   c. With decreases in length of pipe. d. With decrease in velocity of water.

8. Springs are the drinking water source that come under:
   a. Surface water sources. b. Ground water sources.
   c. Artesian spring. d. Sea water source.

9. The pipes that bear extremely internal pressure but weak in external pressure is:
   a. Concrete pipes. b. Cast iron pipes. c. Steel pipes. d. PVC pipes.

10. The valve you must fit at the lowest end of the suction pipe of a pump is:
    a. Floating valve. b. Sluice valve. c. Ball valve d. Check valve.

11. The least Hydraulic radius among pipes below are is of:
    a. Circular pipe. b. Square pipe. c. Rectangular pipe. d. Trapezoidal pipe.

12. In the hot water central supply system, where circuit is long and chances of pressure loss is high, the best water supply system would be:
a. Down feed system. b. Up feed system and.
c. Reverse circulation system. d. Thermo-symphonic action

13. In a sedimentation tank for drinking water treatment, the settlement of flocks does not depends on:
a. Velocity of the water. b. Specific gravity of flocks.
c. Height of the tank. d. Area of the tank.

14. In the presence of proper sewage treatment plant, you do not need to construct a septic tank. As a designer, you will go for the following plumbing system for your two-story building.
a. Two pipe system. b. One pipe system
c. Single stake (partially ventilated) d. Single stake system

15. The minimum self-cleansing velocity of waste water recommended by NBC 208: 2003 is:
a. 0.5m/sec. b. 0.75 m/sec. c. 0.85 m/sed. d. 1.0 m/sec.

16. Residual head or remaining pressure (head) at the extreme end comes into existence when water is:
a. Filled in the tank and pipes. b. Flowing in the pipe
c. Under pressure of its own. d. Stagnant in the pipe.

17. In a bacteria-algal symbiotic relationship in oxidation pone algae produce oxygen for the microbes which in turn microbes produce:
a. O_2 and NH_4 for algae. b. O_2, NH_3, and P for algae.
c. CO_2, NH_3 and PO_4 for algae. d. O3, NH_4 and PO_4 for algae.

18. Anaerobic digestion of wastewater in septic tank produces following gases:
a. H_2S and CO_2. b. NH_3 and CH_4.
c. H_2S, CH_4 and CO_2. d. H_2S, NH_3 and CO_2.

19. In a threaded joint system of water supply pipes in a buildings is joined finally with the existing meter by:
a. Union b. Elbow c. Socket d. Plug.

20. For rainwater disinfection the chlorine can be added at following quantity:
a. 1.0 teaspoon per 200 litters. b. ½ teaspoon per 200 litters.
c. ¼ teaspoon per 200 litters of water. d. ¾ teaspoon per 200 litters.

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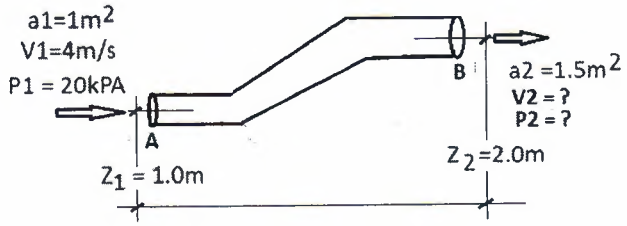
F. M. : 40

SECTION "B"

Attempt *ALL* questions.

1. Briefly describe the distribution of water on earth and surface water sources. [5]

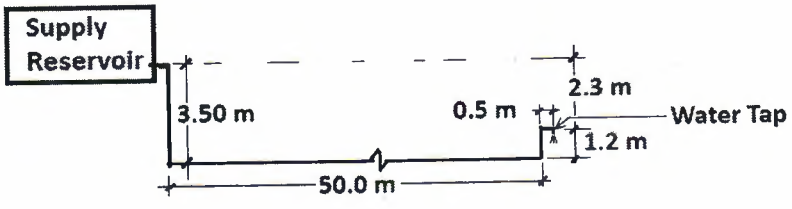
2. Water flows through a pipe as shown below. At point A water enters with the velocity of 4.0m/s with a pressure of 20kPA and passes through point B. If the area of pipe at A and B is 1.0m2 and 1.5m2 respectively, find the velocity and pressure at the point B. The height of the point A and point B from the datum are 1.0 and 2.0m respectively [Refer to the following figure]. [3+5=8]



3. Briefly describe any five processes of disinfection process that are feasible in mass drinking water treatment. [5]

4. You are required to design a public water tap at remote area from an existing water tank as shown below. The flow rate at the tap should be 0.15 litters/sec (0.00015 m^3/sec) and the residual head should be not less than 0.018 N/mm (1.8 meters of water column head). Hazen William's constant C=100 and relevant formulas are given below. [5]

$$HL = \frac{10.68 * L * Q^{1.85}}{d^{4.87} * C^{1.85}} \qquad d = \left[\frac{10.68 * L * Q^{1.85}}{H_L * C^{1.85}}\right]^{\frac{1}{4.87}}$$



5. Briefly describe Secondary / Biological Treatment process in the wastewater treatment. Also explain why Activated Sludge Process is important within this process. [5]

6. Write short notes on ***ANY THREE***. [4+4+4=12]
   a. Importance of water and its functions to a human body.
   b. Any three physical parameters of potable water as per quality standard of Nepal.
   c. Any two methods of population estimation for water supply projects.
   d. Functions of manholes in the sewerage system and places where they are provided.