Unit operation

BT/III/CBGS/Uo-I

QP Code : 4949

(3 HOURS) (MAX. MARKS : 80)

Note:

1. Question No. 1 is compulsory.
2. Attempt any three questions out of remaining five questions.
3. Assume suitable data wherever necessary.
4. Figures to right indicate full marks.

Q. 1 Answer the following (Any four) 20

a. Derive the equation of continuity.

b. Explain belt conveyor.

c. Discuss various types of fluids.

d. Define the following

i) Viscosity ii) Boundary layer thickness

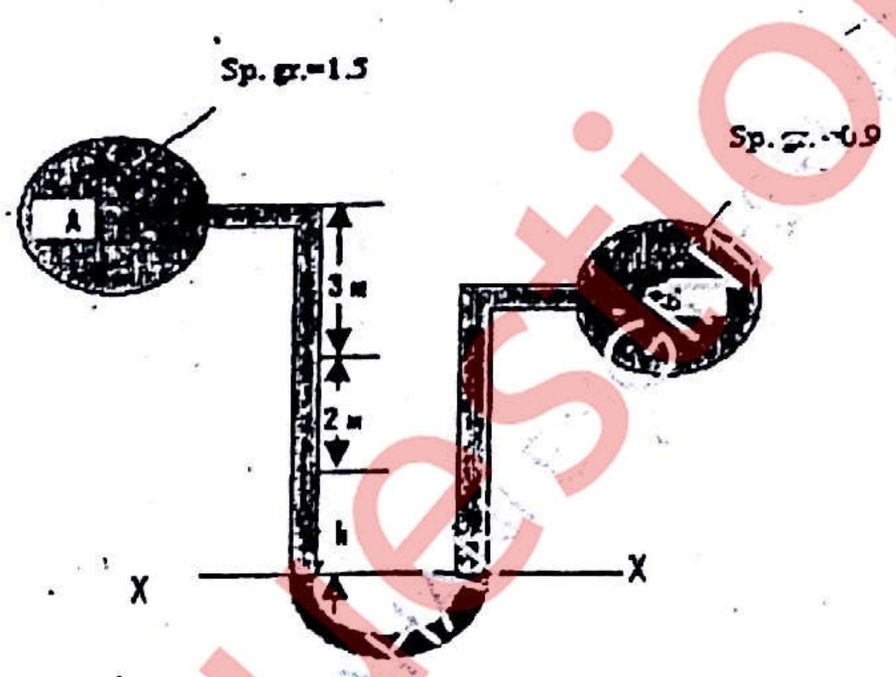
iii) Fanning friction factor iv) Screen effectiveness

e. Explain constant rate filtration.

Q.2 a. Derive the Bernoulli's equation for adiabatic process. 10

b. Derive the equation for pressure head for the fluid at rest. 10

Q.3 a. A differential manometer is connected at two points A and B as shown in figure. 10



Pipe A contains a liquid of specific gravity 1.5 while pipe B contains a liquid of specific gravity 0.9. The pressures at A and B are 9.8×10^4 N/m^2 and 17.658×10^4 N/m^2 respectively. Find the difference in mercury level in the differential manometer.

b. Water is flowing through a pipe AB one meter in diameter at 3 m/s and then passes through a pipe BC 1.2 m diameter. At C, pipe branches. Branch CD is 0.8m in diameter and carries one third of flow in AB. The flow velocity in branch [illegible] m/s. Find; 10

i) Volume rate of flow in AB

ii) Velocity in BC

iii) Velocity in CD

iv) Diameter of CE.

Q.4a. What are the types of pumps? Explain centrifugal pump.

b. Explain Kynch theory of sedimentation.

Q.5a. Explain orifice meter. Derive the equation for discharge through orifice meter.

b. Explain major and minor losses in pipes.

Q.6 Write a short note. (Any four)

a. Types of impellers

b. Pitot tube

c. Hammer mill

d. Boundary layer formation

e. Venturimeter