Q.P. Code: 24542

(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**)

   a.   Explain the rheological behaviour of fluid?

   b.   Write short note on Pneumatic conveyor?   5

   c.   Explain pitot tube in detail?   5

   d.   Differentiate between free settling and hindered settling?   5

   e.   Discuss the effect of roughness parameter on friction parameter?   5
     5

Q.2   a.   Discuss major and minor losses in pipe flow and write the expression for loss of   10
       head due to major losses?

   b.   The right limb of simple U-tube manometer containing mercury is open to the   10
       atmosphere while the left limb is connected to a pipe in which a fluid of specific
       gravity 0.9 is flowing . The center of pipe is 12cm below the level of mercury in
       the right limb. Find the pressure of fluid in the pipe if the difference of mercury
       level in the two limb is 20 cm?

Q.3   a.   Explain hydrostatic equilibrium and derive the expression for same?   10

   b.   Derive expression of bernoulli's theorem for compressible fluids under isothermal   10
       condition?

Q.4   a.   Water is flowing through a pipe AB 1m diameter at 3m/sec and then passes through   10
       a pipe BC 1.2m diameter. At C, the pipe branches. The branch CD is 0.8m in
       diameter and carries one third of the flow in AB. The flow velocity in branch CE
       is 2.5m/s. Find i) The volume rate of the flow in AB. ii) The velocity in BC. iii)
       The velocity in CD. iv) Diameter of CE.

   b.   Derive expression for coefficient of discharge for orifice meter.   10

Q.5 a. What is screen effectiveness? Derive the expression for same?   10

b. Calculate the operating speed of the ball mill from the following data: 5
diameter of ball mill = 500mm, diameter of ball = 40mm and operating speed is
50% of the critical speed of the mill.

c. Write short notes on cavitation and priming?   5

Q.6 Write a note on **any Four**

a. Inclined tube manometer   5

b. Rotameter   5

c. Fluid energy mill.   5

d. Constant rate and constant pressure filtration   5

e. Sedimentation   5