Q. P. Code: 24543

(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.   What are the particle size measurement techniques?   5

    b.   What are the various types of losses in pipes? How it can be calculated?   5

    c.   Derive continuity equation.   5

    d.   Discuss the types of fluids.   5

    e.   Write a note on Hammer mill.   5

Q.2   a.   Explain different laws of crushing.   10

    b.   A U- tube manometer is used to measure the pressure of water in a pipe line, which   10
is in excess of atmospheric pressure. The right limb of the manometer contains
mercury and is open to atmosphere. The contact between water and mercury is in
left limb. Determine the pressure of water in the main line, if the difference in level
of mercury in the limbs of U tube is 10 cm and the free surface of mercury is in
level with the centre of the pipe. If the pressure of water in pipe line is reduced to
9810 N/m^2, calculate the new difference in the level of mercury. Sketch the
arrangement in both the cases.

Q.3   a.   A venturimeter of 150 mm x 75 mm size is used to measure the flow rate of oil   10
having specific gravity of 0.9. The reading shown by U tube manometer connected
to the venturimeter is 150 mm of mercury column. Calculate the coefficient of
discharge for the ventirimeter if the flow rate is 1.7 m^3/ min. (Note: The size of
venturimeter generally specified in terms of inlet and throat diameters)

[TURN OVER]

    b.   Discuss Kynch theory of sedimentation.   10

Q.4   a.   What are the characteristics of centrifugal pump? Differentiate between pumps and   10
          blowers.

    b.   The water is flowing through a pipe having diameters 20 cm and 10 cm at section   10
        1 and 2 respectively. The rate of flow through pipe is 35 lit/s. The section 1 is 6m
        above datum and section 2 is 4m above datum. If the pressure at section 1 is 39.24
        N/m^2, find the intensity of pressure at section 2.

Q.5   a.   Find the head lost due to friction in a pipe of diameter 300 mm and length 50m,   10
        through which water is flowing at a velocity of 3m/s using Darcy formula and
        Chezy's formula for which C = 60. Take V for water = 0.01 stoke.

    b.   Discuss free and hindered settling.   5

Q.6   Write a note on any Four
    a.   NPSH   5
    b.   Screen effectiveness   5
    c.   Boundary layer formation   5
    d.   Screw conveyors   5
    e.   Newton's law of viscosity   5