# 17452

**21314**

**3 Hours / 100 Marks** Seat No. | | | | | | | | |

*Instructions* – (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

(8) Use of Steam tables, logarithmic, Mollier's chart is permitted.

**Marks**

**1. Attempt any <u>TEN</u> of the following:** **20**

a) Differentiate between real fluid and ideal fluid.

b) Define viscosity. State its unit.

c) State different types of flows.

d) Define Reynolds number and classify the flow based on it.

e) State minor losses with expressions in pipe.

**Marks**

f) What is water hammer in pipes?

g) Draw the different shapes of artificial channels.

h) Define Froud's number.

i) State any two factors on which selection of pump depends.

j) What is meant by priming of pump?

k) What is cavitation?

l) Define discharge and state its S.I. unit.

m) Explain the principle of hydraulic Jack.

n) Explain the use of Pitot tube.

**2. Attempt any <u>FOUR</u> of the following:** **16**

a) Distinguish between Hydrostatic and Hydrodynamics.

b) A liquid weights 15 kN and occupies 3.75 $m^3$. Find its specific weight and mass density.

c) Draw a neat sketch of Bourden's tube pressure gauge and explain its working.

**Marks**

d) U-tube differential mercury manometer is connected to horizontal pipe carrying water of two points 'A' and 'B'. The difference in levels of mercury in the two limbs is 0.35 m. Calculate pressure difference at 'A' and 'B' in $kN / m^2$.
Refer Figure No. 1

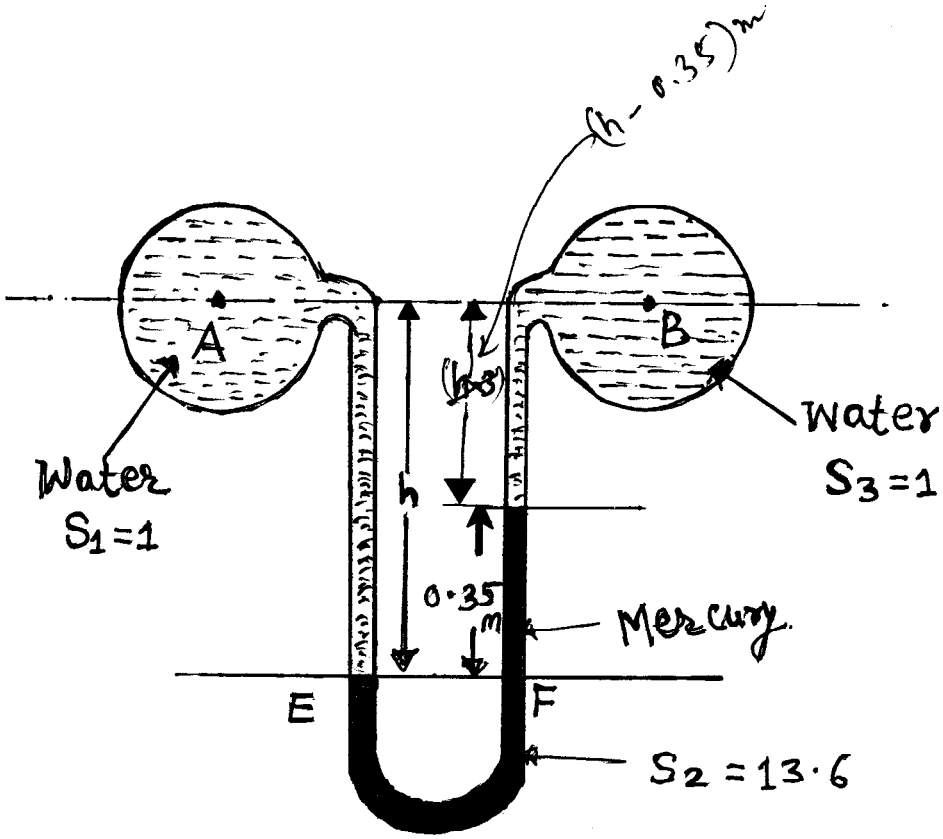


**Fig. No. 1**

e) Explain the term atmospheric pressure, absolute pressure, gauge pressure by drawing line diagram.

**Marks**

**3. Attempt any FOUR of the following:** **16**

a) Define uniform flow and non uniform flow.

b) State Bernoulli's theorem and explain each term.

c) A venturimeter 100 mm × 50 mm size is used to measure the flow of liquid of specific gravity 0.8. If the mercury differential manometer head is 200 mm. Find discharge through the venturimeter. Take Cd = 0.96.

d) Write the advantages of V-notch over rectangular notch.

e) Draw sketches of simple U-tube manometer to measure:

i) Positive pressure and

ii) Negative pressure

**4. Attempt any FOUR of the following:** **16**

a) What is meant by loss of head and major losses?

b) What is meant by T.E.L. and H.G.L? Explain with sketch.

c) A reservoir connected with two parallel pipes of diameter 175 mm and 225 mm each 150 m long carries a total discharge 0.17 cum / sec. Calculate head loss due to friction. Take f = 0.04.

d) Explain Moody's diagram. Give its uses.

e) Define friction factor and state any four factors affecting friction factor.

**Marks**

**5. Attempt any FOUR of the following:** **16**

a) Define the following term:

i) Wetted perimeter.

ii) Hydraulic mean depth

b) Write the Chezy's equation and assumptions made in Chezy's formula.

c) A pipe laid at a slope of 0.0002 flowing half full conveys a discharge of 1000 litres per second. Calculate the diameter of pipe. Take Manning's coefficient. N = 0.014.

d) What do you mean by a hydraulic jump? State the locations in hydraulic structures where hydraulic jump occurs.

e) Find the maximum discharge for least excavation of rectangular channel 3 m wide, when C = 60 and bed slope 1 in 1200.

**6. Attempt any FOUR of the following:** **16**

a) Define suction head and delivery head.

b) Compare between reciprocating pump and centrifugal pump.

c) Explain the working principle of double acting reciprocating pump.

d) Draw a sketch showing typical installation of sub-mersible pump on a tube well.

e) A centrifugal pump has 70% efficiency. It is used to deliver 30 lit / sec. of water for a static head of 18.0 m. The delivery and suction pipe together are 100 m long and are of 10 cm diameter and f = 0.04 for both the pipes. What will be the power of the pump required?