

QP Code : 28841

(3 hours)

Max Marks: 100

- N.B. :- 1) Question No.1 is compulsory
 2) Attempt any four questions from any six questions.
 3) Assume suitable data where required and clearly. State the same.

Q.1 Solve any four of the following. (20)

- Explain Newtonian and Non Newtonian fluids.
- State Bernoulli's theorem and its practical applications.
- Write a note on flow net.
- What is meant by convective acceleration and local acceleration?
- Define venacontract and write its significance.
- Define the term source, sink and doublet.

Q.2 a) Develop a formula for capillary rise between two concentric squares of side 'a' and '2a' placed vertically in a liquid of specific gravity 's'. (10)

b) The gate 3m wide and 2m high separates a liquid of specific gravity 1.5 and height 2m on one side and water up to a height of 1.5m on other side of gate. Find the resultant force acting on the gate and position of centre of pressure. (10)

Q.3 a) A solid cylinder 10cm diameter and 40cm long is made of two materials. The bottom 1cm is of material of sp.gr.6.5 and the position above of sp.gr. 0.6 does the cylinder float vertically in water of sp.wt.1000Kg/m³? (10)

b) Explain the conditions of equilibrium of a floating and submerged body. (10)

Q.4 a) i) For a two dimensional flow $\phi = 3xy$ and $\Psi = 3/2 (y^2 - x^2)$. Determine the velocity Components at the points (1,3) and (3,3) also find the discharge passing between. The stream lines passing through given above. (06)

ii) For the velocity potential function $\phi = x^2 - y^2$. Find the velocity components at the points (3,4). (04)

b) i) Derive an expression on continuity equation for three dimensional flow. (06)

ii) A pitot-static tube placed in the centre of a 200mm pipe line, has one orifice pointing upstream and other perpendicular to it. If the pressure difference between the two orifices is 40mm of water when the discharge through the pipe is 1365lit/minute, calculate the coefficient of the pitot tube take the mean velocity in the pipe to be 0.83 of central velocity. (04)

Q.5 a) Describe the experimental method of determination of hydraulics coefficients of circular orifice. (10)

b) A 45cm X 20cm venturimeter is held in an inclined position such that the inlet section is 2D above the throat section. The piezometers at inlet and outlet read 2.4m and 2m respectively. If D is diameter of inlet, Find flow through venturimeter $C_d = 0.97$. (10)

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(2)

Q.6 a) what is cipoletti weir or notch, find the expression for the discharge over Cipoletti weir. (10)

b) A 40m long weir is divided into 10 equal bays by vertical post, each of 0.6m wide using Francis formula, calculate the discharge over the weir under an effective head of 1.1m. (10)

Q.7 Write a short note on. (20)

- a) Circulation and Vorticity
- b) pitot tube
- c) Rotameter
- d) Micromamometer
- f) Borda's mouthpiece

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