

--	--	--	--	--	--	--	--	--	--



GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (Third Semester – Regular) Examinations, December – 2020

BPCAG3020 – FLUID MECHANICS AND OPEN CHANNEL HYDRAULICS (AGRICULTURE ENGINEERING)

Time: 2hrs

Maximum: 50 Marks

The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions)(1 x 10 =10 Marks)

Q.1. Answer ALL questions

- a. The intensity of pressure at any point in a liquid at rest is _____ to the surface of contact of the container.
- (i) parallel (ii) normal
(iii) reciprocal (iv) proportional
- b. The hydraulic press is based on the on the application of
- (i) Principle of transmission of liquid (ii) Law of conservation of energy
pressure
(iii) Law of conservation of mass (iv) Law of conservation of momentum
- c. The metacentric height of a floating body is the distance between
- (i) Centre of gravity & Centre of buoyancy (ii) Centre of buoyancy & metacentre
(iii) Centre of gravity & metacentre (iv) centre of buoyancy and free surface of the liquid
- d. Bernoulli's equation is based on the principle of
- (i) Principle of transmission of liquid (ii) Law of conservation of energy
pressure
(iii) Law of conservation of mass (iv) Law of conservation of momentum
- e. A flow in which velocity of liquid particles at all sections of the pipe are equal is called
- (i) uniform flow (ii) stream flow
(iii) steady flow (iv) compressible flow
- f. An orifice is said to be large if
- (i) Size of the orifice is large (ii) Velocity of flow is large
(iii) Available head of water is more than 5 (iv) Available head of water is less than 5 times its height
times its height
- g. The ratio of loss of head at entrance to that at the exit of pipe is
- (i) 0.375 (ii) 0.4
(iii) 0.5 (iv) 0.855
- h. The discharge of a rectangular channel is maximum, if depth is
- (i) twice the width (ii) same as its width
(iii) half of width (iv) 1/3rd of the width
- i. In the casing of a centrifugal pump, the kinetic energy of water is converted into
- (i) Potential energy (ii) Pressure energy
(iii) Datum energy (iv) Heat energy
- j. If the ratio of the corresponding linear dimensions are equal in the model and the prototype then the model and prototype are said to be in
- (i) Geometric similarity (ii) Kinematic similarity
(iii) Dynamic similarity (iv) Rayleigh's similarity

PART – B: (Short Answer Questions)

(2 x 5=10 Marks)

Q.2. Answer ALL questions

- a. Differentiate between u-tube differential manometer and inverted differential manometer.
- b. Write limitations of Bernoulli's theorem.
- c. Write Francis's formula for end contraction of rectangular weir.
- d. Write about velocity measurement of open channel by current meter by one point method.
- e. Write a note on flow through parallel pipes and pipes in series.

PART – C: (Long Answer Questions)

(6 x 5=30 Marks)

Answer ANY FIVE questions

Marks

3. Derive an expression for metacentric height of conical buoys floating in liquid. (6)
4. A concrete dam 10 m high trapezoidal in section has top width 1 m and bottom width 6 m. The face exposed to water has slope 1 horizontal to 10 vertical. Check the stability of the dam, when the water level coincides with the top of the dam. The coefficient of friction between the bottom of the dam and the soil is 0.6. Take wt. of masonry as 2300 kg/m^3 . (6)
5. Give classification of notches? Derive an expression for calculating discharge over a rectangular notch. (6)
6. A reservoir has a catchment area of 25 sq km. The maximum rainfall over the area is 2.5 cm/hr, 40 % of which flow to the reservoir over a weir. Using Francis's formula find the length of the weir. The head of water over the weir should not exceed 8 cm. (6)
7. Derive the Darcy's formula for head loss in pipes. (6)
8. Water is flowing through a pipe 1500 m long with a velocity of 0.8 m/sec. What should be the diameter of the pipe, if the loss of head due to friction is 8.7 m. Take f for the pipe as 0.01. (6)
9. Write down Rayleigh's method and write how it is applied in dimensional analysis. (6)
10. Give a brief classification of pumps. (6)

--- End of Paper ---