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Question Paper Code: 44105

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Fourth Semester

Civil Engineering

14UCE405- APPLIED HYDRAULIC ENGINEERING

(Regulation 2014)

Duration: One hour

Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. In open channel, the specific energy is
 - (a) Energy per unit discharge
 - (b) Total Energy measured below the datum
 - (c) $h + V^2/2g$
 - (d) Loss of energy

2. A open channel flow is one in which
 - (a) The boundaries are closed at the top
 - (b) The liquid flowing with free surface
 - (c) Flow does not take place
 - (d) Steady flow take place

3. A rectangular channel section will be most economical when the depth of flow and bottom width are in the ratio of
 - (a) 1:4
 - (b) 1:1
 - (c) 1:2
 - (d) 2:1

4. The maximum discharge through a circular channel takes place when depth of flow is equal to

(a) 0.95 times the diameter	(b) 0.3 times the diameter
(c) 0.81 times the diameter	(d) 0.5 times the diameter

5. The maximum increase in water level due to obstruction in the path of flow of water is called as

(a) hydraulic jump	(b) gradually varied flow
(c) afflux	(d) surges

6. If the Froude number in open channel flow is more than 1.0, the flow is called

(a) critical flow	(b) steaming flow
(c) shooting flow	(d) none of the above

7. Turbines are used to generate

(a) velocity	(b) head	(c) discharge	(d) power
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8. Example for reaction turbine is

(a) Pelton turbine	(b) pump
(c) gear pump	(d) Francis turbine

9. The vertical height of the centre line of the centrifugal pump from the water surface in the pump is called as

(a) Suction head	(b) Delivery head
(c) Manometric head	(d) Static head

10. The rotating part of the centrifugal pump is

(a) Impeller	(b) Casing	(c) Suction pipe	(d) Delivery pipe
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PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. Find the displacement thickness, momentum thickness and energy thickness for the velocity distribution in the boundary layer given by $u/U = 2(y/\delta) - (y/\delta)^2$. (8)

12. A horizontal pipe of diameter 500mm is suddenly contracted to a diameter of 250mm. the pressure intensities in the large and the smaller pipe is given as 13.734N/cm^2 and 11.772N/cm^2 respectively. Find the loss of head due to contraction if $C_c=0.62$. Also determine the rate of flow of water. (8)

13. A sluice gate discharges water into a horizontal rectangular channel with a velocity of 6m/s and depth of flow is 0.4m . The width of the channel is 8m . Determine whether a hydraulic jump will occur, and if so, find its height and loss of energy per kg of water. Also determine the power lost in the hydraulic jump. (8)
14. A Pelton wheel is to be designed for a head of 60m when running at 200rpm . The Pelton wheel develops 95.6475kW shaft power. The velocity of the buckets is equal to 0.45 times the velocity of the jet, overall efficiency is equal to 0.85 and coefficient of velocity is equal to 0.98 . (8)
15. The length and diameter of a suction pipe of a single acting reciprocating pump are 5m and 10cm respectively. The pump has a plunger of diameter 15cm and a stroke length of 35cm . The centre of the pump is 3m above the water surface in the pump. The atmospheric pressure head is 10.3m of water and pump is running at 35 r.p.m. determine:
- (i) Pressure head due to acceleration at the beginning of the suction stroke
 - (ii) maximum pressure head due to acceleration, and
 - (iii) Pressure head in the cylinder at the beginning and at the end of the stroke.
- (8)