TED (15) – 4011 Reg. No.....

(REVISION — 2015) Signature .....

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE — APRIL, 2018

HYDRAULICS

[*Time* : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

I Answer *all* questions in one or two sentences. Each question carries 2 marks.

1. Define specific weight of liquid.
2. Define vena contracta.
3. Differentiate sharp crested and broad crested weir.
4. State the water hammer.
5. Differentiate uniform and non uniform flow. (5×2 = 10)

PART — B

(Maximum marks : 30)

II Answer any *five* of the following questions. Each question carries 6 marks.

1. Discuss atmospheric pressure, gauge pressure and absolute pressure.
2. Define orifice and list the types of orifice.
3. Explain minor losses of head of water flowing through pipes.
4. Sketch a typical layout of hydro electrical power plant.
5. A circular door of 1 m diameter closes an opening in the vertical side of a bulk head, which retains sea water. If the centre of the opening is at a depth of 2m from the water level, determine the total pressure on the door. Take specific gravity of sea water as 1.03.
6. A circular water tank of 4m diameter contains 5m deep water. An orifice of 400 mm diameter is provided at its bottom. Find the time taken for water level to fall from 5m to 2m. Take Cd = 0.6.
7. During an experiment in a laboratory 280 litres of water flowing over a right angled triangular notch was collected in one minute. If the head of water over the sill is 100mm, calculate the coefficient discharge of the notch. (5×6 = 30)

Marks

PART — C

(Maximum marks : 60)

(Answer *one* full question from each unit. Each full question carries 15 marks.)

UNIT — I

III (a) Explain (i) Piezometer tube (ii) Manometer 6

(b) A differential manometer connected at the two points A and B at the same level in a pipe containing an oil of specific gravity 0.8, shows a difference in mercury levels as 100 mm. Determine the difference in pressures at the two points. 9

OR

IV (a) Discuss the assumptions of Bernoulli's theorem. 6

(b) Derive the Bernoull's theorem of total energy of liquid in motion. 9

UNIT — II

V (a) State the following :

(i) Co-efficient of contraction

(ii) Co-efficient of velocity

(iii) Co-efficient of discharge 6

(b) A 60 mm diameter orifice is discharging water under a head of 9 meters. Calculate the actual discharge through the orifice in litres per second and actual velocity of the jet in meters per second at vena contracta, if Cd = 0.625 and Cv = 0.98. 9

OR

VI (a) Classify the types of mouth pieces. 6

(b) A pipe of 100 mm diameter is suddenly enlarged to 200 mm diameter. Find the loss of head, when the discharge is 60 litres/second. 9

UNIT — III

VII (a) Discuss velocity of approach. 6

(b) Determine the maximum discharge over a broad-crested weir 60 meters long having 0.6 m height of water above its crest. Take co-efficient of discharge as 0.595. Also determine the new discharge over the weir, considering the velocity of approach. The channel at the upstream side of the weir has a cross sectional area of 45 square meters. 9

OR

VIII (a) A weir 30m long is divided into 10 equal spans by vertical posts each 0.6m wide. Using Francis formula, calculate the discharge over the weir under an effective head 1 meter. 6

Marks

(b) Determine the discharge over a broad crested weir 20m long with ahead of 0.7m over the crest. Cd = 0.95. The width of approach channel is 40m and its depth below the crest of weir is 0.6m. 9

UNIT — IV

IX (a) A 2 km long water main has to carry a discharge of 0.5 m^3/sec. If the maximum allowable loss of head due to friction is 25m, find the minimum diameter required. Use Darcy's equation assume f = 0.008, neglect minor losses. 6

(b) A water flowing through a pipe 1.5 km long and 1 m diameter with a velocity of 1 m/sec. Find the head lost due to friction using Chezy's formula. Take C = 64. 9

OR

X (a) A most economical trapezoidal channel has an area of flow 3.5m^2. Find the discharge in the channel when running 1 m deep. Take C = 60 and bed slope 1 in 800. 6

(b) Determine the dimensions of the trapezoidal channel of the most economical section to carry a discharge of 6 cumecs at a velocity of 1.6 m/sec. The side slopes of channels are ½ horizontal to 1 vertical. If the chezy's constant C = 60, what is the bed fall per km length of the channel ? 9