HYDRAULICS

Course Code	Course Title	No. of Periods per Week	Total No. of Periods	Marks for Formative Assessment	Marks for Summative Assessment
C-303	HYDRAULICS	05	75	20	80

Model Paper for Unit Test-I :
State Board of Technical Education and Training, A.P.Diploma in Civil Engineering (DCE)
Third Semester:C-303 HYDRAULICS

Time: 90 Minutes **Unit Test –I** Maximum Marks : 40

PART- A **16 Marks**

Instructions :

(i) Answer all questions

(ii) First question carries FOUR marks, each question of remaining carries THREE marks.

1. (a) Specific gravity has the same unit as that of mass density – True/False (CO1)

   (b) Viscosity is the resistance to flow of fluids – True/False (CO1)

   (c) The unit for measuring discharge in SI system is ---------- (CO2)

   (d) The ratio of actual discharge of orifice to the theoretical discharge is called. (CO3)

2. Define (a) Specific weight (b) Cohesion (c) Surface tension (CO1)

3. State the types of fluid pressure measuring devices (CO2)

4. State and briefly explain the equation of continuity (CO3)

5. Define a Notch and state the types based on its shape. (CO3)

PART- B **3 x 8 = 24 Marks**

Instructions :

(i) Answer all questions
(ii) Each question carries EIGHT mark
(iii) Answer should be comprehensive and the criterion for valuation is the content but notthe length of the answer.

6. (A) A rectangular plate 3 m long and 1.5 m wide is immersed vertically in water in such a way that its 3m side is parallel to water surface and its top edge is 2.5m below the free surface. Find the total pressure and depth of centre of pressure on one side of the plate? (CO1)

   (OR)

   (B) A circular plate 2.1M diameter is immersed in water so that its plane makes an angle of300 to the water surface and higher point of the plate is 2.0M below the surface. Calculate the total pressure and centre of pressure. (CO1)

7. (A) A pipe 340 m long has a slope 1 in 100 and tapers from 1.25 m diameter at the higher end to 625mm diameter at the lower end. Determine the pressure at lower end. If the pressure atthe higher end 0.14N/mm^2 and the discharge through the pipe is 108lit/sec of water. (CO2)

(OR)

(B) (i) write any three assumptions of Bernoulli's equation? (ii)A pipe of 0.3m diameter carries an oil of specific gravity 0.9 at the rate of 120 lit/sec. Pressure at a point A in the pipe is 24.5 kN/m^2. If the point A is 5m above the datum line calculate the total head in meters of oil. (CO2)

8. (A) A circular tank of diameter 3m contains water up to a height of 9m. An orifice of diameter400mm is provided at the bottom of the tank. Calculate time required for empty the tank, if c_d =0.97.
(CO3)

(OR)

(B) A Right-angle triangular V-Notch was used to measure discharge of a centrifugal pump. If the depth of water at V-Notch is 200mm, calculate the discharge over the notch in lit per minute. Cd=0.62. (CO3)

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Model Paper for Unit Test-II
State Board of Technical Education and Training,
A.P.Diploma in Civil Engineering (DCE)
Third Semester:C-303 HYDRAULICS

Time: 90 Minutes **Unit Test –II** **Maximum Marks : 40**

PART- A **16 Marks**

Instructions :

(i) Answer all questions

(ii) First question carries FOUR marks, each question of remaining carries THREE marks.

1. (a) Weirs are used to find the discharge of rivers – True/False (CO3)

   (b) If the Reservoirs are kept at the same level the head loss is zero – True/False (CO4)

   (c) In open channel, If the flow characteristics unchanged with space the flow is called---(CO4)

   (d) Low specific speed of turbine implies it is a..... Turbine (CO4)

2. State (i) Darcy's equation (ii) Chezy's equation to find the Loss of head due to Friction(CO4)

3. Define the terms (a) Reynold's number (b) Hydraulic mean Depth (CO4)

4. Sketch a Centrifugal pump and show its parts. (CO5)

5. State any three components of a Hydro Electric Power Station. (CO5)

PART- B **3 x 8 = 24 Marks**

Instructions :

(i) Answer all questions

(ii) Each question carries EIGHT mark

(iii) Answer should be comprehensive and the criterion for valuation is the content but notthe length of the answer.

6. (A) Water is passing over a rectangular notch flows subsequently over a right-angled triangular notch. The length of the rectangular notch is 0.6 m and its coefficient of discharge is 0.62. If the coefficient for triangular notch is 0.59, what will be the head through the triangular notch when the head over rectangular notch is 0.15m? (CO3)

(OR)

(B)A broad crested weir is constructed across the entire 3 m width of a rectangular channel. Ifthe head on the weir crest is 56 cm, find the discharge over the weir. Take C_d = 0·96. (CO3)

7. (A) Two reservoirs are connected by a pipe line 22 m long consisting of two pipes one of 15 cm dia. and length 6m and the other of diameter 22.5 cm and 16 m length. If the difference ofwater levels in two reservoirs is 6 m, calculate the discharge considering all losses. Take
f = 0.04. (CO4)

(OR)

(B) Two Reservoirs are connected by a straight pipe 1500 m long. For the first 800m length it has 200 mm diameter and then reduced to 150mm diameter for the remaining length. The water levels in the two reservoirs differ by 25m. Determine all the losses of head and also the Discharge in cumecs. Take friction f = 0.01.(CO4)

8. (A) A Trapezoidal channel section has side slopes 1 vertical to 2 horizontal. The discharge inthe channel is 16 m^3/sec, with a bed slope of 1 in 2000. Design the channel for the most economic section. Use manning formula with N = 0.012
(CO4)

(OR)

(B) A trapezoidal channel has side slopes 1 : 1 and is discharging 20 m^3/sec with bed slope of 0·5 m per 1000 m. Manning's n = 0·01. Determine the section of the channel. (CO4)

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Model Paper for End Examination :

MODEL PAPER – BOARD DIPLOMA EXAMINATION,

(C–23)DCE—THIRDSEMESTER EXAMINATION

HYDRAULICS (C-303)

Time: 3 hours] **[Total Marks: 80**

PART—A **10×3 =30 Marks**

Instructions: (1) Answer all questions.

(2) Each question carries three marks.

(3) Answers should be brief and straight to the point and shall notexceed five simple sentences.

1. Define the terms viscosity, capillarity and surface "tension". (CO1)
2. State the relation among atmospheric pressure, gauge pressure and absolute pressure. (CO1)
3. State the Bernoulli's theorem and express it in equation form (CO2)
4. State the classification of mouth pieces according to shape and according to position.(CO3)
5. Find the discharge over a rectangular notch having width 2m and a constant head of 30cm.assume C_d = 0.62. (CO3)
6. List the classification of weirs. (CO3)
7. Define Reynold's number. How it is useful in determining the type of flow. (CO4)
8. What do you understand by the term most economical section of channel? (CO4)
9. List the functions of air vessels in reciprocating pumps. (CO5)
10. State the component parts of a hydroelectric power plant. (CO5)

PART – B **5 x 10 = 50 marks**

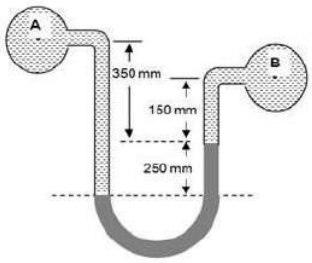
Instructions:

i) Answer any FIVE questions

ii) Each question carries TEN marks.

iii) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. U-tube differential manometer is used to find out a pressure difference of liquids in pipe A and pipe B as shown in figure. If the pipe A contains liquid of specific gravity 1·6 and pipe B contains water, find the difference of pressure between the two points. Manometric liquid is mercury of specific gravity 13.6. (CO1)



12. The diameter of a pipe changes gradually from 150mm at point A to 100mm at point B, which are situated at 20m and 16mrespectively above the datum. Determine the pressure at B, if the pressure at A is 0.2 N/mm^2 and velocity of flow at A is 1.1m/sec. Neglect the

losses between aand B.

13. A pipe 340 m long has a slope 1 in 100 and tapers from 1.25 m diameter at the higher endto 625mm diameter at the lower end. Determine the pressure at lower end. If the pressure atthe higher end 0.14N/mm^2 and the discharge through the pipe is 108lit/sec of water. (CO2)
14. Calculate the discharge passing through an orifice 80 cm wide and 60 cm deep in the side of tank. It is having a water level of 3·5 m above the upper edge of the orifice and tail water is 20 cm above the lower edge of the orifice. Take Cd = 0·62. (CO3)
15. Water passing over a rectangular notch flows subsequently over a right-angled triangular notch. The length of the rectangular notch is 0·6 m and the coefficient of discharge is 0·62. If the coefficient of discharge of triangular notch is 0·59, what will be the head through the triangular notch when the head over rectangular notch is 0·15 m? (CO3)
16. A compound piping system consists of three pipes of lengths 1500 m, 1200 m and 1000 m and diameters 0·5 m, 0·4 m and 0·3 m respectively are connected in series. Convert the system to (a) an equivalent Length of 0·4 m diameter pipe; (b) an equivalent size of pipe 3700 m long.
17. A 2 km long water main has to carry a discharge of 0·5 cumec. If the maximum allowable loss of head due to friction is 26 m, find the minimum diameter required. Use Darcy's equation. Assume f = 0.008. Neglect the minor losses.
18. A rectangular channel having most economical section is 6m wide. Find the discharge, if the bed slope is 1 in 1200. Assume 'C' as 50.. (CO4)