

Course / Subject Name NQ CIVIL-324 HYDRAULICS & IRRIGATION ENGINEERING

ASSESSMENT TASKS (SUMMATIVE ASSESSMENT)

ASSESSMENT TASK 01

DETERMINATION OF PIPE FLOW LOSSES IN PIPES

03:00 Hours

APPARATUS: Stop watch, Hydraulic bench, Piezometer tube & Apparatus for losses in pipes

1. Wear required PPEs
2. Choose pipes with varying diameters and materials (e.g., copper, PVC).
3. Prepare and calibrate the required equipments.
4. *Set up the apparatus on the hydraulics bench*
5. *Fill pipe system and manometer with water by opening valves i.e, check calve, gate valve and flow control valve*
6. *Set the flow rate at approximately 17 liters/minute*
7. *Take height readings from all manometers*
8. *Draw hydraulic gradient line.*
9. *Calculate losses using required formulae*
10. *Develop table comprising observations & calculations*
11. Submit the results to lab instructor

ASSESSMENT TASK 02

01:00 Hour

A MOST ECONOMICAL TRAPEZOIDAL CHANNEL HAVING SIDE SLOPE AT 60" WITH THE HORIZONTAL HAS A BED SLOPE OF 1 IN 1600. FIND THE BED WIDTH AND THE DEPTH OF THE CHANNEL FOR A DISCHARGE OF 194 CUMECs. TAKE M FOR MANNINGS FORMULA AS 60.

1. *Identify given data and required data as per above noted statement.*
2. *Compute required data using appropriate formulae*
3. *Present the solution in tabular form*

Submitted by: Engr. Zeeshan Ali Instructor Civil (P-TEVTA)

ASSESSMENT TASK 03

01:00 Hour

FIND THE DUTY OF WATER, IF IRRIGATION CANAL RUNS FOR 140 DAYS IN A SEASON WHEN WHEAT IS GROWN. DELTA IS FOUND TO BE 12 INCHES

- 1. Identify given data and required data as per above noted statement.*
- 2. Compute required data using appropriate formulae*
- 3. Present the solution in tabular form*

OR

ASSESSMENT TASK 01

03:00 Hours

METACENTRIC HEIGHT OF A FLOATING BODY IN LAB

APPARATUS: Hydraulic bench, Metacentric height apparatus & Electronic digital balance

1. Wear required PPEs
2. Choose a model with known dimensions and mass.
3. Record initial depth & Gradually tilt using inclination device.
4. Fill the tank with water and insert the floating body and ensure that it is in stable equilibrium.
5. Set the horizontal sliding weight to position 'x' from the center towards left side of the vertical bar.
6. Give the model a small angular displacement in clockwise direction.
7. Measure the angle θ in the stable equilibrium.
8. Calculate GM experimentally. Draw a relationship between angle of heel θ (x-axis) and GM (y-axis), then obtain GM when equals zero
9. Plot the metacentric height for different angle of heel and calculate the metacentric height for zero angle of heel.

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10. Calculate GM theoretically and compare

11. Record observations & calculations

12. Submit the results to lab instructor

ASSESSMENT TASK 02

01:00 Hour

PRODUCE IRRIGATION MAP OF PAKISTAN

1. Select appropriate drawing instruments

2. Identify drawing instruments and prepare drawing sheet as per given standards.

3. Draw map of Pakistan and show rivers on it.

4. Draw barrages, main canals, head works and link canals

ASSESSMENT TASK 03

01:00 Hour

DESIGN AN IRRIGATION CHANNEL IN ALLUVIAL SOIL FROM FOLLOWING DATA USING LACEY'S THEORY: DISCHARGE = 15.0 CUMEC, LACEY'S SILT FACTOR = 1.0; SIDE SLOPE = $\frac{1}{2} : 1$

1. Identify given data and required data as per above noted statement.

2. Compute required data using appropriate formulae

3. Present the solution in tabular form

OR

ASSESSMENT TASK 01

03:00 Hours

DETERMINATION OF COEFFICIENT OF DISCHARGE USING VENTURIMETER / WEIR / NOTCH / ORRIFICE METER

APPARATUS: Hydraulic bench, Venturimeter, Weirs, Notches, Orifice meter apparatus

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FOR VENTURIMETER

1. Wear required PPEs
2. Prepare required apparatus for observations as per operating manual
3. *Measure flow rates using volumetric tank.*
4. *Determine readings/values by varying discharge using control valve*
5. *Observe readings through piezometric tubes at inlet and throat*
6. *Calculate head through piezometer readings*
7. *Calculate actual and theoretical discharge*
8. *Calculate coefficient of discharge using formula.*
9. *Develop table comprising observations & calculations*
10. Submit the results to lab instructor

FOR WEIR/NOTCH

1. Wear required PPEs
2. Familiarize with weir / notch
3. Prepare equipment
4. Calibrate equipment for accurate measurement
5. *Calculate area of notch/weirs using required formulae*
6. *Establish steady flow rate*
7. *Measure flow rate (Actual Discharge)*
8. *Record water level*
9. *Calculate theoretical discharge using formulae*
10. *Calculate coefficient of discharge using formula*
11. *Plot Cd vs Discharge*
12. *Develop observations & calculations in tabular form*
13. Submit results to the concerned

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FOR ORRIFICE METER

1. Wear required PPEs
2. Familiarize with weir / notch
3. Prepare equipment
4. Calibrate equipment for accurate measurement
5. *Set constant head in tank*
6. *Measure horizontal and vertical coordinates*
7. *Calculate actual discharge using required apparatus*
8. *Use formulae to calculate coefficient of velocity and discharge*
9. *Develop observations & calculations in tabular form*
10. Submit results to the concerned

ASSESSMENT TASK 02

01:00 Hour

A DISTRIBUTARY CANAL HAS A CULTURABLE COMMAND AREA OF 8000 HECTARES. THE INTENSITY OF IRRIGATION FOR RABI CROP IS 70% AND BASE PERIOD IS 120 DAYS. THE DEPTH OF APPLICATION OF WATER IS 80CM. CALCULATE THE DISCHARGE TO BE SUPPLIED IN THE CHANNEL.

1. *Identify given data and required data as per above noted statement.*
2. *Compute required data using appropriate formulae*

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3. *Present the solution in tabular form*

ASSESSMENT TASK 03

01:00 Hour

DESIGN AN IRRIGATION CHANNEL WITH FOLLOWING DATA

- i. **FULL SUPPLY DISCHARGE = 06 CUMECS**
- ii. **RUGOSITY COEFFICIENT (N)=0.225**
- iii. **C.V.R m = 1.0**
- iv. **BED SLOPE = 1 IN 5000**

ASSUME OTHER RESONABLE DATA

1. *Identify given data and required data as per above noted statement.*

2. *Compute required data using appropriate formulae*

3. *Present the solution in tabular form*