IQRA NATIONAL UNIVERSITY, PESHAWAR

DEPARTMENT OF CIVIL ENGINEERING
Final Term Examination (*Spring Semester 2020*)

Subject: Hydraulics Engineering   **Instructor:** Engr. Fawad Ahmad
Total Marks: 50

Note:
1. Attempt all questions.
2. R is your class ID
3. Don't try to copy.
4. Mention your id on each page of answer sheet with page number.
5. Any one who copied from else will get zero marks and from whom was copied will also get zero. So better to do your own paper.

Q.NO (01)   **(20)**

A prototype gate valve which will control the flow in a pipe system conveying paraffin is to be studied in a model. List the significant variables on which the pressure drop across the valve would depend. Perform dimensional analysis to obtain the relevant non-dimensional groups.

A 1/5 scale model is built to determine the pressure drop across the valve with water as the working fluid.

(a)   For a particular opening, when the velocity of paraffin in the prototype is 3.0 m s^{-1} what should be the velocity of water in the model for dynamic similarity?

(b)   What is the ratio of the quantities of flow in prototype and model?

(c)   Find the pressure drop in the prototype if it is 60 kPa in the model.

(The density and viscosity of paraffin are 800 kg m^{-3} and 0.002 kg m^{-1} s^{-1} respectively. Take the kinematic viscosity of water as 1.0×10^{-6} m^2 s^{-1}).

The pressure drop Δp is expected to depend upon the gate opening h, the overall depth d, the velocity V, density ρ and viscosity μ.

Q.NO (02)   **(10)**

Design a Practical Profile of gravity dam with the following data:
1. Maximum Depth of water in the reservior is (your first Two digits of R)
2. Specific gravity of dam material is G (Can be of your own choice)
3. Allowable compressive strength for the dam masonary is (your first T three digits of R T/m^2)
4. Height of wave is Hw (Can be of your own choice)
5. G and Hw is of your own choice but should be differ from one another.

Q.NO (03)   **(10)**

Using any hydraulic model and explain the concept of Dimensional analysis and similitude. Each student should have separate model analysis.

Q.NO (04)   **(10)**

What will be the effect of sediment particle diameter, particle density, particle concentration, particle shape, viscosity of water, turbulence of water flowing in reservoir on fall velocity? Explain in detail.

************************************Best of Luck******************************