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**University Examinations 2015/2016**

THIRD YEAR FIRST SEMESTER EXAMINATION FOR DIPLOMA IN CIVIL ENGINEERING

**ECV 2303: ENGINEERING HYDRAULICS I**

 **DATE: NOVEMBER 2015 TIME: 11/2 HOURS**

**INSTRUCTIONS:** *Answer question* ***one*** *and any other* ***two*** *questions*

**QUESTION ONE (30 MARKS)**

1. Define the following terms:
2. Open channel.
3. Uniform flow.
4. Gradually varied flow.
5. Reservoir.
6. Critical flow. (5 Marks)
7. Calculate the Hydraulic mean depth for a V section channel-made up of two 30o angles, when the depth of water at the centre is 225 mm. (4 Marks)
8. Briefly describe any three structural based type of dams. (6 Marks)
9. Sketch the following channel slopes associated with gradually varied flow.
10. Mild slope.
11. Steep slope.
12. Critical slope.
13. Adverse slope. (6 Marks)
14. List the advantages of hydro-electrical power plant. (5 Marks)
15. List the main differences between a reaction and an impulse turbine. (4 Marks)

**QUESTION TWO (15 MARKS)**

1. With the aid of a drawing describe the main storage levels of a dam. (8 Marks)
2. Describe with a drawing, the working of a pelton wheel hydroelectric power plant. (7 Marks)

**QUESTION THREE (15 MARKS)**

1. Show that for a circular culvert of a diameter D velocity of flow will be a maximum when the depth of flow h at the centre is approximately 0.81D. Use the chezy formula. (9 Marks)
2. A sewer diameter D=0.6m, has a slope of 1 in 200. What will be the maximum velocity of flow that can occur, and what is the discharge at this velocity? Take C=55SI units. (6 Marks)

**QUESTION FOUR (15 MARKS)**

1. Describe the working of a Kaplan Turbine. (9 Marks)
2. Show that for a rectangular channel of depth D and width B, the proportions which will make the discharge a maximum for a given cross-sectional area A are given by A=2D2.

(6 Marks)