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Question Paper Code: 50146

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

Fourth Semester

Civil Engineering

15UCE406 APPLIED HYDRAULIC ENGINEERING

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. The velocity in m/sec. at solid boundaries in open channels is

   (a) 1 (b) 2 (c) 0 (d) 5

2. The most economical section of a channel is one which gives

   (a) Minimum discharge (b) maximum discharge
   (c) Maximum velocity (d) Minimum velocity

3. Direct step method is applicable to

   (a) Non-prismatic channels (b) Prismatic channels
   (c) Wide open channels (d) Exponential channels

4. Pelton wheel has specific speed between

   (a) 40 to60 (b) 60 to 400 (c) 300 to1000 (d) 10 to35

5. Pumps in series are employed for

   (a) Large discharge and low head (b) Small discharge and high head
   (c) Medium discharge and low head (d) Large discharge and low head

PART - B (5 x 3 = 15 Marks)

6. Write the relation between specific energy and critical depth.

7. How the velocity determined using pitot tube?

8. Give the classification of hydraulic jump.

9. How the Francis turbine differ from Kaplan turbine?

10. What is the uses of characteristic curves of centrifugal pump?

PART - C (5 x 16 = 80 Marks)

11. (a) A trapezoidal channel with a bed width of 3m and side slope of 1.5H:1V carries a certain discharge. (a) If the critical depth of floor is 1.5m, calculate the discharge in the channel. (b) If the discharge is flowing at a depth of 2.5m in a reach estimate Froude number. (16)

Or

(b) Discuss the different types of flow in open channels. (16)

12. (a) Determine the dimensions of most economical trapezoidal channel section with 1:1 side slope to carry 10cumecs of water on a bed slope of 1 in 1600. Assume C=60. (16)

Or

(b) Derive Chezy's formula to determine velocity of flow in open channels. Also list the factors affecting Manning's roughness co-efficient. (16)

13. (a) Derive the dynamic equation for gradually varied flow stating clearly the assumptions involved. (16)

Or

(b) A sluice gate discharges 2.5m^3/s into a horizontal rectangular channel. The depth of vena contract a is 0.2m. The tail water depth is 2m Assuming n=0.015, determine the location of hydraulic jump. Take bed slope as 0.0005. (16)

14. (a) A pelton wheel is to designed for the following specifications. Power=9560kW, Head=350m, speed=750rpm, overall efficiency=85% and jet diameter=1/6th of wheel diameter. Determine the following (i) Wheel diameter (ii) diameter of jet and (iii) no. of jets. Take C_V=0.985 and speed ratio=0.45. (16)

Or

(b) Discuss the function and types of draft tubes in reaction turbines. (16)

15. (a) Obtain an expression for the specific speed of a centrifugal pump. Also add a note on the component parts of centrifugal pump. (16)

Or

(b) Explain the working of single acting and double acting reciprocating pumps. (16)