

S4(0) 13/05/2014 AN

G 545

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Reg. No.....

Name.....

**B.TECH. DEGREE EXAMINATION, MAY 2014**

**Fourth Semester**

Branch : Civil Engineering

FLUID MECHANICS-II (C)

(Old Scheme—Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

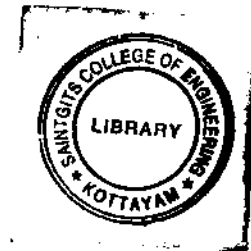
Time : Three Hours

Maximum : 100 Marks

**Part A**

*Answer all questions.  
Each question carries 4 marks.*

1. Briefly explain "gradually varied flow".
2. Define the terms : (i) hydraulic mean depth ; and (ii) Wetted perimeter.
3. What are prismatic channels ?
4. Briefly discuss : back water curve.
5. What are stilling basins ?
6. Explain the need of non-dimensionalising an equation.
7. What are the practical applications of impact of jets ?
8. Write a note on surge tanks.
9. Why manometric head is important for a centrifugal pump ?
10. List the salient features of positive displacement pumps.



(10 × 4 = 40 marks)

**Part B**

*Answer all questions.  
Each question carries 12 marks.*

11. A trapezoidal channel with side slopes of 3-horizontal to 2 vertical has to be designed to convey  $10 \text{ m}^3/\text{s}$  at a velocity of  $1.5 \text{ m/s}$ , so that the amount of concrete lining for the bed and sides is minimum. Find : (i) the wetted perimeter, and (ii) slope of the bed if Manning's  $N = 0.014$ .

Or

12. Determine the best side slope for most economical trapezoidal section for open channel flow.

Turn over

13. Determine the length of the back water curve caused by an afflux of 2.0 m in a rectangular channel of width 40 m and depth 2.5 m. The slope of the bed is given as 1 in 11000. Take Manning's  $N = 0.03$ .

*Or*

14. Find the slope of the free water surface in a rectangular channel of width 20 m, having depth of flow 5 m. The discharge through the channel is  $50 \text{ m}^3/\text{s}$ . The bed of the channel is having a slope of 1 in 4000. Take the value of Chezy's constant  $C = 60$ .
15. Derive an expression for loss of energy due to hydraulic jump. State the assumptions made.

*Or*

16. A sluice gate discharges water into a horizontal rectangular channel with a velocity of 10 m/s and depth of flow of 1 m. Determine the depth of flow after the jump and consequent loss in total head.
17. Derive the expressions for (i) Work done ; and (ii) hydraulic efficiency for a Pelton wheel turbine. What is the condition for achieving maximum efficiency ?

*Or*

18. What is Euler's equation of hydrodynamic machines ? Define degree of reaction. Derive an expression for it. What is the degree of reaction for a Pelton turbine ?
19. A centrifugal pump delivers water against a net head of 14.5 m and a design speed of 1000 r.p.m. The vanes are curved back to an angle of  $30^\circ$  with the periphery. The impeller diameter is 300 mm. and outlet width 50 mm. Determine the discharge of the pump if manometric efficiency is 95 %.

*Or*

20. Explain how and when separation of flow takes place in a reciprocating pump. Discuss the preventive measures usually adopted for effective reduction of separation in such a pump.

[5 × 12 = 60 marks]

