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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech III Year I Semester Supplementary Examinations December-2021

HYDRAULIC ENGINEERING

(Civil Engineering)

Time: 3 hours

Max. Marks: 60

PART-A

(Answer all the Questions 5 x 2 = 10 Marks)

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|---|---|----|----|
| 1 | a Define specific energy. | L1 | 2M |
| | b Define hydraulic jump. | L1 | 2M |
| | c Define overall efficiency of turbine. | L1 | 2M |
| | d Give any two limitations of distorted models. | L1 | 2M |
| | e Name any four efficiencies of a hydraulic turbine | L1 | 2M |

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

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|---|--|----|----|
| 2 | a Derive an expression for maximum velocity of flow through a circular section. | L3 | 5M |
| | b Determine the expression for the most economical trapezoidal section in terms of side slope. | L3 | 5M |

OR

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|---|---|----|----|
| 3 | a Derive the condition for a rectangular channel to be most efficient | L3 | 5M |
| | b Explain the term specific energy of a flowing liquid and derive the condition for critical depth. | L2 | 5M |

UNIT-II

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|---|--|----|-----|
| 4 | What are assumptions of gradually varied flow? Derive the Dynamic equation of gradually varied flow. | L2 | 10M |
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OR

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| 5 | a Derive an expression for hydraulic jump in rectangular channel | L3 | 5M |
| | b What are the applications of hydraulic jump? | L1 | 5M |

UNIT-III

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|---|--|----|----|
| 6 | a Derive the equation for force exerted by a jet on stationary inclined flat plate | L3 | 5M |
| | b Find the force exerted by a jet of water of diameter 75mm on a stationary flat plate, when the jet strikes the plate normally with velocity of 20m/s | L3 | 5M |

OR

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| 7 | Obtain the expression for the force exerted by jet of water on a fixed vertical plate in the direction of the jet. | L3 | 10M |
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UNIT-IV

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|---|--|----|-----|
| 8 | A centrifugal pump is to discharge 0.118m ³ /sec at a speed of 1450r.p.m. against a head of 25m. The impeller diameter is 250mm, its width at outlet is 50mm and manometric efficiency is 75%. Determine the vane angle at the outer periphery of the impeller. | L3 | 10M |
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OR

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|---|--|----|----|
| 9 | a What are different types of dimensionless numbers? Explain them. | L1 | 5M |
| | b Define the terms: model, prototype, hydraulic similitude. | L1 | 5M |

UNIT-V

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|----|---|----|----|
| 10 | a What is a turbine and give the classification in detail? Give the various efficiencies. | L1 | 5M |
| | b Explain Radial flow reaction turbine with a neat diagram. | L2 | 5M |

OR

- 11 a Define (i) speed ratio (ii) Flow ratio (iii) Diameter of turbine (iv) Radial discharge. L2 5M
- b Define the term unit power, unit speed and unit discharge with reference to a hydraulic turbine. And also derive the expression for these terms. L3 5M

END