Code No: 07A40103 **R07** **Set No. 2**

II B.Tech II Semester Examinations,April/May 2012
HYDRAULICS AND HYDRAULIC MACHINERY
Civil Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Derive the equation that defines cross section of an open channel with constant velocity at all depths of flow.
   (b) A flow of water of 100 liters per second flows down in a rectangular flume of width 60 cm and having adjustable bottom slope. If Chezy's constant C is 56, find the bottom slope necessary for uniform flow with a depth of flow of 30 cm. Also find the conveyance K of the flume. [8+8]

2. In a 1 in 20 model of a stilling basin, the height of the hydraulic jump in the model is observed to be 0.20 metre. What is the height of the hydraulic jump in the prototype? If the energy dissipated in the model is $\frac{1}{10}$ h.p., what is the corresponding value in prototype? [16]

3. (a) What do you understand by unit speed of a turbine? What is its use? Derive the equation for specific speed.
   (b) What are the constant efficiency curves of a turbine? What are their uses? [8+8]

4. (a) Write down the uses of hydraulic jump
   (b) Define rapidly varied flow and gradually varied flow
   (c) Derive the equation for specific energy curve. [4+4+8]

5. (a) Draw a typical layout and explain the working of centrifugal pump. Also indicate various components.
   (b) Explain the method of selection of centrifugal pumps through the characteristic curves. [8+8]

6. (a) List out the components of high head diversion power plant.
   (b) Explain in detail about penstock & surge tank and their uses with respect to hydroelectric power plants. [8+8]

7. (a) Define the term: impact of jets. Obtain an expression for the force exerted by a jet of water on a fixed vertical plate in the direction of the jet.
   (b) Find the force exerted by a jet of water of diameter 100mm on a stationary flat plate, when the jet strikes the plate normally with a velocity of 30m/sec. [8+8]

8. An outward flow reaction turbine has inner and outer diameter of the wheel as 1000mm and 2000 mm respectively. The water enters the vane at an angle of 20^0 and leaves the vane radially. If the velocity of flow remains constant at 10m/sec and the speed of the wheel is 300rpm, find the vane angles at inlet and outlet.[16]

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Code No: 07A40103 **R07** **Set No. 4**

II B.Tech II Semester Examinations,April/May 2012
HYDRAULICS AND HYDRAULIC MACHINERY
Civil Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Write down the uses of hydraulic jump
   (b) Define rapidly varied flow and gradually varied flow
   (c) Derive the equation for specific energy curve. [4+4+8]

2. (a) Define the term: impact of jets. Obtain an expression for the force exerted by a jet of water on a fixed vertical plate in the direction of the jet.
   (b) Find the force exerted by a jet of water of diameter 100mm on a stationary flat plate, when the jet strikes the plate normally with a velocity of 30m/sec. [8+8]

3. (a) Derive the equation that defines cross section of an open channel with constant velocity at all depths of flow.
   (b) A flow of water of 100 liters per second flows down in a rectangular flume of width 60 cm and having adjustable bottom slope. If Chezy's constant C is 56, find the bottom slope necessary for uniform flow with a depth of flow of 30 cm. Also find the conveyance K of the flume. [8+8]

4. (a) What do you understand by unit speed of a turbine? What is its use? Derive the equation for specific speed.
   (b) What are the constant efficiency curves of a turbine? What are their uses? [8+8]

5. (a) List out the components of high head diversion power plant.
   (b) Explain in detail about penstock & surge tank and their uses with respect to hydroelectric power plants. [8+8]

6. In a 1 in 20 model of a stilling basin, the height of the hydraulic jump in the model is observed to be 0.20 metre. What is the height of the hydraulic jump in the prototype? If the energy dissipated in the model is $\frac{1}{10}$ h.p., what is the corresponding value in prototype? [16]

7. An outward flow reaction turbine has inner and outer diameter of the wheel as 1000mm and 2000 mm respectively. The water enters the vane at an angle of 20^0 and leaves the vane radially. If the velocity of flow remains constant at 10m/sec and the speed of the wheel is 300rpm, find the vane angles at inlet and outlet. [16]

8. (a) Draw a typical layout and explain the working of centrifugal pump. Also indicate various components.

(b) Explain the method of selection of centrifugal pumps through the characteristic curves. [8+8]

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Code No: 07A40103 **R07** **Set No. 1**

II B.Tech II Semester Examinations,April/May 2012
HYDRAULICS AND HYDRAULIC MACHINERY
Civil Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Define the term: impact of jets. Obtain an expression for the force exerted by a jet of water on a fixed vertical plate in the direction of the jet.
   (b) Find the force exerted by a jet of water of diameter 100mm on a stationary flat plate, when the jet strikes the plate normally with a velocity of 30m/sec. [8+8]

2. (a) Derive the equation that defines cross section of an open channel with constant velocity at all depths of flow.
   (b) A flow of water of 100 liters per second flows down in a rectangular flume of width 60 cm and having adjustable bottom slope. If Chezy's constant C is 56, find the bottom slope necessary for uniform flow with a depth of flow of 30 cm. Also find the conveyance K of the flume. [8+8]

3. (a) Write down the uses of hydraulic jump
   (b) Define rapidly varied flow and gradually varied flow
   (c) Derive the equation for specific energy curve. [4+4+8]

4. (a) List out the components of high head diversion power plant.
   (b) Explain in detail about penstock & surge tank and their uses with respect to hydroelectric power plants. [8+8]

5. In a 1 in 20 model of a stilling basin, the height of the hydraulic jump in the model is observed to be 0.20 metre. What is the height of the hydraulic jump in the prototype? If the energy dissipated in the model is $\frac{1}{10}$ h.p., what is the corresponding value in prototype? [16]

6. (a) What do you understand by unit speed of a turbine? What is its use? Derive the equation for specific speed.
   (b) What are the constant efficiency curves of a turbine? What are their uses? [8+8]

7. (a) Draw a typical layout and explain the working of centrifugal pump. Also indicate various components.
   (b) Explain the method of selection of centrifugal pumps through the characteristic curves. [8+8]

8. An outward flow reaction turbine has inner and outer diameter of the wheel as 1000mm and 2000 mm respectively. The water enters the vane at an angle of 20^0 and leaves the vane radially. If the velocity of flow remains constant at 10m/sec and the speed of the wheel is 300rpm, find the vane angles at inlet and outlet.[16]

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Code No: 07A40103 **R07** **Set No. 3**

II B.Tech II Semester Examinations,April/May 2012
HYDRAULICS AND HYDRAULIC MACHINERY
Civil Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Derive the equation that defines cross section of an open channel with constant velocity at all depths of flow.
   (b) A flow of water of 100 liters per second flows down in a rectangular flume of width 60 cm and having adjustable bottom slope. If Chezy's constant C is 56, find the bottom slope necessary for uniform flow with a depth of flow of 30 cm. Also find the conveyance K of the flume. [8+8]

2. An outward flow reaction turbine has inner and outer diameter of the wheel as 1000mm and 2000 mm respectively. The water enters the vane at an angle of 20^0 and leaves the vane radially. If the velocity of flow remains constant at 10m/sec and the speed of the wheel is 300rpm, find the vane angles at inlet and outlet. [16]

3. (a) List out the components of high head diversion power plant.
   (b) Explain in detail about penstock & surge tank and their uses with respect to hydroelectric power plants. [8+8]

4. (a) Define the term: impact of jets. Obtain an expression for the force exerted by a jet of water on a fixed vertical plate in the direction of the jet.
   (b) Find the force exerted by a jet of water of diameter 100mm on a stationary flat plate, when the jet strikes the plate normally with a velocity of 30m/sec. [8+8]

5. In a 1 in 20 model of a stilling basin, the height of the hydraulic jump in the model is observed to be 0.20 metre. What is the height of the hydraulic jump in the prototype? If the energy dissipated in the model is $\frac{1}{10}$ h.p., what is the corresponding value in prototype? [16]

6. (a) Draw a typical layout and explain the working of centrifugal pump. Also indicate various components.
   (b) Explain the method of selection of centrifugal pumps through the characteristic curves. [8+8]

7. (a) Write down the uses of hydraulic jump
   (b) Define rapidly varied flow and gradually varied flow
   (c) Derive the equation for specific energy curve. [4+4+8]

8. (a) What do you understand by unit speed of a turbine? What is its use? Derive the equation for specific speed.

(b) What are the constant efficiency curves of a turbine? What are their uses? [8+8]

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