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B. TECH. THEORY EXAMINATION (SEM-VI) 2016-17 FLUID MACHINERY

Time : 3 Hours

Note : Be precise in your answer. In case of numerical problem assume data wherever not provided.

SECTION – A

1. Attempt all parts of the following questions:

- State and explain continuity equation of steady flow for incompressible fluids. (a)
- **(b)** Define degree of reaction.
- State the impulse momentum principle. (c)
- (**d**) What is the function of the nozzle in an impulse turbine?
- What do you mean by radial flow turbine? **(e)**
- **(f)** Define unit sped.
- **(g)** What are the advantages of model testing?
- **(h)** Define manometric efficiency.
- **(i)** What is the cause of acceleration head?
- What is a hydraulic intensifier? (j)

SECTION – B

2.

- (a) Draw the neat sketch and explain the working of a simple accuminator
 (b) Derive an expression for accelerating here bits (b) Derive an expression for accelerating head in reciprection stamp assuming piston motion by S.H.M.
- (c) A centrifugal pump delivers 12/m or water per monute at 1200 r.p.m. The impeller diameter is 350 mm and present at outlet 2.7 min. The pressure difference between inlet and outlet through casing is 271 RJ/m². Assuming manometric efficiency at 63%, call use the impeller exit blace angle.
- (d) Discuss performance characteristics of a hydraulic turbine.
- (e) Prove that a draft tube prevents for the loss of head of reaction turbine.
- (f) Explain the Governing of a Pelton Turbine. Use neat sketch.
- (g) A jet of water of diameter 50 mm having a velocity of 20 m/s strikes at inlet of a curved vane which is moving with a velocity of 10 m/s in the direction of the jet. The jet leaves the vane at an angle of 600 to the direction of motion of vane at outlet. Determine the force exerted by the jet on the vane in the direction of motion and work done per second by the jet.
- (h) Discuss the classification of hydraulic turbines.

SECTION - C

Attempt any two of the following questions:

- 3 Explain with neat sketch the working of a hydraulic ram. Also, explain the various efficiencies applicable to hydraulic ram. State its advantages and limitations.
- A single acting reciprocating pump running at 60 r.p.m. has its piston area of 80 cm² 4 and stroke length 150 mm. The area of suction pipe is 60 cm2. The suction head is 3 m. assuming a friction factor of 0.04, find the pressure head on the piston at the beginning, middle and at the end of the suction stroke if the length of suction pipe is 6 m. Assume motion of piston as S.H.M. Can cavitation take place if the working liquid is

$10 \ge 2 = 20$

NME021

Max. Marks : 100



 $2 \ge 15 = 30$