SUBJECT CODE NO:- E-68
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(Civil) Examination Nov/Dec 2017
Fluid Mechanics- II
(OLD)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.

N.B
1) Q. no 1 & Q.no. 6 are compulsory
2) Solve any two question from remaining question from each section
3) Assume suitable data if necessary

Section A

Q.1   Solve any five   10

1) Define Froude number.

2) Define hydro dynamically smooth boundary.

3) Define Dynamic Similarity.

4) Define gradually varied flow.

5) Explain the specific energy of a flowing liquid.

6) State Buckingham π Theorem.

7) What do you mean by water hammer.

8) Give the momentum equation for flow through open channel.

9) Define flow in open channel.

10) What is a Compound pipe.

Q.2   A) Find an expression for the power transmission through pipes.   07

B) Calculate the discharge through a pipe of diameter 200mm when the difference of   08
pressure head between the two end of a pipe 500m apart is 4m of water. Take the value of
f=0.009.

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Q.3   A) State & prove the condition under which the trapezoidal section of an open channel will be   07
most economical.

B) The discharge of water through a rectangular channel of width 8m, is 15m^3/sec when the   08
depth of flow is 1.2m. Calculate;-
    i)   Specific energy of the flowing water.
    ii)   Critical depth and Critical velocity
    iii)   Value of minimum specific energy

Q.4   A) The time period (t) of a pendulum depends upon the length [L] of the pendulum and   07
acceleration due to gravity [g]. Derive an expression for the time period using Rayleigh's
method.

B) Explain the procedure for solving problems by Buckingham's π Theorem.   08

Q.5   Write Short notes on:- (Any Three)   15

    i)   Backwater Curve and Afflux
    ii)   Classification of flow in open channels
    iii)   Hydraulic Jump and energy dissipation
    iv)   Slope Profiles

Section B

Q.6   Solve Any Five   10

1) Draw outlet velocity triangles for centrifugal pump.

2) What is reciprocating pump?

3) What precaution should be taken against Cavitation.

4) In a Single acting pump Q_{th} = 10.45 lit/sec Cd=0.96 , find Q_{act}.

5) Draw ideal indicator diagram.

6) What is basis of selection of turbine at a particular place.

7) Draw inlet velocity triangle for Pelton wheel turbine.

8) Define governing of turbines.

9) Define Similitude.

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10) Define Euler's number.

Q.7   A) Find an expression for force exerted by a jet on stationary curved plate.   07

B) A jet of water having a velocity of 15m/sec strikes a curved vanc at centre which is moving   08
with velocity of 5m/sec in the direction of jet. The jet is deflected through an angle of
165^0. Assuming the plate is smooth find:-
i)   Force exerted on the plate in the direction of jet.
ii)   Power of jet.
iii)   Efficiency of jet.

Q.8   A) Derive an expression for specific speed of a centrifugal pump.   07

B) What do you understand by the characteristic curve of a turbine? Name the important   08
types of characteristic curves.

Q.9   A) Derive an expression for friction head in suction and delivery pipe of reciprocating pump.   07

B) A single acting reciprocating pump has piston diameter 12.5cm and stroke length 30cm.   08
The centre of the pump is 4m above the water level in the pump. The diameter and length of
suction pipe are 7.5cm and 7m respectively. The separation occurs if the absolute pressure
head in the cylinder during suction stroke falls below 2.5m of water. Calculate the
maximum speed at which the pump can run without separation. Take atmospheric pressure
head = 10.3m of water.

Q.10   Write Short Notes on Any Three   15

i)   Hydraulic Ram
ii)   Hydraulic Press
iii)   Hydraulic Crane
iv)   Hydraulic Lift

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