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SARDAR PATEL UNIVERSITY

B.Sc. Industrial Chemistry

(Semester – 5TH) EXAMINATION

25th NOVEMBER 2013, Monday

Course No. : US05CICH06

(Fluid Mechanics and Heat Transfer)

Total Marks: 70 **Time: 10:30 to 1:30pm**

Q.1 Answer the given multiple choice questions. **[10]**

1. The branch of engineering science which deals with the behaviors of liquid fluids at rest is called
   a)Aerodynamics b)Hydrodynamics c)Hydrostatic d)Aerostatic
2. A fluid is a substance which is
   a) Capable to flow c)No definite shape
   b) Undergoes deformation when subjected to shear force d) All of the above
3. The fluids which follows Newtons law of viscosity is called
   a) Newtonian fluid c) Compressible fluid
   b) Non newtonian fluid d) None of these
4. The pressure developed by the pump impeller is proportional to the _____of fluid in the impeller.
   a)Temperature b) velocity c) density d) volume.
5. An air tight chamber in which impeller rotates is
   a)Casing c) Sump
   b) Foot valve d) None of these
6. A tube is specified by its
   a) Thickness only. c) outer diameter only
   b) Thickness and outer diameter both d) inner diameter.
7. When a wall is formed out of series of layers of different materials it is called
   a) Separated wall c) Composite wall
   b)Layered wall d) None of these
8. The distance between two tubes is known as
   a) Pitch b) Clearance c) Economy d) Efficiency
9. Extended surface heat exchangers are well suited for handling ----------fluids
   a) Viscous b) Denser c) Volatile d) corrosive
10. Graphite heat exchangers are well suited for
    a)Corrosive fluid c)Viscous
    b)Salty d)All of the above

Q.2 Attempt any Ten. **[20]**

i. Explain Laminar Flow and Turbulent Flow
ii. Draw the diagram of Inclined manometer and write its equation.
iii. Explain compressible and incompressible fluids.
iv. Define :Capacity and economy
v. Discuss different types of pipe fittings
vi. Write classification of pump.
vii. Explain Insulators.

Conti...

viii. What is L.M.T.D ?.

ix Write equation of Fourier's Law.

x State the advantages of floating head heat exchanger.

xi Write the difference between cooler and chiller.

xii Where scraped surface heat exchanger are useful.

Q.3a) Define fluid. Write classification of fluid mechanics. Discuss about different types of fluid in detail. [5]

b) Derive Bernoullie's equation . [5]

OR

Q.3a) Derive continuity equation. [5]

b) Derive an equation for loss of head due to sudden enlargement. [5]

Q.4 Discuss **[10]**
i) Reciprocating pump ii) Centrifugal pump.

OR

Q.4 Write a note on: Gate Valve and Globe valve **[10]**

Q.5a) Derive an equation for compound resistance in series **[5]**

b) Derive an equation for heat flow through a cylinder. **[5]**

OR

Q.5a) A furnace is constructed with 200 mm of fire brick, 100 mm of insulating brick and 200 mm of building brick. The inside temperature is 650^0C and the outside temperature is 165^OC.Find the heat loss per unit area and the temperature at the junction of the fire brick and insulating brick. **[5]**

Data:

Type of brick	'K' Kcal /hr m^oC
Fire Brick	5.2
Insulating Brick	0.5
Building Brick	2.0

b) Derive an equation for individual and overall heat transfer coefficient **[5]**

Q.6a) Discuss Kettle type reboiler. **[5]**

b) Write a note on: Finned tube heat exchanger. **[5]**

OR

Q.6a) With the help of diagram explain working of shell and tube heat exchanger. **[5]**

b) Write difference between single pass and multipass shell. **[5]**

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