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SARDAR PATEL UNIVERSITY
T.Y.B.Sc. Industrial Chemistry
(Semester – 5th) EXAMINATION
Friday, 22nd November 2019
Course No. : US05CICH06
(Fluid Mechanics and Heat Transfer)

Total Marks: 70   Time: 10.00am to 1.00pm

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

1. What is the unit of kinematic viscosity in SI unit?
   a)m^2/sec   c)N/m^2.sec
   b)Kg.sec/m   d) None of these.

2. Continuity equation is based on
   a) Law of conservation of mass   c) Both a) and b)
   b) Law of conservation of energy   d) None of these

3. The branch of science which studies the behavior of gaseous fluid in motion is
   a)Hydrostatic   c) Hydrodynamics
   b)Aerostatic   d)Aerodynamics

4. Volute converts the .... energy of the liquid imparted by the impeller to pressure energy.
   a)Mechanical   b) Kinetic   c) Potential   d) Translational.

5. A tube is specified by its
   a) Thickness only.   c) Outer diameter only
   b) Thickness and outer diameter both   d) Inner diameter.

6. A Simplex pump is the one having only .... Cylinder.
   a)Four   b)Two   c)Three   d) One

7. The distance between two tubes is known as
   a) Pitch   c)Clearance
   b) Economy   d)Efficiency

8. The ratio of the useful hydraulic work performed to the actual work input is known as
   a) Capacity   b) NPSH   c) Overall Efficiency   d) None of these

9. Extended surface heat exchangers are well suited for handling ------------fluids
   a) Viscous   c) Denser
   b) Volatile   d) corrosive

10. Widely used heat exchanger in paraffin wax plant is
    a)Graphite   c)Finned Tube
    b)Scrapped Surface   d)All of these

Q.2   Attempt any ten.   [20]
i.   Discuss about Absolute viscosity and Kinematic viscosity.
ii.   Define :Laminar flow and Turbulent flow
iii.   Draw and explain Inclined Manometer.
iv.   Write about Pipe and Tube.
v.   What is Priming and why it is done?.
vi.   Define: Capacity and Overall efficiency.
vii   Define: Thermal Conductivity and explain Conductors.
viii.   Write the statement of Fourier's Law.
ix.   Explain Natural convection and Forced Convection.

(1)   (P T O)

x.   What is fouling factor?
xi.   When Scrapped surface heat exchanger is used.?
xii. Explain Pitch and Clearance.

Q.3a) Write classification of fluid based on viscosity.   [5]
  b)   Derive Continuity Equation.   [5]

                                    OR

Q.3 a) Derive Bernoullies Equation.   [5]
  b)   Write a note on: Differential Manometer.   [5]

Q.4a) With the help of diagram explain working of Reciprocating Pump.   [5]
  b)   Discuss Nash Hystor Pump.   [5]
                                    OR
Q.4a) Discuss about different types of impellers used in centrifugal pump.   [5]
  b)   Write a note on: Gear Pump.   [5]

Q.5a) A furnace is constructed with 200 mm of fire brick, 100 mm of insulating brick and 200   [5]
       mm of building brick. The inside temperature is 650^{0}C and the outside temperature is
       165^{0}C.Find the heat loss per unit area and the temperature at the junction of the fire
       brick and insulating brick.
       Data: Type of brick   'K' Kcal /hr m°C
             Fire Brick   5.2
             Insulating Brick   0.5
             Building Brick   2.0
  b)   Derive an equation for heat flow through cylinder.   [5]
                                    OR
Q.5a) Derive an equation for heat flow through Sphere.   [5]
  b)   Derive an equation for individual and overall heat transfer coefficient.   [5]

Q.6a) With the help of diagram explain working of Shell and Tube Heat Exchanger.   [5]
  b)   Describe working of Finned Tube Heat Exchanger.   [5]
                                    OR
Q.6a) Write a note on: Plate Type Heat Exchanger.   [5]
  b)   Discuss Graphite heat exchanger.   [5]

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