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SARDAR PATEL UNIVERSITY  
EXTERNAL EXAMINATION  
B.SC. INDUSTRIAL CHEMISTRY  
(FIFTH SEMESTER)  
US05CICH06: Fluid Mechanics and Heat Transfer  
SATURDAY, 3<sup>RD</sup> November, 2018

Time: 10:00 am to 1:00 pm

Total Marks: 70

Q-1 Answer the following multiple choice question. [10]

- Which of the following Reynolds number indicates laminar flow?
  - 1500
  - 3500
  - 15000
  - 5000
- The branch of engineering science which deals with the behavior of liquid in motion is called \_\_\_\_\_.
  - Flow dynamic
  - Hydrodynamics
  - Motion of fluids
  - None of above
- The impeller blades of the centrifugal pump in revolving produce a reduction in \_\_\_\_\_ at the eyes of the impeller.
  - Pressure
  - Temperature
  - Volume
  - Resistance
- The shortest center to center distance between the adjacent tubes is known as the \_\_\_\_\_.
  - Tube pitch
  - Clearance
  - Square pitch
  - Baffles
- A simplex pump is the one having only \_\_\_\_\_ cylinder.
  - Four
  - Two
  - Three
  - One
- Measure of ability of a substance to conduct heat is known as \_\_\_\_\_.
  - Thermal conductivity
  - Temperature
  - Heat transfer coefficient
  - Convection
- The quantity of heat transferred in a unit time through a unit area at one degree temperature difference between the surface and surrounding is known as \_\_\_\_\_.
  - Heat transfer coefficient
  - Sensible heat
  - Latent heat
  - None of above
- The well suited heat exchanger for corrosive fluid is \_\_\_\_\_.
  - Graphite block heat exchanger
  - Seal & Tube
  - A & B Booth
  - All of these
- The long metal strips attached to the outside of the pipe are \_\_\_\_\_ fins.
  - Circular
  - Square
  - Longitudinal
  - None of these
- Widely used heat exchanger in paraffin wax plant is \_\_\_\_\_ heat exchanger.
  - Scrapped surface
  - Single pipe
  - Seal & Tube
  - None of these

Q-2 Answer any ten of following.

[20]

- Define the following terms:
  - Ideal fluid
  - Bingham plastic
- Write the equation for head loss due to sudden enlargement & contraction.

①

(P.T.O.)

3. What is pressure head & pressure energy?
  4. Distinguish between volute and diffuser type casing.
  5. Enlist the names of various type of pump.
  6. Define the following terms:
    - a. Priming
    - b. Cavitation
  7. Enlist the various methods of heat transfer.
  8. What is fouling factor?
  9. Write the importance of insulators in industries.
  10. Enlist the advantages of plate type heat exchanger.
  11. In which situation kettle type reboiler is used?
  12. What do you mean by 1-2 & 2-4 shell & tube heat exchanger?
- Q-3** a. Discuss the Reynolds experiment. [05]  
 b. Discuss differential manometer with suitable diagram. [05]
- OR**
- Q-3** a. Derive the Bernoulli's theorem. [05]  
 b. Write classification of fluid based on viscosity. [05]
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- Q-4** Discuss the centrifugal pump with neat sketch and explain different types of impeller for centrifugal pump. [10]
- OR**
- Q-4** Discuss the following with neat sketch: [10]  
 1. Gear Pump  
 2. Diaphragm pump.
- Q-5** a. Derive an equation for individual heat transfer coefficient. [05]  
 b. Derive an equation for heat flow through sphere. [05]
- OR**
- Q-5** a. Derive an equation for resistance in series. [05]  
 b. Derive an equation for heat flow through cylinder. [05]
- Q-6** a. Discuss the working of floating head heat exchanger with neat sketch. [05]  
 b. Explain in detail about double pipe heat exchanger. [05]
- OR**
- Q-6** a. Write a detail note on scrapped surface heat exchanger. [05]  
 b. Explain in detail about U-tube heat exchanger with neat diagram. [05]

