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SEAT No. \_\_\_\_\_



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**SARDAR PATEL UNIVERSITY**  
**B.Sc. Industrial Chemistry**  
**(Semester –VI) EXAMINATION**

Date: 07/04/2022, Thursday Course No.: US06CICH24

**(Process Control for Heat and Mass Transfer Operations)**

Total Marks: 70

Time: 3.00 pm to 5.00 pm

**Q.1 Answer the given multiple choice questions.**

[10]

- 1 Bob and Tape method is used for the measurement of  
a) Pressure                      b) Level                      c) Density                      d) None of these
- 2 The wire which connects the measuring junction of the thermocouple to the indicating instrument is known as  
a) Copper wire                      c) Both (a) and (b)  
b) Lead wire                      d) None of these.
- 3 A body which absorbs all the radiation falling on it is known as  
a) White body                      c) Stefan Body  
b) Black body                      d) None of these.
- 4 Triangular Notch is used to measure  
a) Open channel flow                      b) Closed channel flow  
c) Both a) and b)                      d) None of these
- 5 Flow measuring instrument work based on variable area is  
a) Venturimeter                      b) Orifice meter                      c) Rotameter                      d) V-Notch
- 6 The undesirable oscillation of an automatic control system is known as  
a) Error                      c) Hunting  
b) Offset                      d) None of the above
- 7 Graphite block heat exchangers are well suited for handling -----fluids  
a) Viscous                      c) Denser  
b) Volatile                      d) Corrosive
- 8 Equipment which uses refrigerant such as ammonia for cooling is a.....  
a) Chiller                      b) cooler                      c) boiler                      d) heater.
- 9 Rayleigh's equation is valid for \_\_\_\_\_ distillation  
a) Simple                      b) Flash                      c) Continuous                      d) Rectification.
- 10 Spray Dryer is used for the production of  
a) Dye                      b) Milk Powder                      c) Bricks                      d) Polymer



**Q.2 True or False**

[08]

- 1 The instrument which does not require manual assistance for their operation is manual instrument.
- 2 Magnetic float is used for the measurement of vacuum.
- 3 The difference between set point and actual value is known as error.
- 4 The lag due to the property of material to store energy is termed as capacitance lag.
- 5 Thermal conductivity depends upon nature of the material.
- 6 The distance between two tubes is known as Pitch.
- 7 Atomizer is the integral part of spray dryer.
- 8 Separation by distillation is not possible when relative volatility is equal to one.

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**Q.3 Short Answer Questions (Attempt any 10 out of 12)**

[20]

- 1 Write the principle of liquid expansion thermometer.
- 2 Explain Sight glass method used for level measurement.
- 3 Differentiate direct and indirect measurement.
- 4 Discuss about pitot tube.
- 5 Write classification of open channel flow measuring devices.
- 6 Write any two differences between analog and digital type indicator.
- 7 Write the statement of Fourier's Law.
- 8 Write the difference between condenser and Reboiler.
- 9 Explain working of double pipe heat exchanger.
- 10 Define: Relative volatility and state Raoult's Law.
- 11 Explain Bound Moisture and Unbound Moisture.
- 12 What is reflux ratio? Draw a diagram of Rectification column..

**Q.4 Long Answer Questions (Attempt any Four)**

[32]

- 1 Write a note on; Resistance Temperature Detector.
- 2 Discuss classification of instruments based on different parameters.
- 3 Derive an equation for Orificemeter. Also write its principle, working, advantages and disadvantages.
- 4 Write notes on: Rectangular notch and ON-OFF Control.
- 5 With the help of diagram explain working of Shell and Tube Heat Exchanger.
- 6 Derive an equation for heat flow through a sphere.
- 7 Derive mass and Energy balance equation for distillation column.
- 8 Discuss working of tunnel dryer.

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