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No. of Printed Pages: 02

SARDAR PATEL UNIVERSITY
B.Sc. Industrial Chemistry
(Semester – 1ST) EXAMINATION
29th NOVEMBER 2013, Friday
Course No. : US01CICV02
(Process Calculation)

Total Marks: 70

Time: 2:30 to 4:30pm

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

1. The average atmospheric pressure of mercury is _____
a) 29.92 psi b) 17.40 c) 15.90 psi d) 14.70psi
2. Which of the following is the equation of Charles law
a) $P/T = \text{Constant}$ b) $V/T = \text{Constant}$ c) $T/V = \text{Constant}$ d) $V \times T = P$
3. With increase in rate of vaporization, vapour pressure will _____
a) Remains constant b) Decrease c) Increase d) None of the above
4. Limiting reactant is in less amount than
a) Stoichiometric requirement c) Both (a) and (b)
b) Theoretical requirement d) None
5. Material balance calculations is based on
a) Law of conservation of energy c) Both (a) and (b)
b) Law of conservation of mass d) None of these
6. Physical Changes take place in _____
a) Unit Process b) Unit Operation c) Both a & b d) None of these
7. The energy associated with system due to its motion is known as _____
a) Kinetic energy c) Internal energy
b) Solar energy d) Renewable energy
8. A process in which no heat can leave or enter the system is known as _____
a) Continuous process c) Batch process
b) Adiabatic process d) None of the above
9. Orsat apparatus is used to _____
a) Analyze gas b) Separate oxygen c) Purify the air d) None of the above
10. The rapid reaction of fuel with oxygen is known as _____
a) Combustion b) Distillation c) Humidification d) Both (a) and (c)

Q.2 Attempt any Ten. [20]

- i. State and explain Raoult's law and Henry's law.
- ii. State Dalton's law and Amagat's law.
- iii. Define weight percentage and mole percentage.
- iv. Explain Batch and Continuous Processes
- v. Differentiate between Unit operation and Unit Process with suitable examples
- vi. Explain the law of conservation of mass.
- vii. What do you mean by heat of combustion, explain using suitable example?
- viii. Write down the equation for energy balance during phase change operation
- ix. Define: Standard heat of formation, Heat of combustion
- x. Discuss about excess and limiting air.

(1)

- xi Define molal Humidity and Specific heat.
xii Explain Saturation humidity, Relative humidity

- Q.3a) Write a note on : Vapour pressure of solids. [5]
b) Explain the effect of temperature on vapour pressure [5]

OR

- Q.3a) List and explain different methods used to express the composition of solution and mixtures [5]

- b) Derive ideal gas equation. [5]

- Q.4a) A single effect evaporator is fed with 10000 kg/hr of weak liquor containing 15% caustic by weight and is concentrated to get thick liquor containing 40% by weight caustic (NaOH). Calculate a) kg/hr of water evaporated b)kg/hr of thick liquor obtained. [5]

- b) Write a note on: Bypass operation. [5]

OR

- Q.4a) Write a short note on: Process flow sheet. [5]

- b) Discuss the outline of a procedure for solving material balance calculation. [5]

- Q.5a) Explain Hess law of constant heat summation. [5]

- b) Discuss effect of pressure on Heat of Reaction. [5]

OR

- Q.5a) Derive the relation between C_p and C_v for ideal gas. [5]

- b) Explain in brief Latent heat of phase change. [5]

- Q.6 Explain complete and partial combustion with suitable examples. [10]

OR

- Q.6 Write a note on: OrsatAnalyzer. [10]

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