

SARDAR PATEL UNIVERSITY
B.Sc. (I Semester) Examination
12th April 2016 (Tuesday)
2.30 pm – 4.30 pm
INDUSTRIAL CHEMISTRY (VOCATIONAL)
US01CICV02 – Process Calculation

Total Marks : 70

- Q-1** **Select right option in the following questions.** (10)
- I In a system of immiscible liquids which of the following will vaporize first?
 a. Bottom layer c. Liquid having low boiling point
 b. Upper layer d. Liquid having high boiling point
 - II Molecular weight of H_2SO_4 is _____
 a. 78 gm/mole b. 89 gm/mole c. 97 gm/mole d. 98 gm/mole
 - III With increase in rate of vaporization, vapour pressure will _____
 a. Remains constant b. Decrease c. Increase d. None of the above
 - IV Chemical changes takes place in _____
 a. Unit Process b. Unit Operation c. Both a & b d. None of the above
 - V Diesel can be separated from crude petroleum by _____
 a. Distillation b. Halogenation c. Evaporation d. Extraction
 - VI Which of the following is an Unit operation
 a. Halogenation b. Alkylation c. Oxidation d. Evaporation
 - VII 1 calorie = _____ joules
 a. 4.184 b. 4.181 c. 4.814 d. 4.418
 - VIII The energy associated with system due to its motion is known as _____
 a. Kinetic energy b. Internal energy c. Solar energy d. Renewable energy
 - IX The rapid reaction of fuel with oxygen is known as _____
 a. Combustion b. Distillation c. Humidification d. Both (a) and (c)
 - X Air contains _____ percentage of oxygen.
 a. 22.4 b. 20 c. 21 d. 2

- Q-2** **Answer any TEN of the following in short:** (20)
- I Define the terms Normality and Molarity.
 - II Calculate the molecular weight of following
 (a) NaOH (b) KOH (c) CaO.
 - III State and explain Raoult's law.
 - IV Define the following terms:
 (a) Unit operation (b) Unit Process.
 - V Explain Batch and Continuous Processes
 - VI Draw the block diagram of following unit operations.
 (a) Evaporation (b) Distillation
 - VII Define energy and write down the forms of energy.
 - VIII Write down the first law of thermodynamics.
 - IX Define calorie and write down the units of heat energy.
 - X Define: Dew point.
 - XI Define combustion.
 - XII Draw the fire triangle.

(P.T.O.)

- Q-3 (a) Derive ideal gas equation. (05)
(b) State and explain Dalton's law of partial pressure (05)
OR
- Q-3 (a) State and explain Henry's law. (05)
(b) Explain the effect of temperature on vapour pressure (05)
- Q-4 A single effect evaporator is fed with 15000 kg/hr. of weak liquor containing 25% caustic by weight and is concentrated to get thick liquor containing 65% by weight caustic (NaOH). Calculate (10)
(a) kg/hr. of water evaporated
(b) kg/hr. of thick liquor obtained
OR
- Q-4 (a) Discuss the outline of a procedure for material balance calculation (05)
(b) Explain in detail Bypass and Purge operation. (05)
- Q-5 (a) Explain in brief Latent heat of phase change (05)
(b) Effect of pressure on Heat of Reaction. (05)
OR
- Q-5 (a) Explain in detail Hess law of constant heat summation (05)
(b) Derive the relation between C_p and C_v for ideal gas. (05)
- Q-6 Explain in detail construction and working of Orsat gas analyser for flue gas analysis (10)
OR
- Q-6 (a) Write a short note on Humidification. (05)
(b) Give the formula to calculate theoretical air and excess air (05)

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(2)