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SARDAR PATEL UNIVERSITY
External Examination
B.Sc. (First Semester) Industrial Chemistry Vocational
US01CICV02 :Process Calculation

16/11/16, Wednesday

Time: 10:00 am to 12:00 noon **Total Marks: 70**

Q-1 **Answer all the following MCQs(10 *1 =10 marks)**

I The number of gram-equivalents of solute dissolved in one litre of solution known as
a. Molarity b. Normality c. Molality d. Formality

II Unit of density is expressed by _____
a. gm/c.c b. W/c.c c. KJ/c.c d. None of the above

III Which of the following is the equation of Charles law
a. P/T = Constant b. V/T = Constant c. T/V = Constant d. V x T = P

IV Which one is not a unit operation?
a. Distillation b. Evaporation c. Filtration d. Nitration

V Material balance is based on law of conservation of _____
a. Energy b. Mass c. Heat d. both a & c

VI Which one is the unit operation?
a. Oxidation b. Evaporation c. Sulfonation d. Nitration

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 Air contains 21 percentage of _____.
a. Carbon b. Carbon dioxide c. Oxygen d. Nitrogen

X The rapid reaction of fuel with oxygen is known as _____
a. Combustion b. Distillation c. Humidification d. Evaporation

Q-2 **Answer any ten of the following(10 *2 =20 marks)**

I Find the molecular weight of. H_2SO_4 and Na_2CO_3

II Enlist the different systems of units.

III Define **Normality** and **Molarity**

IV Define **Unit Operation** and **Unit Processes**

(P.T.O.)

V What is chemical engineering and chemical process?

VI Draw different types of diagram to explain chemical process.

VII What is Energy? Give its units.

VIII Define **Extensive property** and **Intensive property**

IX State the first law of thermodynamics

X Differentiate between complete combustion and partial combustion

XI Define Theoretical oxygen

XII What is adsorption?

Q-3 (A) An aqueous solution of sodium chloride is prepared by dissolving 25Kg of sodium chloride in 100Kg of water. Find **Weight %** and **Mole %** (05)

(B) 98 gms of sulphuric acid (H_2SO_4) are dissolved in water to prepare one litre of solution. Find its *normality* and *molarity*. (05)

OR

Q-3 (A) Give fundamental quantities in different system of units. (05)

(B) Explain different methods of expressing the composition of mixture and solutions. (05)

Q-4 (A) Define and explain with suitable block diagram: 1. **Distillation** 2. **Evaporation** (05)

(B) A single effect evaporator is fed with 10,000 kg/h of weak liquor containing15% caustic by weight and is concentrated to get thick liquor containing 40% by weight caustic. Calculate… (05)

I. kg/h of water evaporated and

II. kg/h of thick liquor obtained

OR

Q-4 (A) Explain in detail systems of chemical process. (05)

(B) Explain in detail unit operation. (05)

Q-5 (A) Explain energy balance and give procedure for energy balance problems. (05)

(B) Explain first law of thermodynamics for the steady state steady flow process. (05)

OR

Q-5 (A) Explain in detail Heat capacity. (05)

(B) Derive the relation between Cp and Cv for ideal gas. (05)

Q-6 Explain in detail adsorption of gases by solids. (10)

OR

Q-6 Give detail comparison between physical adsorption and chemisorptions. (10)