

GUJARAT TECHNOLOGICAL UNIVERSITY
DIPLOMA ENGG.- SEMESTER-III EXAMINATION – WINTER 2012

Subject code: 330503**Date: 04/01/2013****Subject Name: Industrial Stoichiometry****Time: 2:30 pm – 5:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. English version is Authentic

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|-------------|---|-----------|
| Q.1 | (a) Define: 1. Force. 2. Pressure 3. Work. 4. Density. | 08 |
| | (b) A rectangular tank having dimensions 4 m x 2 m x 5 m is filled with acid of density 1.2 in C.G.S units. Calculate mass of acid in tank. | 06 |
| Q.2 | (a) Prove that $PV = nRT$. | 07 |
| | (b) A sample of caustic soda flakes contain 60% Na ₂ O by weight. Find purity of flakes. | 07 |
| | OR | |
| | (b) Convert 294 grams per liter sulphuric acid in to Normality and Molarity. | 07 |
| Q.3 | (a) Prove that mole% = Volume % = Pressure %. | 07 |
| | (b) A gas contain Hydrogen 80%, Oxygen 10% and Carbon dioxide 10% by volume. Calculate composition in weight %. | 07 |
| | OR | |
| Q.3 | (a) A sample of groundnut seeds contain 45% oil, 40% solids and rest moisture. After extraction, cake composition is 80 % solids, 5% oil and rest moisture. Find % recovery of oil. | 07 |
| | (b) A 100 kg cellulose solution contains 5.2% cellulose by wt. How many kilograms of 1.2 % solution are required to dilute original solution to make final solution of 4.2%. | 07 |
| Q.4 | (a) A feed contains 60% Benzene. Top product contain 95% Benzene and bottom product contain 96% toluene. Find quantities of top and bottom products. | 07 |
| | (b) Give importance of mass balance. | 07 |
| | OR | |
| Q. 4 | (a) 500 grams of acetic acid is mixed with 1 liter of water. Find weight ratio and mole ratio of acetic acid. | 07 |
| | (b) Give importance of stoichiometry. | 07 |
| Q.5 | (a) A coal sample has 75% carbon, 8% hydrogen 6% sulphur and rest ash. Calculate quantity of air required for complete combustion of 100 kg of coal. | 07 |
| | (b) 200 kg Nitrobenzene is prepared from benzene and nitric acid. Calculate amount of benzene and nitric acid required. | 07 |
| | OR | |
| Q.5 | (a) Derive equation for heat of reaction. | 07 |
| | (b) Ammonia is prepared taking 100 kg nitrogen and 50 kg hydrogen. Find limiting reactant and quantity of ammonia formed. | 07 |
