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NA—192—2023

FACULTY OF SCIENCE

B.Sc. (First Semester) EXAMINATION

NOVEMBER/DECEMBER, 2023

(New Pattern)

INDUSTRIAL CHEMISTRY

Paper-II

(Material Balance and Process Calculation)

(Tuesday, 26-12-2023)

Time : 10.00 a.m. to 12.00 noon

Time—2 Hours

Maximum Marks—40

N.B. :— (1) Solve *all* questions.

(2) Scientific calculator is allowed.

1. Explain and derive ideal gas law $PV = nRT$. 5 kg of oxygen containing a closed container of volume 1 M^3 is heated without exceeding a pressure of 709.28 kPa. Calculate maximum temperature in gas attained. 15

Or

- (a) What are molarity and molality ? 8
- (b) A solution of caustic soda contains 20% NaOH taking density of the solution 1.196 kg/lit. 7

Find :

- (a) Normality
- (b) Molarity and molality.

P.T.O.

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(2)

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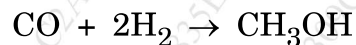
2. A single effect evaporator is fed with kg/hr of weak liquor containing 15% caustic by weight and is concentrated to get thick liquor containing 40% by weight caustic NaOH. 15

Calculate :

- (a) kg/hr of water evaporated
(b) kg/hr thick liquor obtained.

Or

The carbon monoxide is reacted with hydrogen to produce methanol calculate from the reaction : 15



- (a) Stoichiometric ratio H_2 to CO , and K mol of CH_3OH produced per K mol CO reacted. 8
- (b) Weight ratio of CO to H_2 if both are fed to reactor in a stoichiometric proportion and the quantity of CO required to produce 100 kg of CH_3OH . 7
3. Write short notes on (any two) : 10
- (a) Unit system
(b) Force and pressure and its unit
(c) Convert 1000 dyne to newton
(d) Distillation.

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