Q.33 How average molecular weight of gas mixture is calculated?

Q.34 Convert 327°K into °R

Q.35 Calculate the amount of $H_2SO_4$ in grams needed to prepare 1 litre of 2N $H_2SO_4$ solution.

## SECTION-D

**Note:** Long answer type questions. Attempt any two questions out of three questions. (2x10=20)

Q.36 Write short note on

a) Hess Law of contant heat summation.

b) Recycle Material Balance.

Q.37 For-Ideal Gas mixture, Prove that Moles% = volume %= Pressure %

Q.38 10000 kg/hr of solution containing 20% methanol is continuously fed to distillation column. Distillate is found to contain 98% methanol and waste solution from the column carrues 1% methanol. All percentage are by weight. Calculate

a) mass flow rates of disyllable and bottom product

b) percent loss of methyl alcohol.





**3rd Sem / Chemical Engg. Pulp & Paper Tech.**
**Subject:- Chemical Process Calculations**

Time : 3Hrs. M.M. : 100

## SECTION-A

**Note:** Multiple choice questions. All questions are compulsory (10x1=10)

Q.1 Equivalent weight of $CaCl_2$

a) 65.5 b) 55.5

c) 75.5 d) 85.5

Q.2 Formula of Pressure

a) Area/Force b) Force/ Area

c) Workdone/Area d) Area/workdone

Q.3 Unit of Molarity of solution

a) moles/kg b) unitless

c) moles/litre d) gram/ litre

Q.4 Name of in Ideal Gas equation.

a) universal gas constant

b) Plank constant

c) Steafan constant

d) None of these

Q.5 Molecular weight of $H_2SO_4$

a) 49 b) 98

c) 73 d) 43

Q.6 Name SI unit of Pressure

a) Pascal b) Newton/ $cm_2$

c) $lbs/inch^2$ d) Bar

Q.7 Average molecular Weight of Air

a) 31.84 b) 29.84

c) 30.84 d) 28.84

Q.8 Heat capacity at Constant Pressure is devoted by

a) $C_V$ b) $C_P$

c) $C_T$ d) $C_H$

Q.9 Unit of T in PV = nRT

a) $^oC$ b) $^oR$

c) $^oK$ d) $^oK$

Q.10 Katoms of carbon which weighs 36kg

a) 3 b) 9

c) 6 d) 12

## SECTION-B

**Note:** Objective type questions. All questions are compulsory. (10x1=10)

Q.11 Define Normality of solution.

Q.12 Convert 125 Pascal into Dynes/ $cm^2$

Q.13 Define unit operation.

Q.14 State boyle's law



Q.15 Calculate k moles of NaoH in 160 gram NaOH.

Q.16 State Dalton's Law.

Q.17 Define heat of combustion.

Q.18 Expand SI

Q.19 Define Mole fraction.

Q.20 Expand STP.

## SECTION-C

**Note:** Short answer type questions. Attempt any twelve questions out of fifteen questions. (12x5=60)

Q.21 Calculate value of universal gas consultant R in J/mole k.

Q.22 Write briefly history of Chemical Engineering.

Q.23 How many kg of sulphur are present in 64 kg $So_2$?

Q.24 Define standard heat of reaction.

Q.25 Define weight fraction and weight percent.

Q.26 Define theoretical air.

Q.27 Discuss Charles' Law and Amagat's Law of gases.

Q.28 Write short note on by pass Material Balance.

Q.29 Give Differences between Unit Operation and unit process.

Q.30 Convert 372 $Btu/ft^3$ of hr into $MJ/m^3\ ^oC$ sec

Q.31 Define Gross calorific value of fuel and its unit.

Q.32 Define Combustion.