Q.30 Explain the terms Molarity and Normality with their Mathematical relations

Q.31 How many moles of $H_2 SO_4$ will contain 64 kg of sulphur

Q.32 Define theoretical and excess air in combustion

Q.33 What is a recycle stream ? Describe with the help of diagram

Q.34 Define combustion , Sensible heat and latent heat

Q.35 Discuss any one of the following

(I) Amagat's law (II) boyle's law

SECTION-D

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

Q.36 The feed contains 50% benzene and 50% toluene is fed to a distillation column at the rate of 5000 kg/h. Atop product contains 95% benzene and the bottom product contains 92% toluene. All percentages are by weight. Calculate

(i) the mass flow rate of top and bottem products

(ii) Percentage recovery of benzene

Q.37 Explain in detail about Hess's law of constant heat summation

Q.38 Discuss the concept of material balance and write the step of procedure to carry out material balance

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3rd Sem / CHEMICAL ENGINEERING, CHEM(P&P).CHEM(SPT), CHEM(SPE)

Subject:- CHEMICAL PROCESS CALCULATIONS/Ind. CHEM CAL .

Time : 3Hrs. M.M. : 100

SECTION-A

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

Q.1 Concept of Energy balance is based upon

a) Conservation of mass
b) Conservation of energy
c) Conservation of Momentum
d) Conservation of volume

Q.2 A reaction which absorbs heat is called

a) Exothermic reaction
b) Endothermic reaction
c) Neutral reaction
d) Autocatalytic reaction

Q.3 Full Form of MKS system is

a) Material kilogram system
b) Mass kelvin system
c) Mass kilogram second
d) None of the above

Q.4 In ideal gas law N stands for

a) Negative b) Number of Moles

c) Non dimensional d) None

Q.5 Unit of specific gravity is

a) kg/m^3 b) m/sec^2

c) kg/m sec d) None of the above

Q.6 100 cm is expressed as

a) 10mm b) 10dm

c) 100m d) 100km

Q.7 Standard temperature in Degree Celsius is Equal to

a) 298.15 degree Celsius

b) 273.15 degree Celsius

c) 25 degree Celsius

d) 0 degree Celsius

Q.8 Unit of Density are

a) kilogram b) centimeter

c) kg/m^3 d) kelvin

Q.9 1^0 C=..... K

a) 10 b) 274.15

c) 373.15 d) 0

Q.10 C_v is the heat capacity at

a) Constant velocity b) clear volume

c) Constant volume d) None

SECTION-B

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

Q.11 Define Combustion

Q.12 State Sensible heat

Q.13 Define Material Balance

Q.14 Write SI units of universal gas constant (R)

Q.15 Define latent heat of fusion

Q.16 Define unit processes

Q.17 Convert 36 HP into Watts

Q.18 Draw the labeled diagram of purge stream

Q.19 One mm Hg=_____Torr.

Q.20 Material balance is based on law of conservation of_____

SECTION-C

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

Q.21 Define heat of reaction and heat of formation

Q.22 Define Chemical Engineering ? Explain the future of Chemical Engineers

Q.23 Prove mole %= Pressure %=volume %

Q.24 Describe the concept of bypass stream with the help of neat diagram

Q.25 Describe in detail about unit operation

Q.26 Derive ideal gas equation

Q.27 Write the steps to be followed for energy balance calculation

Q.28 A natural gas has the following composition by volume CH_4=80%, C_2H_6=12%, N-butane-3% and rest N_2. Calculate the composition by weight

Q.29 Derive the relation between C_p and C_v