Q.21 Define and discuss the concept of excess air for combustion process in brief?

Q.22 State and explain standard heat of formation in brief?

SECTION-D

Note: Long answer type questions. Attempt any two questions out of three questions. (2x8=16)

Q.23 What is significance of material balance? Describe the general procedure for solving the material balance problem in detail?

Q.24 A solution of common salt (Molecular Weight 58.5 u) water is prepared by adding 20kg of salt to 100 kg of water, to make a liquid of density 1323 kg/m^3. Calculate the concentration of salt in this solution as a (a) weight fraction, (b) weight/volume fraction, (c) mole fraction, (d) molal concentration?

Q.25 Describe the general energy balance equation for closed system in detail along with different special cases?

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Sub.: Chemical Process Calculations

Time : 3Hrs. M.M. : 60

SECTION-A

Note: Multiple choice questions. All questions are compulsory (6x1=6)

Q.1 Which of the following is the correct material balance equation?

a) input+output=accumulation
b) input+accumulation=output
c) output+accumulation=input
d) input - output= accumulation

Q.2 Which of the following is decreased by the bypass stream?

a) Feed b) Product
c) Feed and product d) None of these

Q.3 The material balance is useful for?

a) Control of processing
b) Maximizing process yields
c) Minimizing product cost
d) All of these

Q.4 If shaft wok, kinetic an potential energy change tend to be negligible then simplified energy balance equation is?

a) $Q = \Delta U$ b) $Q = \Delta H$

c) $Q = \Delta U + \Delta H$ d) $Q = \Delta U - \Delta H$

Q.5 What is S.I. Unit of pressure?

a) N b) J

C) Pa d) W

Q.6 What is the percentage of excess air, if 10 moles of air entered the process and 5 moles of that are required

a) 5% b) 50%

c) 10% d) 100%

SECTION-B

Note: Objective type questions. All questions are compulsory. (6x1=6)

Q.7 Define the molarity?

Q.8 How many litre of liquid is present in $1 m^3$ of liquid?

Q.9 Write the name of fundamental law on which energy balance is based?

Q.10 What is theoretical air?

Q.11 Write the S.I. Unit of work?

Q.12 What is latest heat?

SECTION-C

Note: Short answer type questions. Attempt any eight questions out of ten questions. (8x4=32)

Q.13 Describe the force in brief along with its units and dimensions?

Q.14 Discuss in brief how will select the basis in material and energy balance calculations?

Q.15 Define and discuss material balance in brief?

Q.16 What is difference between C_p and C_v? How these two are related to each other?

Q.17 What is energy balance? Discuss its significance?

Q.18 Describe the recycle stream and bypass stream with the help of neat diagrams?

Q.19 What is difference between differential material balance and integral material balance?

Q.20 Discuss the different ways of expressing the concentrations in brief?