



NCD-003-047401 Seat No. _____

**B. Voc. (Pharm. Analysis & Qa) (Sem. IV)
(CBCS) Examination**

April / May - 2017

BVPAQA - 401 : Pharma. Engineering

Faculty Code : 003

Subject Code : 047401

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

Instructions : (1) All questions are compulsory & carry equal marks.

(2) Draw diagram and/or scheme wherever necessary.

1 (A) Answer the following questions : 10

- (1) What is STP? Give its unit.
- (2) Difference between Daltons law & Amagat's law.
- (3) What is the Normality of 4.5M HCl solution?
- (4) What is the law of conservation of mass?
- (5) What is general mass balance equation for continuous steady state process?
- (6) Define Stoichiometry.
- (7) Define and exemplify : Isolated system
- (8) Which metal tube is used in evaporator?
- (9) Enlist advantage of Rising Film Evaporator.
- (10) Define: (i) System (ii) Surrounding

(B) Answer the following multiple choice questions : 20

- (1) What is weight percent of sucrose in a solution made by dissolving 15gm of sucrose in 185gm of water?

- (2) Give the definitions and equations of Weight fractions.
- (3) Differentiate between Molarity & Molality.
- (4) Draw a process flow diagram for Distillation and write its overall and individual material balance equations. Or Explain in detail material balance of Distillation.
- (5) Draw a process flow diagram for Filtration and write its overall and individual material balance equations. Or Give a detailed account on material balance for Filtration process.
- (6) Write in detail about Limiting and Excessing Reactants.
- (7) Enthalpies of formation of $CO(g)$, $CO_2(g)$, $N_2O(g)$, and are -110 , -393 , 81 and 9.7 kJ/mol respectively. Find the value of ΔH_r for the reaction :

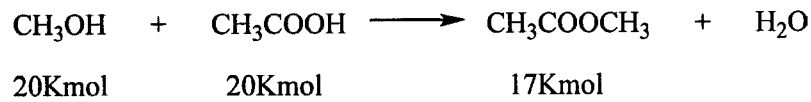
$$N_2O_4(g) + 3CO(g) \rightarrow N_2O(g) + 3CO_2(g)$$
- (8) Explain enthalpy of combustion with a suitable example.
- (9) Differentiate between Rising Film Evaporator and Falling Film Evaporator.
- (10) Write a note on requirement of recycle operation.

2 Answer any 4 out of the following 6 questions :

20

- (1) Derive ideal gas equation.
- (2) (a) How many moles of oxygen would you have if you had a volume of 60 lit. under a pressure of 1268mmHg at standard temperature? ($R = 0.082$ L.atm/K.mol).
- (b) 30 grams of $Al(OH)_3$ is dissolved into 500 grams of water. What is the mole fraction of $Al(OH)_3$ and water? The molecular mass of $Al(OH)_3$ is 78gm/mole. The molecular mass of water is 18gm/mole.

- (3) Write down the short note on Rault's law.
- (4) Discuss Hess's Law in detail with a suitable example.
- (5) Calculate conversion ration of methanol in following reaction :



3 kmol methanol was found in recycle stream.

- (6) Explain the theory of Falling Film Evaporator with diagram.

3 Answer any 4 out of the following 6 questions : **20**

- (1) Outline the detailed procedure for material balance calculation in general.
- (2) Give brief account on Percent Excess and Conversion including their equations explaining fractional and percent values.
- (3) What is Stoichiometry and Stoichiometric equation? Write about Stoichiometric Coefficient and Stoichiometric ratio with example.
- (4) Explain heat capacity. Define C_p , C_v and give relation between C_p and C_v .
- (5) Write a note on Purging Operation with example.
- (6) Write law of conservation of mass. Explain its importance with example.