B.TECH. SEM -VII (CHEMICAL 2014 COURSE (CBCS) : WINTER - 2017

SUBJECT: PLANT UTILITIES AND PROCESS SAFETY

Day: **Wednesday** Time: **02.30 PM TO 05.30 PM**
Date: **17/01/2018** **W-2017-2255** Max. Marks : 60

N. B. :

1) All questions are **COMPULSORY**.
2) Draw neat and labeled diagram **WHEREVER** necessary.
3) Use of non programmable **CALCULATOR** is allowed.
4) Assume suitable data, if required.

Q. 1 How water quality affects the water resource management for a typical chemical process industry? Elaborate. **(10)**

OR

Q.1 Explain the working of liquid phase and vapor phase heat transfer fluid systems employed in chemical process industries. **(10)**

Q.2 What are different types of boilers? Explain working of any one in detail. **(10)**

OR

Q.2 Write notes on: **(10)**

i) Selection and sizing of boilers
ii) Condensate utilization

Q.3 What are various methods of refrigeration? Discuss the applications of refrigeration and air conditioning in chemical process industries. **(10)**

OR

Q.3 Elaborate the following: **(10)**

i) Material handling under vacuum
ii) Ventilation and indoor air quality.

Q.4 How the following factors affect the safety of a typical chemical process plant? **(10)**

i) Technology selection and transfer
ii) Selection of process.

OR

Q.4 Differentiate between hazards, risk and safety. Give the classification of hazards and hazard ratings. **(10)**

Q.5 Explain safety parameters in the process design of polyvinyl chloride plant. **(10)**

OR

Q.5 Illustrate the risk and hazards for following chemicals: **(10)**

i) Acetone
ii) Acetic acid
iii) Bromine

Q.6 Illustrate the role and importance of following controls in safety procedure: **(10)**

i) Block Valves
ii) Redundancy
iii) Explosion suppression

OR

Q.6 How eliminating hazards through inherently safer designs is beneficial rather than controlling hazards? Explain in details. **(10)**

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