

B.Tech. SEM -VII (Chemical 2014 Course (CBCS) : WINTER - 2018

SUBJECT: PLANT UTILITIES AND PROCESS SAFETY

Day: Wednesday
Date: 28/11/2018

W-2018-2522

Time: 02.30 PM TO 05.30 PM
Max Marks. 60

N.B. :

- 1) All questions are **COMPURSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Assume suitable data, if necessary.
- 4) Use of non-programmable calculator is **ALLOWED**.
- 5) Draw neat and labeled diagram **WHEREVER** necessary.

Q.1 Explain the storage and distribution of water for cooling/fire fighting systems. (10)

OR

Q.1 Enumerate the importance of different process utilities in the operation of a typical chemical plant. (10)

Q.2 Explain steam generation, distribution and utilization in chemical plants. (10)

OR

Q.2 Define process steam and exhaust steam. Discuss the optimum use of exhaust steam and process steam in chemical process industries. (10)

Q.3 Elaborate the concept of HVAC and explain different processes of HVAC system. (10)

OR

Q.3 A single stage compressor is to compress 8×10^{-3} Kmol/s of methane gas at 27°C and 150 kPa to 555 kPa. Calculate the power required if the mechanical efficiency is 78 % and the compression is adiabatic with $\gamma = 1.31$ (10)

Q.4 Define elements of safety. Elaborate the effect of safety elements on a chemical process plant. (10)

OR

Q.4 Illustrate the terms: (10)
i) Hazard ratings
ii) Industrial hygiene

Q.5 Elaborate identification and assessment of safety parameters in process design. (10)

OR

Q.5 Explain risk, hazards and safety for following chemicals: (10)
i) p-xylene
ii) monochlorobenzene
iii) butyl amine

Q.6 Illustrate the importance and role of following controls in safety procedures: (10)
i) Explosion suppression
ii) Double Block and Bleed
iii) Redundancy

OR

Q.6 Summarize inherently safer designs for elimination of hazards in chemical process industry. (10)

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