

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(END SEMESTER EXAMINATION)

CLASS: M. PHARM.  
BRANCH: PHARMACY

SEMESTER : II  
SESSION : SP/19

SUBJECT: MPC204T PHARMACEUTICAL PROCESS CHEMISTRY

TIME: 3:00 Hours

FULL MARKS: 75

INSTRUCTIONS:

1. The question paper contains 7 questions each of 15 marks and total 105 marks.
  2. Candidates may attempt any 5 questions maximum of 75 marks.
  3. The missing data, if any, may be assumed suitably.
  4. Before attempting the question paper, be sure that you have got the correct question paper.
  5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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- Q.1(a) What is steam distillation? Briefly explain with schematic diagram. [7]
- Q.1(b) A mixture of benzene and toluene boils at 368 K under pressure of 101.325 kPa. Determine the composition of the boiling liquid assuming that mixture obeys Raoult's law. [8]  
At 368 K, the vapour pressure of benzene is 155.56 kPa and that of toluene is 63.98 kPa

- Q.2(a) What are the properties of evaporating liquid that influence the process of evaporation? [7]
- Q.2(b) What is halogenation? Describe important methods for preparing chlorine compounds. [8]

- Q.3(a) Explain chemical hazard label using NFPA pyramid. [7]
- Q.3(b) With the help of empirical equation generate vapor-liquid equilibrium data and construct x-y plot. [8]  
The vapour pressure of n-heptane (A) and n-octane (B) are given in the following table. Obtain an empirical relation between y and x for this system at constant pressure of 101.3 kPa.

Data:

T, K	341.7	352.4	366.3	380.2	394.1	398.6
$p_A^o$	101.3	136.6	197.3	283.9	399.9	455.9
$p_B^o$	16.1	23.1	37.1	57.8	87.2	101.3

With the help of empirical equation generate vapor-liquid equilibrium data and construct x-y plot.

- Q.4(a) Discuss the importance of Safety Data Sheet in Pharmaceutical Industry and Lab. [7]
- Q.4(b) Discuss the operation of Effluent Treatment Plant with help of suitable flow charts. [8]

- Q.5(a) Explain streamlining reaction steps. [7]
- Q.5(b) Discuss SELECT criteria. [8]

- Q.6(a) Discuss the production of Lovastatin Using submerged fermentation technology. [7]
- Q.6(b) Discuss typical bioreactor and its different parts with a suitable diagram. [8]

- Q.7(a) What is the importance of the study of Process Chemistry in field of Pharmaceutical Manufacturing of bulk drugs? Define and explain the terms: Material Cost and Conversion Cost. [7]
- Q.7(b) Discuss in detail how Boehringer Ingelheim tried to strategize and economize the process of manufacturing cheaper and more efficient BILN-2061 from HCV protease inhibitor (BI201302). [8]

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