

BBL732: Bioprocess Plant Design

Major Examination

22nd November, 2018
8.00 – 10.00 Hrs.
LH 318

Answer all questions. Maximum marks 100

1. The relative volatility of a mixture of A and B are such that they can be separated using distillation. Explain how you will (a) decide on the number of ideal stages to be employed in a continuous rectification column to effect the separation (b) decide on the size of the column and layout of column internals (c) check the plate hydraulics for stable operation.
(8 x 3 = 24 marks)
2. How is the selection of the gasket material and its geometry relevant to the design of a flanged joint?
(16 marks)
3. (i) How will you estimate the total equipment cost (a) while carrying out an economic feasibility study for a proposed project (b) during project implementation stage? (ii) How is the life cycle assessment (LCA) concept applied to 'Bioprocess Validation'? (iii) Which of the two methods, straight line method and declining balance method, will be more attractive to you if you are the owner of a medium scale industry and want to depreciate your plant and equipment? Why?
(8 x 3 = 24 marks)
4. (i) What is the difference in the way in which information about plant utilities is provided in a P&I diagram, as compared to that in a flow sheet? (ii) How are plant safety concerns addressed during the development of the P&I diagram?
(12+8=20 marks)
5. (i) Why is it necessary to apply corrections to the calculated value of the shell side heat transfer coefficient in a shell and tube heat exchanger?
(ii) Why are plate type heat exchangers extensively employed in biochemical industries? Explain.
(8 x 2 = 16 marks)