

Code: 9A23802

R09

B.Tech IV Year II Semester (R09) Advanced Supplementary Examinations, July 2013

**BIOPROCESS ECONOMICS AND PLANT DESIGN**

(Biotechnology)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions  
All questions carry equal marks

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- 1 (a) Write short notes on process design.  
(b) Explain in detail the considerations to be made in carrying out technical feasibility survey.
- 2 (a) Write short notes on the importance of the following in plant operation and control:  
(i) Instrumentation.  
(ii) Storage.  
(b) Write a detailed note on plant layout.
- 3 Explain in the following in detail that constitute the breakdown of fixed capital investment for a chemical/biochemical process.  
(a) Direct costs.  
(b) Indirect costs.
- 4 Explain the following:  
(a) Variable production costs.  
(b) Fixed charges.
- 5 (a) Write short notes on source of capital.  
(b) For the case of a nominal annual interest rate of 20% per year, determine:  
(i) The total amount to which \$1 of initial principal would accumulate after 1 year with daily compounding and the effective annual interest rate.  
(ii) The total amount to which \$1 of initial principal would accumulate after 1 year with continuous compounding and the effective annual interest rate.
- 6 (a) What is depreciation? Explain the various methods to calculate depreciation.  
(b) Write short notes on salvage value and service life.
- 7 Write short notes on the following:  
(a) Return on investment.  
(b) Payback period.  
(c) Net return.  
(d) Replacements.
- 8 (a) Explain in detail about optimization applications.  
(b) Define and explain about objective function.

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