

Code: 9A23802

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B. Tech IV Year II Semester (R09) Regular Examinations, March/April 2013

BIOPROCESS ECONOMICS & PLANT DESIGN

(Biotechnology)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks

- 1 Write in detail the steps involved in process synthesis including the selection of processing operation to convert the raw material to products.
- 2 Give a overview of general design considerations.
- 3 Briefly, write about total product cost estimating capital investment costs.
- 4 Discuss:
 - (a) Labor requirements for process equipment
 - (b) Estimate of costs for maintains and repairs
- 5 Briefly discuss about:
 - (i) Continuous interest
 - (ii) Annuities
 - (iii) Source of capital
- 6 (a) Give the three different types of classification of taxes and discuss about them in detail.
(b) Explain:
 - (i) Carry-back and carry-forward of losses
 - (ii) Excess profits tax
 - (iii) Capital gains tax
- 7 Explain profitability, profitability standards and methods for profitability evaluation.
- 8 Discuss in detail on the importance of optimization applications in a process industry.

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- 1 Define process design. Briefly discuss and classify type of process designs.
- 2 Write short notes on:
 - (a) Estimation of capital investments
 - (b) Cost indices
- 3 How do you estimate the total capital investment required for given plant?
- 4 Write short notes on:
 - (a) Variable production costs of a process plant
 - (b) Fixed charges
- 5 Write in detail about alternative investments.
- 6 (a) Write about:
 - (i) Tax exemptions for dividends received
 - (ii) Contributions
 - (iii) Investment credit
 - (iv) Capital gains tax
(b) Write about the major insurance requirements for manufacturing concerns.
- 7 Explain the term "Payout period" as applicable to the profitability of a process.
- 8 Write short notes on:
 - (a) Structural optimization
 - (b) Sub optimization

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- 1 One of the main technical factors in plant design report is the set of flow diagrams. Explain giving different flow diagrams used, method of development of these diagrams.
- 2 Write short notes on:
 - (a) Importance of markets in selection of a plant site.
 - (b) Effect of a climate on economic operation of a plant.
 - (c) Labour supply for a proposed plant site.
- 3
 - (a) Compare and contrast the fixed capital with working capital.
 - (b) Write on types of depreciation.
- 4
 - (a) Define overheads in a process plant. How are costs of overheads service classified and accounted?
 - (b) What is risk? How is it related to uncertainties? How is it accounted?
- 5 Discuss in detail on interest rates. Distinguish between different types of interest rates.
- 6
 - (a) What is sinking fund method for the determination of depreciation?
 - (b) Derive an equation for asset value of equipment after few years of use by the application of sinking fund method.
- 7 Discuss in detail on various effects of inflation on profitability analysis.
- 8 Define optimum design and illustrate the basic principle of an optimum design.

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- 1 Explain briefly the importance of the following in preparing the design report:
 - (a) Specifications
 - (b) Flow sheet
 - (c) Research and development
- 2 What are the different resources that are to be considered while locating a process plant? State the importance of each.
- 3 How do you estimate the total capital investment required for given plant?
- 4
 - (a) Distinguish between direct and indirect manufacturing costs.
 - (b) What is depreciation? How does depreciation affect the rate of return.
- 5
 - (a) Write short notes on costs due to interest on investment and source of capital.
 - (b) Explain briefly perpetuities and capitalized costs.
- 6
 - (a) Write short notes on:
 - (i) Excise taxes
 - (ii) Income tax return
 - (b) What are the tax exemptions, usually available to manufacturing companies? Discuss them in brief.
- 7 Briefly explain the concept of selecting a profitability method.
- 8 Write the procedure for the optimum design with one variable. Explain both graphical and analytical procedure.
