Ref. No.: Ex/FTBE/HS/B/T/412/2024

B.E. FOOD TECHNOLOGY AND BIO-CHEMICAL ENGINEERING FOURTH YEAR FIRST SEMESTER EXAM 2024

Subject- PROJECT PLANNING, LAYOUT AND ECONOMICS

Part – I (50) FM-100 Time-3 hrs

Answer question no 4 and any two from the following

1. Depending upon the focus of layout design what are the different types of layout are? What are the different factors influence any layout. Discuss process layout with one schematic diagram. 5+5+10=20
2. A Food Processing unit is producing 14000 kg of cookies per month. Product has the selling price of 240 per kg.

Details of expenditure are given below

A. Non recurring expenditure	Amount
Plant and machinery	5000000/-
B. Land and Building with storage facilities on rental basis	45000/- per month
C. Recurring expenditure	
1) Cost of raw materials including packaging materials per month	835000
2) Salaries and wages	240000
3) Utility cost and other expanses	150000

Calculate the following

a) Net Profit per annum b) Net Profit Ratio c) Rate of Return d) Break Even Point (20)

3. Discuss systematic layout planning. What are the different phases are there in the overall layout design? Give some example of symbol which normally be used for fluid handling? 8+5+7=20

4. If you want to set an ice cream industry, where should you established it in West Bengal? - Explain. 10

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JADAVPUR UNIVERSITY

PROJECT PLANNING , LAYOUT AND ECONOMICS

PART – II (50 Marks)

Answer Question No 1 which is compulsory and any THREE from the rest.

1. Answer the followings to the point and briefly within not more than two simple sentences: (7 *2 = 14)

A. What is the objective of providing depreciation in project economics ?

B. Does salvage value represent a depreciable value ?

C. What do you mean by present worth and discount ?

D. Is perpetuity an annuity ?

E. How do you calculate present worth of an annuity ?

F. What is the type of interest involved in Sinking Fund Method ?

G. What is the role of Break Even Point in plant operation ?

2. a) Following information relates to a fixed asset :

Original cost of the asset : Rs 4000000

Scrap value at the end of service life : Rs 400000

The asset value at the end of the third year 1840000

Calculate using the sum of the years digit method ,

I) the service life of the asset, and

Ii) depreciation over the useful life of the asset .

b) Given that,

K = Capitalized costs,

Cv = Original cost of the equipment,

CR = Replacement value after n years of service life,

i = Nominal interest rate compounding annually,

Find the relations correlating these information with the term Capitalized costs , K.

3. A biscuit manufacturing plant produces biscuit boxes at the rate of P units per day. The variable costs per box have been found to be Rs. 47.73 + 0.1 P^1.2 .

The total daily fixed charges are Rs. 1750 , and all other expenses are constant at Rs.7325 per day. If the selling price per box is Rs 173. Determine

a) The daily profit at a production schedule giving the minimum cost per box,

b) The daily profit at a production schedule giving the maximum daily profit,

c) The production schedule at the break even point.

4 An existing plant has been operating in such a way that a large amount of heat is being lost in the waste gases. It has been proposed to save money by recovering the heat that is now being lost. Four different heat exchangers have been designed to recover the heat, and all prices, costs, and savings have been calculated for each of the designs. The results calculations are presented in the following :

Design	No 1	No2	No3	No4
Total initial installed cost :	10000	16000	20000	26000
Operating cost :	100	100	100	100
Fixed charges % of initial cost per yr	20	20	20	20
Value of heat per year	4100	6000	6900	8850

The company in charge of the plant demands at least a 10 % annual return based on the initial investment for any unnecessary investment. Only one of the four designs can be accepted. Neglecting effects of taxes and time value of money , which of the four designs should be recommended ?

5. The total fixed costs of a company are Rs. 210000 per year, variable cost per unit is Rs. 7. The company sells products at Rs. 10 each. Calculate the units of sales and amount of sales at which the company will yield Break Even Point .

6. Discuss the principle for determining the optimum cost of a blending process with variables x, y , and z having constraints for x is greater than or equal to 10, y is greater than zero, z is greater than or equal to zero . Assume any suitable data for discussing the principle.

7. Discuss the method of optimization for operating cost of a heat exchanger, assuming the variables related this process.