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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

September / October 2023 Supplementary Examinations

Programme: B.E **Semester: VI**

Branch: ECE / ETE **Duration: 3 hrs.**

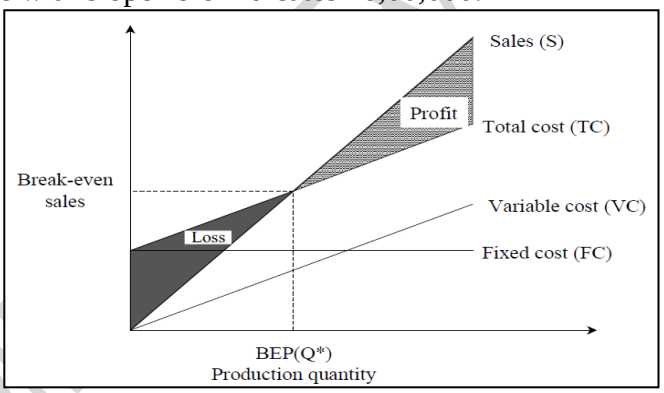
Course Code: 19GC6HSEEC **Max Marks: 100**

Course: Engineering Economics **Date: 27.09.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

UNIT - I

1 a) A plot of Break-Even analysis is as shown below. In this plot slope of the sales line is 200 and slope of the Total Cost Line is 100. Also in the plot, level of straight line with slope zero indicates 20,00,000. **10**



Find the
(i) Break-Even sales quantity
(ii) The break-even sales
(iii) If the actual production quantity is 60,000 find contribution
(iv) Margin of safety using Method-1
(v) Margin of safety using Method-2

b) Classify different costs involved in economics in detail and give one example for each **06**

c) Describe Profit/Volume Ratio **04**

UNIT - II

2 a) List the various factors in simple economic analysis and give one example each. **10**

b) In the design of a jet engine part, the designer has a choice of specifying either an aluminum alloy casting or a steel casting. Either material will provide equal service, but the aluminum casting will weigh 1.2 kg as compared with 1.35 kg for the steel casting. The aluminum can be cast for Rs. 80.00 per kg. and the steel one for Rs. 35.00 per kg. The cost of machining per unit is Rs. 150.00 for aluminum and Rs. 170.00 for steel. Every kilogram of excess weight is **10**

associated with a penalty of Rs. 1,300 due to increased fuel consumption. Which material should be specified and what is the economic advantage of the selection per unit?

UNIT - III

3 a) Examine time value of money with an example **06**

b) A person who is now 35 years old is planning for his retired life. He plans to invest an equal sum of Rs. 10,000 at the end of every year for the next 25 years starting from the end of the next year. The bank gives 20% interest rate, compounded annually. Find the maturity value of his account when he is 60 years old. **07**

c) A company has to replace a present facility after 15 years at an outlay of Rs. 5,00,000. It plans to deposit an equal amount at the end of every year for the next 15 years at an interest rate of 18% compounded annually. Find the equivalent amount that must be deposited at the end of every year for the next 15 years. **07**

OR

4 a) A company wants to set up a reserve which will help the company to have an annual equivalent amount of Rs. 10,00,000 for the next 20 years towards its employee's welfare measures. The reserve is assumed to grow at the rate of 15% annually. Find the single-payment that must be made now as the reserve amount. **06**

b) A bank gives a loan to a company to purchase an equipment worth Rs. 10,00,000 at an interest rate of 18% compounded annually. This amount should be repaid in 15 yearly equal installments. Find the installment amount that the company has to pay to the bank **07**

c) A person is planning for his retired life. He has 10 more years of service. He would like to deposit 20% of his salary, which is Rs. 4,000, at the end of the first year, and thereafter he wishes to deposit the amount with an annual increase of Rs. 500 for the next 9 years with an interest rate of 15%. Find the total amount at the end of the 10th year of the above series **07**

UNIT - IV

5 a) For present worth method of comparison describe the following **10**
(i) Revenue dominated cash flow diagram
(ii) Cost dominated cash flow diagram

b) 2 possible routes for laying a power line are under study. Data is as given below. **10**

	Around the lake	Under the lake
length	15km	5km
First cost (Rs)	1,50,000/km	7,50,000/km
Life (years)	15	15
Maintenance cost (Rs)	6000/km/yr	12000/km/yr
Salvage (Rs)	90,000/km	1,50,000/km
Yearly Power loss (Rs)	15000/km	15000/km

If 10% interest is used should the power line be routed around the lake or under the lake?

OR

6 a) A company is planning to expand its business. It has two alternatives as shown below. Each alternative has 5 years of life span with no salvage value. Minimum attractive rate of interest for the company is 12%. Suggest the best alternative to the company. **10**

	Initial investment (Rs.)	Yearly revenue (Rs.)
Alternative 1	5,00,000	1,70,000
Alternative 2	8,00,000	2,70,000

b) A company provides a car to its chief executive. The owner of the company is concerned about the increasing cost of petrol. The cost per litre of petrol for the first year of operation is Rs. 21. He feels that the cost of petrol will be increasing by Re.1 every year. His experience with his company car indicates that it averages 9 km per litre of petrol. The executive expects to drive an average of 20,000 km each year for the next four years. What is the annual equivalent cost of fuel over this period of time?. If he is offered similar service with the same quality on rental basis at Rs. 60,000 per year, should the owner continue to provide company car for his executive or alternatively provide a rental car to his executive? Assume i = 18%. If the rental car is preferred, then the company car will find some other use within the company. **10**

UNIT - V

7 a) A firm is considering replacement of equipment, whose first cost is Rs. 4,000 and the scrap value is negligible at the end of any year. Based on experience, it was found that the maintenance cost is zero during the first year and it increases by Rs. 200 every year thereafter. When should the equipment be replaced if i = 0%? **10**

b) List the different methods of depreciation and explain each with necessary equations **10**

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