

**B.E./B.TECH. Degree Examination, September 2020**

Semester - VIII

**ME 16801 – ENGINEERING ECONOMICS**

(Regulation 2016)

**Time: Three hours****Maximum : 80 Marks**Answer **ALL** questions**PART A - (8 X 2 = 16 marks)**

1. In linear breakeven analysis, if a company expects to operate at a point above the breakeven point, it should select the alternative:
  - A. With the lower fixed cost
  - B. With the higher fixed cost
  - C. With the lower variable cost
  - D. With the higher variable cost
2. The time it would take for a given sum of money to double at 4% per year with simple interest is closest to:
  - A. 30 years
  - B. 25 years
  - C. 20 years
  - D. 10 years
3. When only one alternative can be selected from two or more, the alternatives are said to be:
  - A. Mutually exclusive
  - B. Independent alternatives
  - C. Cost alternatives
  - D. Revenue alternatives
4. A machine with a 5-year life has a first cost of Rs. 20,000 and a Rs.2000 salvage value. According to the classical straight line method, the depreciation charge in year 2 is nearest to:
  - A. Rs. 2800
  - B. Rs. 3600
  - C. Rs. 4500
  - D. Rs. 5300
5. When is a good called as normal good and Inferior good? Give examples.
6. Construct a cash flow diagram for the following cash flows: Rs. 25,000 outflow at time 0, Rs. 9000 per year inflow in years 1 through 5 at an interest rate of 10% per year, and an unknown future amount in year 5.
7. How to select a best project from two projects whose useful life terms are different?
8. Why Benefit Cost ratio has to be calculated before implementing any projects?

**PART B - (4 X16 = 64 marks)\*\***

09. (a) (i) **From the following particulars, calculate:** **( 8 )**
- (i) Break-even point in terms of sales value
  - (ii) Break-even point in terms of and in units.
  - (iii) Number of units that must be sold to earn a profit of Rs. 90,000.
- Fixed factory overhead costs – Rs. 60,000  
 Fixed selling overhead costs – Rs. 12,000  
 Variable manufacturing cost per unit – Rs. 12  
 Variable selling cost per unit – Rs. 3  
 Selling Price per unit – Rs. 24
- (ii) In what ways economic efficiency can be made to attain more than 100%? **( 8 )**  
 Explain with simple example

**(OR)**

- (b) (i) How the Elasticity of demand is classified and Explain the effect of the following on Price Elasticity of Demand of a good (8)
1. Number of substitutes of a good
  2. Proportion of income spent on the good
- (ii) The process planning engineer of a firm listed down the sequence of operations, as shown in the following table to produce a component (8)

The details of process time for the components for various operations and their machine hour rates are tabulated now.

Sequence	Process Sequence
1	Turning – Milling – Shaping – Drilling
2	Turning – Milling – Drilling
3	All operations are performed with CNC machine

Operation	Machine Hour rate Rs.	Process sequence		
		1 (min)	2 (min)	3 (min)
Turning	320	8	8	-
Milling	425	10	14	-
Shaping	410	12	-	-
Drilling	360	5	5	-
CNC operation	1,350	-	-	10

Find the most economical sequence of operations to manufacture the component. Also justify when to select the CNC machine.

10. (a) (i) Assume a person invests Rs. 1000 in the first year, Rs. 1500 in the second year, Rs. 1800 in the third year, Rs. 1200 in the fourth year and Rs. 2000 in the fifth year. At an interest rate of 8%: (8)
1. Calculate time zero lump sum settlement “P”.
  2. Calculate end of year five lump sum settlement “F”, that is equivalent to receiving the end of the period payments.
- (ii) How much money a company could borrow to finance an ongoing project if it expects revenues of Rs. 14,00,000 per year over a 5-year period. Expenses associated with the project are expected to be Rs. 4,50,000 per year and interest rate is 10% per year. (8)

(OR)

- (b) (i) Mr. Mohan wishes to have a future amount of Rs. 5,00,000 for the construction of a new house after 5 years from Now. What is the exact amount that he should deposit now to get the desired amount after 5 years? The bank gives 10% interest rate compounding annually. (8)
- (ii) Mr. Vasanth kumar planned to enjoy his post retirement life by contributing 20% of his salary every year i.e. Rs. 5,000 as his initial investment with an annual increase of Rs. 500 for next 12 years with an interest rate of 10%. Find the total amount at the end of 12<sup>th</sup> year of the above scheme. (8)

11. (a) Economic data pertaining to four mutually exclusive alternatives to a major project are given in the following table. If interest rate is 9% per year compounding annually, suggest which alternative is economically viable and should be selected. (16)

	Alternatives			
	I	II	III	IV
<b>Capital Investment (Rs)</b>	60,00,000	95,00,000	1,12,00,000	1,35,00,000
<b>Net annual Revenue (Rs.)</b>	5,50,000	9,65,000	11,65,000	13,95,000
<b>Salvage Value (Rs.)</b>	3,99,000	4,50,000	5,00,000	7,50,000
<b>Useful Life (years)</b>	10	10	10	10

(OR)

- (b) Compare the following equipment on the basis of the **equivalent uniform annual worth** and find out the most economical one at the interest rate of 8.0% per year. (16)

**Equipment-A** Cash flow details:

Initial purchase cost = Rs.50,00,000

Annual operating cost = Rs. 60,000 at the end of year 1 and increasing by Rs.3000 in the subsequent years till the end of useful life.

Annual income = Rs.7,80,000

Cost of one-time major repair = Rs.1,50,000 at the end of year 8,

Expected salvage value = Rs.14,00,000

Useful life = 12 years

**Equipment-B** Cash flow details:

Initial purchase cost = Rs.46,00,000

Annual operating cost = Rs. 85,000

Annual income = Rs.7,35,000 for the first 5 years and increasing by Rs.5000 in the subsequent years till the end of useful life.

Cost of one-time major repair = Rs.2,30,000 at the end of year 6

Expected salvage value = Rs.12,00,000

Useful life = 12 years

12. (a) (i) A company purchased a small machine for Rs. 1,00,000. It paid sales taxes and shipping costs of Rs. 10,000. The installation cost of the machine is Rs. 5,000 and its estimated useful life is five years. The estimated salvage value of the machine at the end of its useful life is Rs. 10,000. Calculate (8)
- Depreciation cost during the third year
  - Cumulative depreciation cost through the third year and
  - Book value at the end of third year.
- (ii) In order to shorten the route of rail travel (both passenger and goods) by 10 Kms, a tunnel is planned to be constructed by railway authorities costing Rs. 50,00,000. Due to shortening of the distance, expenditure of (8)

energy cost to railways is expected to come down to the extent of Rs. 10,00,000 in the first year and increase of Rs. 50,000 every year till the end of the 20<sup>th</sup> year. The tunnel will require an annual maintenance cost of Rs. 2,00,000 per annum for next 20 years. Find out whether the project is feasible or not assuming an interest rate of 15% compounded annually.

(OR)

- (b) Suppose a 50-year old man is planning for his retirement. He plans to retire at the age of 60 and estimates that he can live comfortably on Rs. 2,40,000 per year in terms of today's rupee value. Let us assume the average inflation rate for the next 20 years is 7% per year. This is only an assumption. He can invest his savings that yields an interest rate of 13%, compounded annually. **(16)**

What equal amount should he save each year until he retires so that he can make withdrawals that will allow him to live as comfortably as he desires for 10 years beyond his retirement?