

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)**

**CLASS: BE
BRANCH: ALL**

**SEMESTER : VI/ADD
SESSION : SP/19**

SUBJECT: PE6009 ENGINEERING ECONOMY

TIME: 3:00 HOURS

FULL MARKS: 60

INSTRUCTIONS:

1. The question paper contains 7 questions each of 12 marks and total 84 marks.
 2. Candidates may attempt any 5 questions maximum of 60 marks.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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- Q.1(a) Define Engineering Economy. What is the role of an Engineer in Engineering Economy? [2]
- Q.1(b) If current ratio is 2.5 and the working capital is Rs. 60,000. Calculate the amount of current assets and Current liabilities. [4]
- Q.1(c) Differentiate between the following [6]
- (a) Fixed Assets and fixed liabilities
 - (b) Gross profit and net profit
 - (c) Current ratio and quick ratio
- Q.2(a) Define: Sunk cost and Opportunity cost [2]
- Q.2(b) A small firm is producing 100 pens per day. The direct material cost is found to be Rs. 250. If the selling 40% of the factory cost, what must be the selling price of each pen to realize a profit of 14.6% of the selling price. [4]
- Q.2(c) The catalogue price of drilling machine is Rs. 6000 and the discount allowed to distributor is 20%. The administrative and selling expenses are 50% of the factory cost and the material cost, labour cost and factory overheads are in the ratio of 1:3:2. If the cost of labour on the manufacture of the machine is Rs. 1200, determine the profit on each machine. [6]
- Q.3(a) Define: profit-volume (p/v) ratio [2]
- Q.3(b) What are the advantages and disadvantages of break-even analysis? [4]
- Q.3(c) The fixed cost for the years 1997-2000 is Rs. 5, 00,000. Variable cost per unit is Rs. 25. The estimated sales for the period are valued rs. 1500000. Each unit sold at Rs. 150. i) Determine BEP ii) If Rs. 1200000 is the likely turnover for next budget period, calculate estimated contribution and profit. iii) If a profit target of Rs. 6, 50,000 has been budgeted, compute the turnover required. [6]
- Q.4(a) Define nominal interest rate and effective interest rate. Is there any relationship between them? [2]
- Q.4(b) A bank gives a loan to a company to purchase an equipment worth Rs. 1,000,000 at an interest rate of 18%, compounded annually. This amount should be repaid in 15 yearly equal instalments. Find the instalment amount that the company has to pay to the bank. [4]
- | | | | | | | |
|------------------------|--------|--------|--------|--------|--------|--------|
| When
i=18%,
n=15 | F/P | P/F | F/A | A/F | P/A | A/P |
| | 11.974 | 0.0835 | 60.965 | 0.0164 | 5.0916 | 0.1997 |
- Q.4(c) What is continuous compounding? What are continuous compounding single sum 'future worth factor' and 'present worth factor' [6]
- Q.5(a) What is annual equivalent amount? Explain the important features of annual equivalent amount. [2]
- Q.5(b) Define mutually exclusive alternatives. How mutually exclusive alternatives are formed? Explain the various decision criteria for mutually exclusive alternatives. What is minimum attractive rate of return (MARR)? [4]
- Q.5(c) Consider a machine that costs Rs. 40000 and a 10 year useful life. At the end of tenth year, it can be sold for Rs. 5000 after tax adjustment. If the firm could earn an after tax revenue of Rs. 10000 per year with this machine, should it be purchased at an interest rate of 15 % compounded annually? If (P/A, 15%, 10)=5.0188, (P/F, 15%, 10)=0.2472, (A/P, 15%, 10)=0.1993 [6]

Q.6(a) Describe the following replacement policies: [4]

I. Replacement policy for items when money value remains constant

II. Replacement policy for items when money value changes with constant rate during the period

Q.6(b) The following mortality rates have been observed for a certain type of light bulbs: [8]

Month	1	2	3	4	5
Percent failing by month end	10	25	50	80	100

There are 1000 bulbs in use and it costs Rs. 10 to replace an individual bulb which has burnt out. If all bulbs were replaced simultaneously, it would cost Rs. 2.5 per bulb. It is proposed to replace all the bulbs at fixed intervals, and individually those which fail between the intervals. What would be the best policy to adopt?

Q.7(a) What are the various methods of calculating depreciation? Explain any three of them. [4]

Q.7(b) An industrial plant started with initial value of Rs. 2, 00,000 and the salvage value is Rs. 20,000 at the end of 20 years but sold for Rs. 1, 45,000 at the end of 10 years. What is the profit and loss if sinking fund method is adopted and interest charged at 9% is compounded annually? [8]

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