UNIT-1

1. Describe the problem solving process in decision making.

2. Distinwish clearly beween strategy and tactics with suitable examples.

3.With appropriate examples elaborate on the different areas in which an engineer will acts as decision maker

4. Differentiate between intuition and analysis .Support your answer with suitable examples.

5.What is decision making? Briefly explain the importance of decision making in engineering economics

6. With a practical quote illustrate the obivious relation between engineering and economy

7. Discuss the role of engineers in decision making

8. Differentiate between tactics and strategy. Support your answer with suitable examples.

9. What is the importance of cash flow diagram in economic analysis? Explain with suitable Examples.

10. What is CFD? Discuss interest from borrower's and lender's point of view with suitable examples.

11. Briefly explain (i) Nominal interest rate (ii) Effective interest rate (iii) Continous compounding.

12. A company is planning to buy an inspection device for Rs.10,00, 000. The expected life of the device is 5 years and the expected annual operating cost and taxes are Rs.60,000 for the first year with an added increase per year Rs.1000 for years 2 to 5. Maintenance cost will be zero in the first two years because of warranty. But are expected to be Rs. 20,000 in 3^{rd} year, Rs.35,000 in 4^{th} year and Rs.50,000 in fifth year. What is the minimum desired annual economic benefit of the device? The company uses an interest rate of 10% pa.

13. A person is planning for his retired life .He has 10 more years of service. He would like to deposit Rs 50,000 at the end of first year and there after he wishes to deposit the same amount with an annual increase of Rs 5000 for the next 9 years with an interest rate of 7%pa.Find the maturity amount at the end of 10^{th} year for this series?

14. A person wishes to have a future sum of Rs.75, 00,000 to start a new business after 10 years from now. There are two alternatives available. Suggest the best alternative to get the required future amount under single payment deposit scenario.

Nationalized bank	**Private bank**
Interest rate =12%, Compounded annually	Interest rate =11%, Compounded quarterly

15. A company is thinking of purchasing a small truck that has a first cost of Rs.12, 50,000 and is to be kept in service for five years at which time the salvage value is expected to be Rs.4, 00, 000. Maintenance and operating cost are estimated at Rs.25, 000 in the first year and will increase at a rate of Rs.2000 per year. Determine the present worth of this vehicle using an interest rate of 6%pa.

16. A person invests a sum of ₹ 5,000 every month in a bank at a nominal interest rate of 7 % for 10 years, the compounding is done quarterly. At the end of 10^{th} year if his requirement is ₹ 12, 00,000, is this investment pays him the desired amount? If not what is the shortage fund?

17. A company is planning to expand its business after 5 years from now. The expected money required for the expansion programme is Rs. 5,00,00,000. The company can invest Rs. 50, 00, 000 at the end of every year for the next five years. If the assured rate of return of investment is 18% for the company, check whether the accumulated sum in the account would be sufficient to meet the fund for the expansion programme. If not, find the difference in amounts for which the company should make some other arrangement after 5 years.

18. If A wants to invest starting with ₹10 Lakhs first year and decreases by ₹1Lakh every consecutive years for 6 years, calculate final value and present worth at a compound interest of 15% annually.

19. A manufacturing firm has agreed to pay Rs 25,000 in royalties at the end of each year for 5 years for the use of a patented product design. If the payments are left in the company, interest on the retained funds will be paid at an annual rate of 8% pa. compounded annually (i) What amount will be available in 5 years under these conditions? (ii) How large would the uniform annual payments have to be if the patent owner insisted that a minimum of Rs 1, 75,000 be accumulated in the account by the end of 5 years?

20. A company three yers ago borrowed Rs 40,000 to pay for a new machine tool, agreeing to repay the loan in 100 monthly payments at an annual nominal interest rate of 12% compounded monthly. The company now wants to pay off the loan. How much would this payment be, assuming no penaulty costs for early payouts?

UNIT-2

1.List and explain conditions present worth comparison

2.What is rule 72 as applied to present worth comparisons? Support yor anaswer with appropriate examples

3. What are the ingredients of a present worth comparison and explain the conditions for present worth comparisons.

4. Compare present worth analysis of assets with equal lives and unequal lives.

5. Elaborate on present worth comparison of cost dominated and revenue dominated cash flows. Support your answer with appropriate examples.

6. Elaborate on payback period method of comparison. Support your answer with appropriate example.

7.

8. The following alternatives are available for a company. Compare the PW of alternatives using an interest rate of 7%

Particulars	**Plan A**	**Plan B**	**Plan C**
Life(Years)	6	3	4
First Cost (Rs)	2,00,000	8,00,000	10,00,000
Annual Cost (Rs)	32,000	16,000	10,000

9. The following alternatives are available for a company. Compare the PW of alternatives using an interest rate of 7% pa

Particulars	**Plan A**	**Plan B**	**Plan C**
Life(Years)	6	6	6
First Cost (Rs)	6,00,000	8,00,000	10,00,000
Annual Cost (Rs)	32,000	16,000	10,000

10. Given the following information related to an improvement project, estimate the present worth of the proposal using present worth method select the best machine for implementation

Particulars	**Machine A**	**Machine B**
Investment (Rs)	20,00,000	30,00,000
Salvage value (Rs)	4,00,000	7,00,000
Annual Receipts (Rs)	1,00,000	1,40,000
Annual costs(Rs)	44,000	30,000
Life (Years)	5	10
Interest rate	15%	15%

11. The following alternatives are available for investor:

Particulars	Plan A	Plan B	Plan C
First Cost(Rs)	30,00,000	50,00,000	80,00,000
Annual cost (Rs)	1,00,000	80,000	50,000
Life (Years)	6	3	4

Compare the present worth of the alternatives using an interest rate of 7% pa. Suggest the best plan.

12. The data three alternatives are as follows:

Alternative	Investment (Rs)	Resale Value(Rs)	Life (Years)	Annual net cash flow (Rs)
A	60,00,000	10,00,000	3	26,00,000
B	80,000,00	20,00,000	6	25,00,000
C	70,00,000	15,00,000	6	30,00,000

Which plan is to be selected based on payback period method of comparison.

13. .Machine A has a first cost of Rs 90,000,no salvage value at the end of 6 year useful life, and annual operating costs of Rs 50,000.Machine B costs Rs 1,60,000 and has an expected resale value of Rs 40,000 at the end of its 9 year economic life. Operating costs for machine B are Rs 40,000per year. Compare the two alternatives on the basis of their present worth using the repeated –projects assumptions at 10% annual interest.

14. Machine A has a first cost of Rs 10,00,000, salvage value at the end of 6 years of useful life is Rs 2,50,000 and annual operating costs of Rs 50,000.Machine B costs Rs 11,60,000 and has an expected resale value of Rs 2,00,000 at the end of its 6 year economic life. Operating costs for machine B are Rs 40,000per year. Compare the two alternatives on the basis of their future worth 10% annual interest.

15. A project involves an initial outlay of Rs. 30, 00,000 and with the following transactions for the next five years. The salvage value at the end of the life of the project after five years is Rs. 2, 00,000. Draw a cash flow diagram of the project and find its present worth by assuming i = 15%pa, compounded annually

End of Year	**Maintenance and Operating cost (Rs)**	**Revenue (Rs)**
1	2,00,000	9,00,000
2	2,50,000	9,10,000
3	3,00,000	9,20,000
4	3,00,000	9,30,000
5	4,00,000	9,40,000

16. An automobile company recently advertised its car for a down payment of Rs. 15, 00,000. Alternatively, the car can be taken home by customers without making any payment, but they have to pay an equal monthly installment of Rs. 25,000 for 100 months at an interest rate of 12% pa, compounded annually. You are asked to advise the best alternative for the customers based on the present worth method of comparison.

17. .A company has two alternatives for satisfying its daily travel requirements of its employees for the next five years:

Alternative 1: Renting a vehicle at a cost of Rs. 10, 00,000 per year.

Alternative 2: Buying a vehicle for Rs. 5, 00,000 with an operating and maintenance cost of Rs. 3, 50,000 per year. The salvage value of the vehicle after five years is Rs. 1, 00,000.Select the best alternative based on the present worth method of comparison using the interest rate of 20%, compounded annually.

18. A new Rs 16400 automatic machine will have operating cost of Rs 0.30/unit produced whereas the existing machine costs Rs 0.70/unit. The existing machine has a market value of Rs 8700 now and has another five years of life. It would costs Rs 500 to remove the existing machine and install new one. If the firm requires 3 years payback period, how many units must be produced annually to justify new machine?

19. Creative Investment Ltd. accepts Rs. 10,000 at the end of every year for 20 years and pays the investor Rs. 8, 00,000 at the end of the 20th year. Innovative Investment Ltd. accepts Rs. 10,000 at the end of every year for 20 years and pays the investor Rs. 15, 00,000 at the end of the 25th year. Which is the best investment alternative? Use present worth method of comparison with i = 12% pa.

20. A man owns a cornmercial plot. He must decide which of the several alternatives to select in trying to obtain a desirable return on his investment. After much study and calculation, he decides that the two best alternatives are as given in the following table:

Description	**Build gas station**	**Build soft ice-cream Factory**
First cost (Rs.)	20,00,000	36,00,000
Annual property taxes(Rs.)	80,000	1,50,000
Annual income (Rs.)	8,00,000	9,80,000
Life of building (years)	10	10
Salvage value (Rs.)	2,00,000	4,00,000

Evaluate and suggest the best the alternatives based on the future worth method of comparision at i = 12%.pa

UNIT-3

1. Explain the following.with respect to asset life

i) Service life ii) Accounting life iii) Economic life iv) Ownership life

2. ”Economic comparison involving assets with perpetual life.” Use only interest rate instead of capital recovery factor.Justify this method

3.Compare equivalent annual worth method and annual average cost method .support your answer with appropriate examples.

4. Compare AAC method with EAC method of comparison.

5. Elaborate on the importance of rate of return calculation. Support your answer with appropriate example.

6.List and elaborate on IRR misconception.

7.Elaborate on MARR, IRR and ERR

8.Comapre MARR with IRR . Suport your answer with suitable example.

9. A drilling machine can be purchased for Rs 10 lakhs and ued for 5 years after which it can be sold for Rs 1 lakh. As an alternative another drilling machine is available for leasing at Rs 3.5 lakhs per annum.If the company expects 20% on investment with yearend cash flows, which option should be selected? Adopt equivalent annual worth method of comparison for the analysis.

10. An investment of Rs 10, 00,000 in an off gas monitoring system will have a salvage value of Rs 60,000 after an economic life of 5 years. Maintenance and operating costs are Rs 50,000 per year and the firm cost of capital is 10%.Assess the average annual cost of this investment?

11. HAP company has three proposals for expanding its business operations. The details are as follows:

Alternative	**Initial cost (Rs)**	**Annual Revenue (Rs)**	**Life (Years)**
A1	25,00,000	8,00,000	10
A2	20,00,000	6,00,000	10
A3	30,00,000	10,00,000	10

Assuming an interest rate of 8% pa .Find the best alternative using annual equivalent worth method of comparision.

12. The following two machines are being considered for purchase since they are multipurpose. Evaluate which alternative should be purchased using the annual equivalent method.

Description	Machine A	Machine B
Capital cots (Rs)	13,00,000	8,00,000
Labour cost (Rs)	80,000/year	90,000/year
Maintenance cost (Rs)	30,000/year	40,000/year
Life (Years)	7	7

Salvage value (Rs)	2,00,000	2,00,000
Cost of capital	10%	10%

13. Maruthi suzuki company is evaluating three robots for possible use in its assembly operation.

Description	Robot A	Robot B	Robot C
First cost	55,00,000	58,00,000	53,00,000
Annual O& M cost(Rs)	3,00,000	4,50,000	4,00,000
Expected annual income (Rs)	5,00,000	4,50,000	3,80,0000
Expected salvage value (Rs)	6,00,000	6,00,000	4,00,000

Assuming a life of 4 years and a desired interest rate of 8% pa.Assess the equivalent annual worth of robots and suggest the best one.

14. Two possible routes for laying a power cable are under study. Data are as follows.

Description	Arround the Lake	Under the Lake
Length(Km)	15	5
First Cost (Rs)	1,50,000/Km	7,50,000/Km
Life(Years)	15	15
Maintenance Cost (Rs)	6000/Km/Year	12000/Km/Year
Salvage Value (Rs)	90,000/Km	1,50,000/Km
Yearly Power loss (Rs)	15,000/Km	15,000/Km

If 15% interest rate is used, should the power line be routed Around the Lake or Under the Lake.?Adopt equivalent annual worth method of comparison.

15. Analyze the following proposals using cash flow diagram and find the best proposal using AAC method and EAC method of comparison.

Pariticulars	Proposal I	Proposal II	Proposal III
First cost (Rs)	7,00,000	9,00,000	10,00,000
Salvage value (Rs)	2,00,000	3,00,000	3,50,000
Annual disbursement(Rs)	1,80,000	2,30,000	3,50,000
Annual receipts (Rs)	36,00,000	4,60,000	5,20,000

Life of all proposals is 8 years and interest rate to be used is 10% pa.

16. Thripati co. ltd is in the process of selecting the best alternatives among the following three mutually exclusive alternatives.

Alternative	Investment (Rs)	Annual revenue (Rs)	Life (Years)
A1	5,00,000	1,00,000	10
A2	8,00,000	1,40,000	10

A3	3,00,000	70,000	10

Find the best alternative based on the ROR method of comparison.

17. A piece of land can be purchased for Rs 40, 00,000 now, which is expected to be worth Rs 70, 00,000 within 5 years. During that period it can be rented for Rs 1, 50,000 per year. Annual taxes are known to be a constant at Rs 8500.Compute the rate of return, if these estimates are to be accurate.

18. A firm has identified three mutually exclusive investment proposals whose details are given below. The life of all the three alternatives is 5 years with negligible salvage value. If the MARR is 12%, find the best alternative based on ROR method of comparison.

Particulars	**Alt 1**	**Alt 2**	**Alt 3**
Investment (Rs)	1,50,000	2,10,000	2,55,000
Net income/Year	45,570	58,260	69,000

19. An investor has an opportunity to purchase a commercial rental property for Rs 3, 00,000. The current occupants have signed a 10 year lease at a constant annual rate of Rs 48,000 and maintenance costs and taxes on the structure are currently Rs 12,000 and are expected to increase at a rate of Rs 1500 per year over the 10 years period.Assuming that the property can be sold for at least the purchase price when the current lease expaires.Determine the investor's MARR?

20. A company is considering the purchase of a new piece of testing equipment that is expected to produce Rs.8000 additional profit during the first year of operation. This amount will probably decrease by Rs.500 per year for each additional year of ownership. The equipment costs Rs.20, 000 and will have an estimated salvage value of Rs.3000 after 8 years of use. How does the proposal match up against a MARR of 18% pa?

UNIT-4

1.Define depreciation. Discuss the causes of depreciation.

2. List any four methods of computing depreciation. Elaborate on any two methods.

3. Elaborate on declining balance and sinking fund method of depreciation computation.

4. With neat sketch, explain Profit-Volume (P-V)Chart

5. Discuss various methods for lowering the break-even point.

6. A company has purchased an equipment whose first cost is ₹.100,000/- with an estimated life of 8 years. The estimated salvage value of the equipment at the end of its lifetime is ₹.20,000/-. Determine the depreciation charge and book value at the end of various years using the straight line method of depreciation.

7. An equipment was purchased for ₹.100, 000/- and ₹.10,000/-were spent for erection and commissioning. The estimated residual value after 10 years was ₹.12, 000/- . Calculate the following using straight line depreciation method:

i. The annual rate of depreciation.
ii. Book value of the equipment at the end of each year and plot graph of No.of years v/s depreciation fund.
iii. The depreciation fund collected at the end of the 8th year.

8. A company has purchased an equipment whose first cost is ₹.100,000/- with an estimated life of 8 years. The estimated salvage value of the equipment at the end of its lifetime is ₹.20,000/-. Determine the depreciation charge and book value at the end of various years using the declining balance method of depreciation.

9. Luminous 3 kw off grid solar system for commercial complex was purchased for ₹.1, 00,000/- on 1st January 1990. The erection and installation work cost is ₹.10, 000/- . The solar equipment was replaced by a new one on 31st December 2010. If the scrap value was estimated ₹.15, 000/- at the end of the service life. What could be the depreciable amount in depreciation fund on 15th January 1998? If after 10 years of running, some parts of an solar equipment are replaced and replacement cost is ₹.5,000/-.What will be the new rate of depreciation. Solve this problem using straight line depreciation method.

10. A company has purchased an equipment whose first cost is ₹.100,000/- with an estimated life of 8 years. The estimated salvage value of the equipment at the end of its lifetime is ₹.20,000/-. Determine the depreciation charge and book value for the 5th year using the Sum-of-the –Year-Digits method of depreciation.

11. A company has purchased an equipment whose first cost is ₹.100,000/- with an estimated life of 8 years. The estimated salvage value of the equipment at the end of its lifetime is ₹.20,000/-. Calculate the depreciation charge and book value at the end of various years using sinking fund method of depreciation with an interest rate of 12% compounded annually

12. A plant has a monthly sales income of Rs 96,000 and is producing two products, the details of which is as follows.

Description	**Product A**	**Product B**
Fixed cost (Rs)	16,000	34,000
BEP (Rs)	43,000	35,000
Profit (Rs)	8,000	3,000

In view of the high fixed cost and the loss incurred by the product B, it was suggested to management that the product B should be eliminated and production should be concentrated on product A. Analyze the situation and comment on this suggestion.

13.The break even point of a product occurs at at a sales income of Rs 1,20,000 but normally tha sales income is Rs 1,80,000.The fixed cost being Rs 1,00,000. A new product involved

additional cost of Rs 20,000, but PV ratio was improved by 20% and sales income increased to Rs 2,40,000.What net profit did the new design yield.

13. A firm manufacturing some crokery products shows the following data with the help of a PV chart .Calculate the BEP and PV ratio for each item. Also find the equivalent BEP and PV ratio.

Items	**Fixed costs (Rs)**	**Monthly Sales (Rs)**	**Profit/Loss (Rs)**
Vases	25,000	60,000	15,000
Soap Bowls	30,000	48,000	5000 Loss
Tea cups	45,000	78,000	7000

14. A company is dealing with manufacture of nuts and bolts.The fixed costs of the company is Rs 2,00,000 and variable costs are 50% of sales.

(a) What sales are required to show a profit of Rs 25,000

(b)What profit should be earned from sales of Rs 5,00,000

(c) What sales must be achived at the BEP.

15. A company incurs expenditure of fixed costs of Rs 16,000 and needs a profit Rs Rs 2,000.Its annual sales income is Rs 36,000.If the the selling price is Rs 8 per unit , find the production cost per uint and BEQ. Also calculate the profit if the sales income increases to Rs 50,000.

16.A company produces and sales 100 units per month at Rs 20 each. Variable costs per unit is Rs 12 and fixed cost is Rs 300 per month. It is proposed to reduce sales price by 20%. Find the additional sales required to earn the same profit as before.

17.A factory produces 300 units per month. The selling price is Rs 120 and variable csot is Rs 80 per unit. The fixed expenses of the factory amounts to Rs 8,000 per month. Calculate

(a) The estimated profit in amonth wherein 240 units are produced.

(b) The sales to be made to earn a profit of Rs 7000 per month.

18. From the following information find BEP and how much profit the company can make?

Sales= Rs 20,00,000 Variable cost = Rs 12,00,000 Fixed cost = Rs 6,00,000

UNIT-5

1. Define replacement of asset and list the basic ressons for replacement. Explain briefly

2. List and explain any replacement models with suitable examples

3.With suitable example elaborate on cost and price of a product.

4.With a neat diagram elaborate on elements of cost

5.List and elaborate on components of cost

6.Elaborate on job costing. Support your answer with suitable example.

7.Ealborate on process costing. Support your answer with suitable examples.

8.With a standard performa of cost sheet elaborate on the importance of preparing a cost sheet.

9.The cost of a machine is Rs 6100 and its scrap value is Rs 100. The manintancence cost found from experience is as follows.

Year	1	2	3	4	5	6	7	8
Running cost(Rs)	100	250	400	600	900	1200	1600	2000

When shulod the machine be replaced.

10. The cost of a machine is Rs 6,00,000 and its scrap value is Rs 1,00,000. The manintancence cost found from experience is as follows.

Year	1	2	3	4	5	6	7	8
Running cost(Rs)	5,000	5,000	7,000	9,000	9,500	12,000	16,000	20,000

When shulod the machine be replaced.

11. A fleet owner finds from his past experience records that the cost of the machine is Rs 6,000 and the running costs are given below. At what stage the replacement is due?

Year	1	2	3	4	5	6	7	8
Running cost(Rs)	1000	1200	1400	1800	2300	2800	3400	4000
Resale value (Rs)	3000	1500	750	375	200	200	200	200

12. A manufacturing firm from past experience records that the cost of the machine is Rs 10,00,000 and the running costs are given below. At what stage the replacement is due?

Year	1	2	3	4	5	6
Running cost(Rs)	1,00,000	1,50,000	2,00,000	2,75,000	3,50,000	4,00,000
Resale value (Rs)	9,00,000	7,80,000	7,00,000	6,25,000	6,00,000	5,00,000

13. The cost of an asset is Rs 5000, the maintenance cost of the n^{th} year is given by Cn=500(n-1) where n=1,2,3…..If the interest rate is 5% per year, determine the economic replacement interval.

14. The cost of an asset is Rs 5,00,000, the maintenance cost of the n^{th} year is given by Cn=20,000(n-1) where n=1, 2, 3…..If the interest rate is 10% per year, determine the economic replacement interval.

15. A manufacturer is offered two machines A & B. A is priced at Rs 5000 and running costs are estimated at Rs 800 at each of the first 5 years increasing by Rs 200/year in the 6^{th} and subsequent

years, Machine B which has the same capacity as machine A costs Rs2500 but will have running cost of Rs 1200/year for the first 6 years increasing by Rs 200/year thereafter. If money is worth of 10%/year, which machine should be purchased?

16. Calculate prime cost from the following information:-
Opening stock of raw material = Rs. 2,50,000
Purchased raw material = Rs. 15,00,000
Expenses incurred on raw material = Rs. 1,00,000
Closing stock of raw material = Rs. 4,50,000
Wages Rs. 9,52,000
Direct expenses Rs. 4,68,000

17. Compute factory cost from the following details:-
Raw material consumed = Rs 50,00,000
Direct wages = Rs20,00,000
Direct expenses = Rs 10,00,000
Factory expenses 80% of direct wages
Opening stock of work in progress = Rs 15,00,000
Closing stock of work in progress = Rs 21,00,000

18. Prepare cost sheet from the following particulars:
Raw material purchased Rs. 2,40,000 Paid freight charges Rs 20,000
Wages paid to laborers Rs 70,000 Directly chargeable expenses Rs 50,000
Factory on cost =20% of prime cost
General and administrative expenses 4% of factory cost
Selling and distribution expenses 5% of production cost
Profit 20% on sales

	Opening stock (Rs.)	Closing stock (Rs.)
Raw material	30,000	40,000
Work in progress	35,000	48,000
Finished goods	40,000	55,000

19.Calculate (a) Cost of raw-materials consumed; (b) Total cost of production; (c) Cost of goods sold and (d) The amount of profit from the following particulars :

Particulars	Amount (Rs)
Opening Stock :	
Raw-materials	2,00,000
Finished goods	1,60,000
Closing Stock :	
Raw-materials	1,60,000
Finished goods	2,00,000
Raw-materials-purchased	20,00,000
Wages paid to labourers	8,00,000

Chargeable expenses	80,000
Rent, rates and taxes	2,00,000
Power	96,000
Factory heating and lighting	80,000
Factory insurance	40,000
Experimental expenses	20,000

20. From the following information assess (a) Cost of raw-materials consumed; (b) Total cost of production; (c) Cost of goods sold and (d) profit

Particulars	**Amount (Rs)**
Opening Stock	
Raw-materials	2,00,000
Finished goods	1,60,000
Closing Stock	
Raw-materials	1,60,000
Finished goods	2,00,000
Raw-materials-purchased	20,00,000
Wages paid to labourers	8,00,000
Chargeable expenses	80,000
Rent, rates and taxes	2,00,000
Power	96,000
Factory heating and lighting	80,000
Factory insurance	40,000
Experimental expenses	20,000
Sale of wastage of material	8,000
Office management salaries	1,60,000
Office printing and stationery	8,000
Salaries of salesman	80,000
Commission of travelling agents	40,000
Sales	40,00,000