BIRLA INSTITUTE OF TECHNOLOGY
MESRA – 835215, RANCHI, INDIA

UG

Name: …… Roll No.: ……..

Branch: …… Signature of Invigilator: ……

Semester: IVth / VIth Date: 04/05/2022 (MORNING)

Subject with Code: **PE211 ENGINEERING ECONOMY**

Marks Obtained	Section A (30)	Section B (20)	Total Marks (50)

INSTRUCTION TO CANDIDATE

1. The booklet (question paper cum answer sheet) consists of two sections. First section consists of MCQs of 30 marks. Candidates may mark the correct answer in the space provided / may also write answers in the answer sheet provided. The Second section of question paper consists of subjective questions of 20 marks. The candidates may write the answers for these questions in the answer sheets provided with the question booklet.
2. The booklet will be distributed to the candidates before 05 minutes of the examination. **Candidates should write their roll no. in each page of the booklet.**
3. Place the Student ID card, Registration Slip and No Dues Clearance (if applicable) on your desk. All the entries on the cover page must be filled at the specified space.
4. Carrying or using of mobile phone / any electronic gadgets (except regular scientific calculator)/chits are strictly prohibited inside the examination hall as it comes under the category of unfair means.
5. No candidate should be allowed to enter the examination hall later than 10 minutes after the commencement of examination. Candidates are not allowed to go out of the examination hall/room during the first 30 minutes and last 10 minutes of the examination.
6. Write on both side of the leaf and use pens with same ink.
7. The medium of examination is English. Answer book written in language other than English is liable to be rejected.
8. All attached sheets such as graph papers, drawing sheets etc. should be properly folded to the size of the answer book and tagged with the answer book by the candidate at least 05 minutes before the end of examination.
9. The door of examination hall will be closed 10 minutes before the end of examination. Do not leave the examination hall until the invigilators instruct you to do so.
10. Always maintain the highest level of integrity. Remember you are a BITian.
11. Candidates need to **submit the question paper cum answer sheets before leaving the examination hall**.

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

CLASS: B.Tech **SEMESTER: IV ,VI**
BRANCH: PIE **SESSION: MO/2021**

SUBJECT: PE 211 ENGINEERING ECONOMY

TIME : 2 HOURS **FULL MARKS: 50**

GROUP A

Attempt all questions (each question contains 1 mark)

1. In linear breakeven analysis, if process A has a variable cost of $45 per unit and process B has a variable cost of $31 per unit, which alternative would be preferred if the breakeven point is 7400 units and production is expected to be 6200 units?

(a) Process A (b) Process B
(c) Process B if its fixed cost is lower than the fixed cost of Process A (d) Cannot tell; need more information

2. What will be the sales amount required to earn a profit of $4,00,000, if fixed cost is $80,000, direct material is $5 per unit, direct labor $2 per unit, direct overhead 100% of direct labor and selling price is $12 per unit.

(a) $19,20,000 (b) $3,20,000
(c) $12,90,000 (d) None of the above

3. What is Margin of Safety if Sales is 20,000 units and B.E.P is 15,000 units.

(a) 35,000 units (b) 5,000 units
(c) Rs 5,000 (d) Rs 35,000

4. Break-even analysis is used in “Make or Buy” decision.

(a) True (b) False

5. Which of the following are characteristics of B.E.P?

(a) There is no loss and no profit to the firm. (b) Total revenue is equal to total cost.
(c) Contribution is equal to fixed cost. (d) All of the above.

6. The Break-even Point of a company is that level of sales income which will equal the sum of its fixed cost.

(a) True (b) False

7. Marginal cost is independent of the ___ .

(a) Fixed cost (b) Variable cost
(c) Both (a) and (b) (d) None of the above

8. The average total cost (ATC) =

(a) Total Fixed Cost (TFC) / Number of output produced (Q) (b) Total Variable Cost (TVC) / Number of output produced (Q)
(c) Total Cost (TC) / Number of output produced (Q) (d) Total Cost (TC) X Number of output produced (Q)

9. Which of the following is fixed cost?

(a) Contractual rent (b) Interest on capital investment
(c) Insurance fee (d) All of the above

10. What are direct expenses also known as?

(a) Overhead expenses (b) Sundry expenses
(c) Chargeable expenses (d) Major expenses

11. Total cost in the sort run is classified into fixed cost and variable cost. Which one of the following is a variable cost?

(a) Cost of raw material
(b) Cost of equipment
(c) Interest payment on past borrowings
(d) Payment of rent on building

12. Which cost increases with the increase in production?

(a) Average cost
(b) Marginal cost
(c) Fixed cost
(d) Variable cost

13. The amount of the periodic depreciation is dependent on following factors:

(a) Acquisition cost
(b) Estimated salvage value
(c) Estimated life
(d) All the above

14. Classic straight line depreciation of a $100,000 asset takes place over a 5-year recovery period. If the salvage value is 15% of first cost, the depreciation charge for year 3 is closest to:

(a) $17,000
(b) $20,000
(c) $24,000
(d) $28,000

15. Choose from the following that are Decision Tree nodes?

(a) Decision nodes
(b) End nodes
(c) Chance nodes
(d) All of the above

16. All of the following assets can be depreciated, except:

(a) A bulldozer
(b) A copper mine
(c) A surgical robot
(d) A conveyor belt

17. In a replacement study, the correct value to use when determining the purchase price of the challenger is:

(a) Its first cost when it was purchased
(b) Its first cost minus the trade-in value of the defender
(c) Its first cost plus the trade-in value of the defender
(d) The book value of the defender

18. The economic service life of an asset is:

(a) The length of time required to recover the first cost of the asset
(b) The time when the operating cost is at a minimum
(c) The time when the salvage value goes below 25% of the first cost
(d) The time when the AW of the asset is at a minimum

19. When a B/C analysis is conducted, the benefits and costs:

(a) Must be expressed in terms of their present worth values
(b) Must be expressed in terms of their annual worth values
(c) Must be expressed in terms of their future worth values
(d) Can be expressed in terms of PW, AW, or FW

20. The rate of return for alternative X is 18% per year and for alternative Y is 17%, with Y requiring a larger initial investment. If a company has a minimum attractive rate of return of 16%:

(a) The company should select alternative X
(b) The company should select alternative Y
(c) The company should conduct an incremental analysis between X and Y in order to select the better alternative
(d) The company should select the do-nothing alternative

21. The AW values of three cost alternatives are $−23,000 for alternative A, $−21,600 for B, and $−27,300 for C. On the basis of these results, the decision is to:

(a) select alternative A
(b) select alternative B
(c) select alternative C
(d) select the Do Nothing alternative

22. If you have the capitalized cost of a certain alternative that has a 5-year life, you can get its annual worth by:

(a) multiplying the CC by i
(b) multiplying the CC by (A/F,i,5)
(c) multiplying the CC by (P/A,i,5)
(d) multiplying the CC by (A/P,i,5)

23. When comparing mutually exclusive alternatives that have different lives by the present worth method, it is necessary to:

(a) Always compare them over a period equal to the life of the longer-lived alternative
(b) Always compare them over a time period of equal service
(c) Always compare them over a period equal to the life of the shorter-lived alternative
(d) Find the present worth over one life cycle of each alternative

24. The present worth of an alternative that provides infinite service is called its:

(a) Net present value
(b) Discounted total cost
(c) Capitalized cost
(d) Perpetual annual cost

25. The present worth of a deposit of $1000 *now* and $1000 every 6 months for 10 years at an interest rate of 10% per year, compounded semiannually is represented by which of the following equations:

(a) $P = 1000(P/A,5\%,21)(F/P,5\%,1)$
(b) $P = 1000\ (P/A,5\%,20)$
(c) $P = 1000\ (P/A,5\%,21)$
(d) $P = 1000 + 1000(P/A,10.25\%,10)$

26. An interest rate of 2% per month is the same as:

(a) There is no loss and no profit to the firm.
(b) Total revenue is equal to total cost.
(c) Contribution is equal to fixed cost.
(d) All of the above.

27. All of the following are examples of cash outflows, except:

(a) Asset salvage value
(b) Operating cost of asset
(c) Income taxes
(b) First cost of asset

28. A single deposit of $25,000 was made by your grandparents on the day you were born 25 years ago. The balance in the account today if it grew at 10% per year is closest to:

(a) $201,667
(b) $241,224
(c) $270,870
(d) $296,454

29. The time it would take for money to double at a simple interest rate of 5% per year is closest to:

(a) 10 years
(b) 12 years
(c) 15 years
(d) 20 years

30. All of the following mean the same as Minimum Attractive Rate of Return except:

(a) Hurdle rate
(b) Inflation rate
(c) Benchmark rate
(d) Cutoff rate

GROUP B

Attempt all questions (each question contains 4 mark)

1. What do you mean by the term 'cash flow diagram'? With suitable example explain the concept of cash flow diagram from borrower and lender viewpoint.

   OR

   How much money should be deposited now in a saving bank account so as to have a one withdrawal of Rs. 300 at the end of third year and fourth deposits of Rs. 300, Rs.200. Rs.400 and Rs.200 at the end of first, fourth, sixth and eight year respectively? Assume an interest rate of 6% per interest period.

2. Identify the following cash flows as a benefit, disbenefit, or cost.
   a) Loss of income to local businesses because of a new freeway.
   b) Less travel time because of a loop bypass.
   c) $400,000 annual income to local businesses because of tourism created by a national park.

d) Cost of fish from a hatchery to stock a lake at the state park.

e) Less tire wear because of smoother road surfaces.

f) Decrease in property values due to the closure of a government research lab.

g) School overcrowding because of a military base expansion.

h) Revenue to local motels because of an extended weekend holiday.

OR

The Murphy County Fire Department is considering two options for upgrading its aging physical facilities. Plan A involves remodeling the fire stations on Alameda Avenue and Trowbridge Boulevard that are 57 and 61 years old, respectively. (The industry standard is about 50 years of use for a station.) The cost for remodeling the Alameda station is estimated at $952,000, while the cost of redoing the Trowbridge station is $1.3 million. Plan B calls for buying 5 acres of land somewhere between the two stations, building a new fire station, and selling the land and structures at the previous sites. The cost of land in that area is estimated to be $366,000 per acre. The size of the new fire station would be 9000 square feet with a construction cost of $151.18 per square foot. Contractor fees for overhead, profit, etc., are expected to be $340,000, and architect fees will be $81,500. (Assume all the costs for plan B occur at time 0.) If plan A is adopted, the extra cost for personnel and equipment will be $126,000 per year. Under plan B, the sale of the old sites is anticipated to net a positive $500,000 five years in the future. Use an interest rate of 6% per year and a 50-year useful life for the remodeled and new stations to determine which plan is better based on present worth analysis.

3. How is economic service life of an asset determined?

OR

An existing piece of equipment has its market value of Rs. 10,000, maintenance cost is Rs 1000 per year and has a life of 10 years and no salvage value. The interest rate is 10%. The proposed equipment has an installed cost of Rs. 100,000, maintenance cost of Rs. 800 per year, a life of 50 years and salvage vale of Rs. 15,000. Suggest, whether proposed equipment should be purchased or not.

4. What is the cost structure of a manufacturing unit? Explain in brief the various elements that make up the total cost of any product?

OR

A product is manufactured in batches of 500. The direct material cost is Rs 15,000, the direct labor cost is Rs 20,000, and factory overheads are 40 percent of the prime cost. If the selling expenses are 30 percent of the factory cost, what would be the selling price of each product so that profit is 20 percent of the total cost?

5. Describe the effect of increase or decrease in fixed costs and variable costs on B.E.P, with the help of neat sketches.

OR

The fixed costs for the year 2019-20 are ₹ 5,00,000, variable cost per unit is ₹ 25. The estimated sales for the period are valued at ₹ 15,00,000. Each unit sells at ₹ 150. Determine:

i) Break-even point.

ii) ₹ 12,00,000 will be the likely sales turnover for the next budget period, calculate the estimated contribution and profit.







