

**PRACTICE SET**

**End Semester Examination, Spring- 2026**

**Program: BTECH**

**Semester: VIII**

**Course: MINE & MINERAL ECONOMICS**

**Course Code: 8PCCMiE409**

<b>Course Outcomes</b>	<b>Description</b>
CO1	Apply knowledge of mine economics for understanding mineral related policies and solve problems related with the mine economics.
CO2	Analyze and solve the concepts of mine economics, its risk and mineral inventory.
CO3	Describe the concept of mine sampling & illustrate the valuation of mineral deposit and be able to estimate the mine life and profitability.
CO4	Discuss the forms of business, royalty, taxes & duties in mining sector.

**UNIT I**

**Section B (Each carries 10 marks)**

- List the major and minor minerals give at least five example of each. **REMEMBER CO1**
- What is sampling? The method of cutting groove by using diagram? **UNDERSTAND CO1**
- Define Mineral? classify the minerals with example. Explain the probable reserve? **UNDERSTAND CO1**
- Summarize your understanding on substitution of minerals giving an account on renewable and non-renewable sources of energy? **UNDERSTAND CO1**
- Describe the different methods of sampling **REMEMBER CO1**
- Explain the followings with suitable labelled diagram :
  - Groove cut in the face of a drive
  - Groove cut in the cross cut**ANALYSE CO1**
- Distinguish between discounting and non-discounting technique of appraisal **ANALYSE CO1**
- List important points of national mineral policy **REMEMBER CO1**
- Explain the different patterns of borehole sampling. **UNDERSTAND CO1**

**Section C (Each carries 20 marks)**

10. A mining company is considering two different methods for mineral extraction: **Open Cast Mining** and **Underground Mining**.

Parameter	Open Cast	Underground
Capital Cost	₹100 Cr	₹180 Cr
Annual Operating Cost	₹20 Cr	₹15 Cr
Ore Recovery	90%	75%
Ore Grade	2%	2.5%
Life of Mine	10 years	12 years
Market Price of Metal	₹700/kg	₹700/kg
Discount Rate	10%	10%
Annual Ore Production	5 lakh tonnes	3.5 lakh tonnes

- Calculate the total metal recovered over the life of the project for both options.
- Estimate the annual revenue.
- Compute NPV for both options.
- Recommend the better option with justification. **EVALUATE CO1**

11. Answer the following questions

- A machine is valued for Rs.10000/-, taking the life of the machine as 20 years .if the scrap value is Rs. 1000/,Evaluate the depreciation charge per annum. **ANALYSE CO1**
- Conclude your understanding on Break even stripping ratio? What do you think that after reaching to the breakeven point further mining of mineral is possible if yes then explain at what specific conditions? **ANALYSE CO1**

**UNIT II**

**Section B (Each carries 10 marks)**

- Explain mine valuation? Describe various methods of mine valuation. **UNDERSTAND CO2**
- Define the term Critical Minerals. Describe them and also give the locations of these in India. (15 marks) **REMEMBER CO2**
- What are the different methods of calculating depreciation? **REMEMBER CO2**
- Explain ore reserves. How are they classified? **UNDERSTAND CO2**
- Explain the following :- (a) Ore (b) Cut-off grade (c) Dilution **REMEMBER CO2**
- Discuss the Viability gap funding scheme which is recently launched by the government of India with reference to Mining Development? **UNDERSTAND CO2**
- Explain about diminishing annuity method and Sinking fund method? **REMEMBER CO2**

**Section C (Each carries 20 marks)**

- Enumerate the listed critical minerals which is mentioned in the part d of schedule and what is the import value of these minerals in the financial year of 2023-2024? **EVALUATE CO2**
- A mining company acquires a **limestone mining lease** for ₹40,00,000. The estimated total extractable reserve is **2,00,000 tonnes**.

The actual production over 4 years is:

Year 1	Year 2	Year 3	Year 4
25,000 tonnes	35,000 tonnes	50,000 tonnes	40,000 tonnes

Calculate the followings:

- **Amortization rate per tonne**
- **Amortization expense for each year**
- **Remaining value of the lease after Year 4**

### UNIT III

#### Section B (Each carries 10 marks)

21. Judge the method of calculating the average grade of ore with neat clean diagram
- Constant distance weighting technique
  - Inverse distance weighting technique
- EVALUATE CO3**
22. Critique the theory of cash flow. What are the cash inflow and cash outflow?  
**ANALYSE CO3**

#### Section C (Each carries 20 marks)

23. Design a basic cash flow model for a mining project with the following:

- Initial investment: ₹50 Cr
- Annual operating cost: ₹8 Cr
- Annual revenue: ₹18 Cr
- Project life: 6 years
- Discount rate: 10%

**ANALYZE CO3**

24. A coal mine has an initial development cost of ₹120 Crores. The annual production is 5 lakh tonnes. Fixed annual operating costs are ₹10 Crores, and variable costs are ₹500 per tonne. Selling price is ₹1,200 per tonne.

**Calculate the followings:**

- Determine annual revenue and annual total cost.
- Calculate the annual profit before tax.
- Compute the payback period.
- Estimate the break-even production level

**Evaluate CO3**

### UNIT IV

#### Section B (Each carries 10 marks)

25. Define the profitability index along with its importance. **REMEMBER CO4**
26. If the assay values of three samples groove length  $w_1$ ,  $w_2$  and  $w_3$  are 1.3% cu, 2.2% cu and 1.4% cu, and the true width  $T_1=55$ cm,  $T_2=40$  and  $T_3=60$  cm. calculate the average assay of the ore body?
27. List the basic objectives of National mineral policy of India? **APPLY CO4**

#### Section C (Each carries 20 marks)

28. Appraise these terms : **EVALUATE CO4**
- Computed grades
  - Effective grade
  - Run of mine /Grade (ROM)
  - Pit head grade
  - Mill grade
  - Cut-off grade

**Summary Sheet:  
CO Wise**

<b>CO</b>	<b>Q. No</b>	<b>Marks</b>
CO1	1,2,3,4,5,6,7,10,11,8,9,12,13	125
CO2	14,15,16,17,18,19,20,21,22,23,24,25,	115
CO3	26,27,28,30,29,31,32,34,35	115
CO4	36,37,38,39,40,41,42	105
<b>Total</b>		<b>380</b>

**Unit Wise**

<b>Unit</b>	<b>Q. No</b>	<b>Marks</b>
Unit 1	1,2,4,5,6,7,8,9,10,11,12,13	130
Unit 2	14,15,16,17,18,19,20,21,22,23,24,25,	145
Unit 3	26,27,28,29,30,31,32,33,34,35,	115
Unit 4	36,37,38,39,40,41,42,42	105
<b>Total</b>		<b>380</b>

**Blooms Taxonomy Level (BTL) Wise**

<b>BTL</b>	<b>Q. No</b>	<b>Marks</b>
LOT	1,2,3,4,5,6,7,10,11,14,15,16,17,18,19,20,21,22,23,24, 25,26, 27,28,30,36, 37,38,39,40	225
HOT	8.9.12.13,25,29,31,32,34,35	165
<b>Total</b>		<b>380</b>

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**Disclaimer:** - This is a Practice set. The Question in End term examination will differ from the Practice set. This Practice set is meant for practice only.