

Programme: B. Tech (MiE)
Course: Mine & Mineral Economics
Course Code:8PCCMiE409
Enrolment no. _____

Full Marks: 70
Time: 3 Hrs.

Q.N o.	Questions	CO	Bloom Taxonomy Category	Marks																											
Section I																															
1	Short Answer type questions.			4 x 5 = 20																											
a	Define the concept of sampling and illustrate the groove-cutting method using a diagram. or List the important roles of coal mining industry in the country's GDP.	CO1	Understand																												
b	Describe about net present value and internal rate of return and its importance. or Analyze the primary causes of depreciation.	CO2	Understand																												
c	Conclude the financial impacts of long gestation period. or Compare and contrast the characteristics and applications of samples and specimens.	CO3	Analyze																												
d	Classify the minerals the mineral reserves of India on the basis of sufficient and insufficient reserve. or Outline the key measures to ensure accuracy in the sampling process.	CO4	Understand																												
Section II																															
Long Answer type questions.																															
2	Describe the concept of ore reserves and examine the criteria used for their classification. or Discuss the Viability gap funding scheme which is recently launched by the government of India with reference to Mining Development?	CO2	Understand		3 x 10 = 30																										
3	Evaluate the principles of cash flow theory and analyze the distinctions between cash inflows and outflows. or Judge the method of calculating the average grade of ore with neat clean diagram a) Constant distance weighting technique b) Inverse distance weighting technique	CO3	Analyze																												
4	Given three ore samples with assay values of 1.6% Cu, 2.5% Cu, and 1.8% Cu, and respective true widths of 50 cm, 45 cm, and 65 cm, determine the average assay value of the orebody. or List the basic objectives of National mineral policy of India.	CO4	Apply																												
		CO3	Remember																												
Section III																															
Application based questions																															
5	a. A machine is valued at Rs. 15,000/-. Considering the machine's lifespan of 25 years and a scrap value of Rs. 1,500/-, evaluate the annual depreciation charge. b. Explain the concept of break-even stripping ratio and evaluate whether continued mineral extraction beyond the breakeven point is feasible, specifying the conditions under which it remains viable. or A mining company is considering two different methods for mineral extraction: Open Cast Mining and Underground Mining. <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <thead> <tr> <th>Parameter</th> <th>Open Cast</th> <th>Underground</th> </tr> </thead> <tbody> <tr> <td>Capital Cost</td> <td>₹100 Cr</td> <td>₹180 Cr</td> </tr> <tr> <td>Annual Operating Cost</td> <td>₹20 Cr</td> <td>₹15 Cr</td> </tr> <tr> <td>Ore Recovery</td> <td>90%</td> <td>75%</td> </tr> <tr> <td>Ore Grade</td> <td>2%</td> <td>2.5%</td> </tr> <tr> <td>Life of Mine</td> <td>10 years</td> <td>12 years</td> </tr> <tr> <td>Market Price of Metal</td> <td>₹700/kg</td> <td>₹700/kg</td> </tr> <tr> <td>Discount Rate</td> <td>10%</td> <td>10%</td> </tr> <tr> <td>Annual Ore Production</td> <td>5 lakh tonnes</td> <td>3.5 lakh tonnes</td> </tr> </tbody> </table> a. Calculate the total metal recovered over the life of the project for both options. b. Estimate the annual revenue. c. Compute NPV for both options. d. Recommend the better option with justification	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	CO1	Evaluate	1 x 20 = 20
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COURSE OUTCOME

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.