

Name:

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES  
End Semester Examination, DEC 2021

Program Name : B. Tech. (APE Gas)

Semester : VII

Course Name : Petroleum Engineering Economics

Time : 3 hours

Course Code : CHGS 3015

Max. Marks: 100

Nos. of page(s) : 03

Instructions : Assume any missing data. Draw the diagrams, wherever necessary. Use your own graph sheets. Write roll number and name on any additional sheet that you use.

SECTION A  
(6X10=60 marks)

S. No.		Marks	CO																																																																				
1	For the following transactions, <b>tabulate</b> a trial balance sheet for Rahul up to 31 March 2003.	10	CO1																																																																				
	<table border="1"><thead><tr><th>S.No</th><th>Item</th><th>Amount(Rs)</th><th>S.No</th><th>Item</th><th>Amount(Rs)</th></tr></thead><tbody><tr><td>1</td><td>Salaries</td><td>36320</td><td>11</td><td>Purchases</td><td>144670</td></tr><tr><td>2</td><td>Sales up to 31-03-2003</td><td>173500</td><td>12</td><td>Sundry debtors</td><td>1430</td></tr><tr><td>3</td><td>Plant and Machinery</td><td>34300</td><td>13</td><td>Travelling expenses</td><td>2630</td></tr><tr><td>4</td><td>Commission Paid</td><td>1880</td><td>14</td><td>Carriage inward</td><td>240</td></tr><tr><td>5</td><td>Stock on 1.4.2002</td><td>11100</td><td>15</td><td>Sundry Creditors</td><td>14260</td></tr><tr><td>6</td><td>Repairs</td><td>1670</td><td>16</td><td>Capital 01.04.2002</td><td>62500</td></tr><tr><td>7</td><td>Sundry expenses</td><td>460</td><td>17</td><td>Drawing</td><td>3500</td></tr><tr><td>8</td><td>Returns Inward</td><td>1000</td><td>18</td><td>Cash at bank</td><td>1090</td></tr><tr><td>9</td><td>Discount allowed</td><td>1150</td><td>19</td><td>Returns outward</td><td>400</td></tr><tr><td>10</td><td>Rent and rates</td><td>3220</td><td>20</td><td>Investments</td><td>6000</td></tr></tbody></table>			S.No	Item	Amount(Rs)	S.No	Item	Amount(Rs)	1	Salaries	36320	11	Purchases	144670	2	Sales up to 31-03-2003	173500	12	Sundry debtors	1430	3	Plant and Machinery	34300	13	Travelling expenses	2630	4	Commission Paid	1880	14	Carriage inward	240	5	Stock on 1.4.2002	11100	15	Sundry Creditors	14260	6	Repairs	1670	16	Capital 01.04.2002	62500	7	Sundry expenses	460	17	Drawing	3500	8	Returns Inward	1000	18	Cash at bank	1090	9	Discount allowed	1150	19	Returns outward	400	10	Rent and rates	3220	20	Investments	6000		
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2	a. The cost of a piece of equipment is Rs. 25,00,000. The scrap value of the equipment after it's useful life of 10 years will be Rs. 50,000. <b>Enumerate</b> the value of the asset after 4 years using 1. Straight line method 2. Decline balance method 3. Double decline balance method.	10	CO1																																																																				
	b. <b>Enumerate</b> the effective annual interest rate when the interest is compounding continuously and amount of money that would accumulate after 6 years with the initial investment of 35,000 and a nominal interest rate of 20 percent.																																																																						

3	<p>a. <b>Interpret</b> the relations for annuity due. (R represent the uniform periodic payment made during n discrete periods in an annuity due with an interest rate i and the total amount of annuity at the end is S) The periodic payment will be paid at the beginning of each period like an LIC premium plan.</p> <p>b. A piece of equipment has an initial installed value of Rs 2,00,000. It is estimated that its useful life period will be 8 years and its scrap value at the end of the useful life will be Rs20,000. The depreciation will be charged as a cost by making equal charges each year, the first payment being made at the beginning of the first year. The depreciation fund will be accumulated at an annual interest rate of 9 percent. At the end of the life period, enough money must have been accumulated to account for the decrease in equipment value. <b>Interpret</b> the yearly cost due to depreciation under these conditions.</p> <p><b>Note: Annuity due method is used.</b></p>	10	CO2																
4	<p><b>Solve</b> the rate of return based on discounted cash flow method for the following.</p> <p>Initial Fixed capital investment = Rs. 16,00,000  Working capital investment = Rs. 1,26,000  Service life = 7 years  Salvage value = Rs. 55,000  Yearly cash flow is as shown in the table</p> <table border="1" data-bbox="181 1039 1283 1128"> <tr> <td>Year</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> </tr> <tr> <td>Cash(Lakhs) Rs</td> <td>3.21</td> <td>3.76</td> <td>4.04</td> <td>3.67</td> <td>3.99</td> <td>4.02</td> <td>3.96</td> </tr> </table>	Year	1	2	3	4	5	6	7	Cash(Lakhs) Rs	3.21	3.76	4.04	3.67	3.99	4.02	3.96	10	CO3
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5	<p><b>Appraise</b> oil and gas pricing mechanism and discuss about various pricing issues.</p>	10	CO4																
6	<p><b>Pointout</b> a brief note about global distribution and consumption of gas.</p> <p style="text-align: center;"><b>OR</b></p> <p><b>Infer</b> the importance of logistics in petroleum refining cost, demand and forecasting.</p>	10	CO4																
<p><b>SECTION B</b> (2 X 20=40 marks)</p>																			
7	<p>A company has three alternative investments, which are being considered. Because all three investments are for the same type of unit and yield the same service, only one of the investments can be accepted. The risk factors are the same for all three cases. Company policies, based on the current economic situation, dictate that a minimum annual return on the original investment of 15 percent after taxes must be predicted for any unnecessary investment with interest on investment not included as a cost. (This may be assumed to mean that other equally sound investments yielding a 15 percent return after taxes are available.) Company policies also dictate that, where applicable, straight-line depreciation is used, for time-value of money interpretations, end-of-year cost, and profit analysis is used. Land value and pre-startup costs can be ignored. Given the following data, <b>illustrate</b> which investment, if any, should be made by alternative-analysis profitability-evaluation methods of</p> <p>(a) Rate of return on initial investment</p>	20	CO3																

- (b) Minimum payout period with no interest charge
- (c) Discounted cash flow
- (d) Net present worth
- (e) Capitalized costs

Investment No	Total Investment	Working capital (Rs)	Salvage value(Rs)	Useful life (Years)	Annual cash flow (Rs)
1	15,00,000	1,00,000	50,000	5	6,25,000
2	19,00,000	1,50,000	60,000	7	8,24,000
3	24,00,000	1,75,000	80,000	8	5,89,000

The total capital investment for a conventional chemical plant is Rs. 15,00,00,000, and the plant produces 3 million kg of product annually. The selling price of the product is Rs. 82/kg. Working capital amounts to 25 percent of the total capital investment. The investment is from company funds, and no interest is charged. Direct production costs are Rs. 9/kg, Fixed expenses Rs. 8/kg, plant overheads Rs. 5/kg, and packaging Rs. 0.8/kg. Distribution costs are 5 percent of the total product cost. Taxes will be at the rate of 18 percent. **Classify** the following:

- (a) Fixed capital investment..
- (b) Total product cost per year.
- (c) Profit per kilogram of product before taxes.
- (d) Profit per kilogram of product after taxes.

**OR**

The purchased-equipment cost for a plant which produces pentaerythritol (solid fuel processing plant) is Rs. 300,000. The plant is to be an addition to an existing formaldehyde plant. The major part of the building cost will be for indoor construction, and the contractor's fee will be 7 percent of the direct plant cost. All other costs are close to the average values found for typical chemical plants. On the basis of this information, **appraise** the following:

- (a) The minimum capital investment.
- (b) The maximum capital investment.
- (c) The total estimated capital investment.

The cost components are as shown in below table.

8

20

CO4

Component	Cost type	Range (%)
	<b>Direct cost</b>	
Purchased Equipment		15-40
Purchased equipment installation		6-14
Instrumentation and controls		2-8
Piping		3-20
Electrical		2-10
Buildings		3-18
Yard improvements		2-5
Service facilities		8-20
Land		1-2
	<b>Indirect cost</b>	
Engineering and supervision		4-21
Construction expenses		4-16
Contractors fee		2-6
Contingency		5-15