

Name:	
Enrolment No:	

**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**

**End Semester Examination, December 2018**

Programme Name: B.Tech: CE+RP	Semester : VII
Course Name : Chemical Project Economics	Time : 03 hrs
Course Code : CHEG 452	Max. Marks : 100
Nos. of page(s) : 03	

**Instructions: Assume Suitable and necessary data if required and Justify**

**SECTION A**

Answer ***all*** the questions

S. No.		Marks	CO
Q 1	A company has to replace a present facility after 15 years at an outlay of \$ 5.0 million. It plans to deposit an equal amount at the end of every year for the next 15 years at an interest rate of 18% compounded annually. Determine the equivalent amount that must be deposited at the end of every year for the next 15 years and draw a cash flow diagram	8	CO1
Q 2	In a desalination plant, an evaporator of area 200 m <sup>2</sup> was purchased in 2012 at a cost of \$5,00,000. In 2017, another evaporator of area 50 m <sup>2</sup> was added. What was the cost of second evaporator (in \$)? Assume the cost of evaporator scales as (capacity) <sup>0.54</sup>	7	CO3
Q 3	Discuss the uses and limitations of Financial Ratios	8	CO4
Q 4	How the complexity factor of the refinery (Integrated) is determined?	7	CO5

**SECTION B**

Answer ***all*** the questions

Q 5	<p>A company has an initial worth of \$50 million, and an estimated salvage value of \$ 2.0 million in a service life of 8 years.</p> <p>a) Given a choice between the straight line and declining-balance methods of depreciation. Which method would you recommend to save tax and why?</p> <p>b) Estimate the book value of the plant at the end of 4 years for each of the two methods of depreciation and also by sinking fund method by considering, <math>i =</math></p>	15	CO2
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	12%		
Q 6	The annual variable production costs for a plant operating at 75 percent capacity are \$250,000. The sum of the annual fixed charges, overhead costs, and general expenses is \$180,000, and may be considered not to change with production rate. The total annual sales are \$540,000, and the product sells for \$5/kg. What is the breakeven point in kilograms of product per year? What are the gross annual profit (depreciation included) and net annual profit for this plant at 100 percent capacity if the income tax rate is 30 percent of gross profit?	15	CO3
Q 7	Explain the flow of information through an accounting system with a neat exhibit  OR  Describe various methods used for determining profitability	15	CO4

**SECTION-C**

Answer any one question

Q 8.	<p><b>a)</b> The following information applies to a company on given date. Determine current ratio, cash ratio and working capital for the company on the given date</p> <table border="1"> <tr><td>Long Term debts</td><td>\$1,600</td></tr> <tr><td>Debts due within 1 year</td><td>\$1,000</td></tr> <tr><td>Accounts payable</td><td>\$2,300</td></tr> <tr><td>Machinery and equipment (at cost)</td><td>\$10,000</td></tr> <tr><td>Cash in Bank</td><td>\$3,100</td></tr> <tr><td>Prepaid rent</td><td>\$300</td></tr> <tr><td>Government Bonds</td><td>\$3,000</td></tr> <tr><td>Social Security taxes payable</td><td>\$240</td></tr> <tr><td>Reserve for depreciation</td><td>\$600</td></tr> <tr><td>Reserve for expansion</td><td>\$1,200</td></tr> <tr><td>Inventory</td><td>\$1,600</td></tr> <tr><td>Accounts Receivable</td><td>\$1,700</td></tr> </table> <p><b>b)</b> Neatly sketch the symbols for the following equipment and write down about the data included for this equipment on the process flowsheets.</p> <p>i) Centrifugal Pump</p>	Long Term debts	\$1,600	Debts due within 1 year	\$1,000	Accounts payable	\$2,300	Machinery and equipment (at cost)	\$10,000	Cash in Bank	\$3,100	Prepaid rent	\$300	Government Bonds	\$3,000	Social Security taxes payable	\$240	Reserve for depreciation	\$600	Reserve for expansion	\$1,200	Inventory	\$1,600	Accounts Receivable	\$1,700	10	CO4
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		15	CO5																								

	<p>ii) Kettle reboiler  iii) Distillation column  iv) Internal floating roof tank</p> <p style="text-align: center;"><b>OR</b></p> <p>a) The salt content of a crude oil (API gravity 25) was found to be 70 PTB (pounds per thousand barrels). In order to ship and market this oil, it is necessary to install a desalting unit in the field, which will reduce the salt content to 20 PTB. This upgrading in the quality of oil-in terms of an acceptable PTB-could realize a possible saving of 0.1 \$/bbl in the shipping cost of the oil. Assume the following: The crude oil desalter has a design capacity of 120,000 bbl/day. The current capital investment of the desalting unit is estimated to be \$ 3.0 million plus another \$2.0 million for storage tanks and other facilities. Service life of equipment is 10 years with negligible salvage value, while the operating factor = 0.95. The total operating expenses of the desalter are estimated to be \$10/1,000 bbl. The annual maintenance expenses are 10% of the total capital investment. Evaluate the economic merits of the desalter.</p> <p>b) Describe in detail the importance of PFD and P&amp;ID in understanding economics of the plant</p>	<p style="text-align: center;"><b>10</b></p> <p style="text-align: center;"><b>15</b></p>	<p style="text-align: center;"><b>CO4</b></p> <p style="text-align: center;"><b>CO5</b></p>
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