UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Term Examinations – April, 2018

Program/course: B.Tech: APE(UP), APE(Gas)   **Semester   : VIII**
Subject: Petroleum Engineering Economics   **Max. Marks : 100**
Code   : PEEO 401   **Duration   : 3 Hrs**
No. of page/s: 2

Note: Assume Suitable and necessary data if required and Justify

Section-A (Marks: 20)

Answer ***all*** the questions

1. What are the various methods used for evaluating the Profitability?   [4] [CO1]

2. How a Z-score for a firm is determined?   [4] [CO1]

3. An oil production company wishes to repay in 10 installments a sum of $100,000 borrowed at 8% annual interest rate. Determine the amount of each future annuity payment required to accumulate the given present value (debt) of $100,000 for a number of payments of 10 years?   [4] [CO4]

4. Name the major components for capital cost estimation in oil pipeline project? [4] [CO2]

5. Explain the meaning of following terms in approximately two to five lines

   a. Perpetuity   b. Capitalized Cost   [4] [CO4]

Section-B (Marks: 40)

Answer ***all*** the questions and ***any one*** in question ***no: 9***

6. Explain in detail the Government policy on petroleum product pricing   [10] [CO4]

7. What are the challenges in supply chain management?   [10] [CO4]

8. A natural gas pipeline transports 120 MMSCFD (millions standard cubic feet per day) at a load factor of 95%. The capital cost is estimated at, $60 million, and the annual operating cost is $6 million. Amortizing the capital at 10% for a project life of 30 years, determine the cost of service and transportation tariff for this pipeline. [10] [CO2]

9. A heat exchanger has been designed for use in process. A standard type of heat exchanger with a negligible scrap value costs $4000 and will have a useful life of 6 years. Another proposed heat exchanger of equivalent design capacity costs $6800 but will have a useful life of 10 years and a scrap value of $800. Assuming an effective compound interest rate of 8% per annum, determine which heat exchanger is cheaper by comparing capitalized costs [10] [CO3]

OR

During field operations, the manager in charge is considering the purchase and installation of a new pump that will deliver crude oil at a faster rate than the existing one. The purchase and the installation of the new pump will require an immediate layout of $15,000. This pump however, will recover the costs by the end of one year. The relevant cash flows is as follows.

	Year		
	0	1	2
New Pump	-15,000	19,000	0
Old Pump	0	95,000	95,000

If the oil company requires 10% minimum annual rate of return on money invested, which alternative should be chosen? [10] [CO3]

Section-C (Marks:40)

Question *No: 10* Compulsory. Answer *any one* in question *No: 11*

10. a. Discuss the factors involved in economic evaluation of an oil field. [6] [CO1]

b. Why retail sales are lost? Explain in brief the Wheel of retailing. [6] [CO4]

c. Determine EOQ & Total Cost for the following data [8] [CO4]

Actual consumption: 18,000 units per year; cost per unit: $2.0

Cost of placing order: $15 per order; Inventory carrying cost : 20% of unit value.

11. The salt content of a middle-eastern crude oil (API gravity 24) was found to be 60 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 15 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 100,000 bbl/day. The current capital investment of the desalting unit is estimated to be $ 3.5 million plus another $2.0 million for storage tanks and other facilities. Service life of equipment is 8 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   [20] [CO2]

OR

Instead of flaring the associated natural gas separated along with crude oil, it was decided to recover the lost heat by using the waste-heat recovery system (W.H.R.S.). For pilot test runs, four designs were offered each has a lifetime of 5 years. The data associated with each design is as follows: [20] [CO3]

	Design A	Design B	Design C	Design D
Capital Investment	10,000	16,000	20,000	26,000
No: of Years	5	5	5	5
Average Depreciation	2000	3200	4000	5200
Average Operational Cost	100	100	100	100
Revenue $/year	4100	6000	6900	8850

The minimum annual rate of return desired by the management is 10%.Which design is recommended.?

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