UNIVERSITY OF MINES AND TECHNOLOGY, TARKWA

FIRST SEMESTER EXAMINATIONS, DEC 2014

COURSE NO: **PE 473**
COURSE NAME**:** **OIL AND GAS FIELD PROJECT EVALUATION**
CLASS: **PE IV** TIME: **3 HOURS**

Name**:** _____Index Number: _____

ANSWER ALL THE QUESTIONS

SECTION A **(20 marks)**

Read Questions 1-20 carefully and circle the Correct Answer, True or False

1. Present value of an uneven stream of cash flows can be calculated with the help of present value of annuity table.
   A. True B. False
2. Sinking fund factor is used to determine the periodic fixed amount that must be invested regularly to accumulate a specified sum at the end of a given period at a given rate of interest.
   A. True B. False
3. Maximum benefit of compounding occurs when money is compounded daily.
   A. True B. False
4. Given a principal amount of $10,000 to be invested for 9 months, it is better to invest in a scheme that offers 12% annual compound interest than investing in a scheme that earns 12% simple interest.
   A. True B. False
5. The present value of a mixed stream of cash flows is the sum of the present values of the individual cash flows.
   A. True B. False
6. Continuous compounding results in the maximum possible future value for given rate of interest and time period.
   A. True B. False
7. Signature bonus is paid during discovery and production of oil and gas.
   A. True B. False
8. Overriding royalty is payment made to someone other than the mineral owner in form of a stipulated share of future production for an agreed compensation.
   A. True B. False
9. For mutually exclusive alternative projects analysis, NPV can be used whenever possible.
   A. True B. False
10. Cost recovery limit is the only true distinction between concessionary systems and PSC in terms of the mechanics of the two fiscal systems.
    A. True B. False
11. For mutually exclusive alternative, the decision maker can only select one alternative
    A. True B. False

12. Royalty comes first out of the gross revenue such that gross revenue less royalty equals net profit.
    A. True B. False
13. Past costs that have not been recovered are called sunk cost.
    A. True B. False
14. Sensitivity analysis can be performed on any variables.
    A. True B. False
15. Decision making under risk occurs when partial information is known.
    A. True B. False
16. At the chance node on a decision tree, the manager controls the occurrence of a chance event.
    A. True B. False
17. Under decision tree analysis, probabilities are assigned to all branches emanating from decision node and the sum of probabilities must add up to 1.0.
    A. True B. False
18. There can sometimes be multiple IRR for a particular project.
    A. True B. False
19. Petroleum is generally non renewable asset to the extent that a barrel produced today is available for the production in the future.
    A. True B. False
20. Tangible items are items associated with the installation or construction of intangible assets.
    A. True B. False

Choose the Correct Letter, A, B, C or D for Questions 21 – 40

21. Revenues remaining after royalties and cost recovery are called……
    A. Gross revenue B. Cost oil
    C. Net Profit D. None of the above
22. Which of the following is a signal that induces oil producers to produce oil and consumers to buy it?
    A. Supply B. Demand
    C. Price D. None of the above
23. ……are risk takers who have no interest in ownership of crude but are willing to assume price risks in hopes of larger profits.
    A. Speculators B. Brokers
    C. Hedgers D. Operators
24. Royalty:
    I. Royalty can be used as a bid parameter.
    II. Royalty is normally a percentage of gross value and amount of production.
    III. It can be paid in cash or kind.
    A. II only B. I &II only
    C. II & III only D. I, II & III
25. Payments per year until exploration and development activity begins is called……
    A. Rentals B. Signature bonus
    C. Production bonus D. Ring-fencing

26. Expected Opportunity Loss(EOL):
    I. It is the expected value of regret associated with the choice of strategy adopted.
    II. It is the difference between actual profit or loss and the potential profit or loss under a perfect information scenario.
    III. EOL value represents the cost of certainty associated with each strategy.
    A. II only B. I & II only
    C. II & III only D. I, II & III
27. Which of the following is the most popular petroleum evaluation criterion?
    A. Net Present Value (NPV) B. Internal Rate of Return (IRR)
    C. Discounted Payback Period (DPBP) D. Benefit Cost Ratio (BCR)
28. If Project A has an IRR of 15%, and project B has an IRR of 20%, which of the following statements is true?
    A. Project A is more economically viable than project B.
    B. Project B is more economically viable than project A.
    C. Projects A and B are equally economically.
    D. There is not enough information to determine which project is more economically viable.
29. Given an investment of $10,000 to be invested for one year;
    A. It is better to invest in a scheme that pays 10% simple interest.
    B. It is better to invest in a scheme that pays 10% annual compound interest.
    C. Both A and B provide the same return.
    D. None of the Above.
30. The discount rate at which the net present value of a series of cash receipts and disbursement (cash flow) reduces to zero is referred to as……
    A. Net Present Value (NPV) B. Internal Rate of Return (IRR)
    C. Discounted Payback Period (DPBP) D. Benefit Cost Ratio (BCR)
31. A bank deposit account attracts 5% of simple annual fixed interest. What would be the balance in this account in three year's time if the account has $100 in it now?
    A. $105.00 B. $115.00
    C. $115.76 D. $115.92
32. The ……..of an investment proposal may be defined as the NPV of the project at the minimum rate of return divided by the sum of the present values of costs at the minimum rate of return.
    A. Net Present Value (NPV) B. Internal Rate of Return (IRR)
    C. Present Value Ratio (PVR) D. Benefit Cost Ratio (BCR)
33. Which of the following is not a cash flow item to be considered in a cash flow evaluation model?
    A. Cost of a seismic test B. Depreciation of the parent platform
    C. Platform maintenance expenses D. None of the above
34. Spider chart:
    I. Shows the difference between the minimum and maximum forecast values for all the variable tested.
    II. The slopes of the spider graph lines indicate the direction of impact on the forecast value of change in variable.
    III. The steeper the slope of the spider graph line the larger the impact on forecast values of that variable.
    A. I only B. II only

C. I &II only D. I, II & III

35. A contractual agreement with an owner who holds a working interest in an oil and gas lease to assign all or part of that interest to another party in exchange for fulfilling contractually specified conditions is referred as……
    A. Overriding royalties B. Joint venture
    C. Farmout D. Production payment
36. Which of the following statements about the difference between CAPEX and OPEX is true?
    A. CAPEX occurs only before first oil is produced, after which all expenditure is OPEX.
    B. CAPEX is discounted at a different rate to OPEX.
    C. CAPEX relates to the construction of a system of production, whereas OPEX relates to the operation and maintenance of these systems.
    D. CAPEX can be always deducted from the tax liability, whereas OPEX can only be deducted after first oil.
37. Concessionary fiscal system:
    I. Also called royalty/tax (R/T) systems.
    II. Contractor bears all risk and rewards.
    III. Host government's reward is a function of production and price.
    A. II only B. I &II only
    C. II & III only D. I, II & III
38. The difference between effective annual rate of interest with monthly and quarterly compounding, when nominal rate of interest is 10% is;
    A. 0.10% B. 0.14%
    C. 0.21% D. 0.09%
39. The capital needed to operate an oil field or a refinery as well as the facilities associated with them is known as
    A. Fixed Capital B. Working Capital
    C. Non depreciable Capital D. None of the above
40. Profit Oil:
    I. It is the revenues remaining after royalties and cost recovery are called profit oil (P/O).
    II. The contractor's share of profit oil or gas is taxable.
    III. The Host Government is solely responsible for the determination of how to split.
    A. II only B. I &II only
    C. II & III only D. I, II & III

SECTION B

QUESTION 1 **20 MARKS**

A. Define the following terms: ***5 marks***

i. Interest *ii. Effective interest rate* *iii. Hedge*

iv. Market system *v. Reserve*

B. State five (5) major key players in petroleum pricing. ***5 marks***

C. Tema Oil Refinery (TOR) is considering replacing equipment. Purchasing and installation of the new equipment will cost $15 000. It will have an estimated service life of 8 years and $3 000 salvage value. The operating cost will average $100/yr. The present equipment is expected to have 8 more years of service life, at the end of which it can be sold for $2 000; its operating cost is $1 800/yr. If the present equipment is replaced now, it can be sold for $5 000. If the minimum rate of return is 15 %, should TOR replace the present equipment?

10 marks

QUESTION 2 **20 MARKS**

A. Given that a well has declined from 120 stb/day to 112 stb/day during a one-month period, use the exponential decline model to perform the following tasks: ***11 marks***

a. Predict the production rate after 11 more months.

b. Calculate the amount of oil produced during the first year.

B. Using the calculated oil produced during the one year, calculate the net income assuming the following values: ***9 marks***

1. Price of oil = $30/bbl
2. Operating cost = $12/bbl
3. Production taxes = 20%

QUESTION 3 **20 MARKS**

A. Examine whether it is economically desirable to sell the development rights to a new process or property for a $150 000 cash offer at time zero, or, to keep the rights and develop them using another development scenario. The project net before-tax cash flows for each project are presented on the following figures. Use NPV and PVR analysis techniques to make this economic decision for a minimum rate of return of 15%. ***10 marks***

Project A											
Year	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Cash flow (X1000)	-300	-400	200	200	200	200	200	200	200	200	200

Project B											
Year	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Cash flow (X1000)	150	-	-	-	-	-	-	-	-	-	-

B. An oil field has a 40% probability of being rich, in which case it will produce cash flows of $5 million per year for 15 years. The field has a 60% probability of being poor, in which case it will produce cash flows of $1 million per year for 15 years. Drilling a well costs $15 million, and assumes the first of the 15 cash flows occurs 1year after first drilling. The discount rate is 10%. What should you do? ***Note: Use Decision Tree Analysis***

10 marks

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