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**UNIVERSITY OF PETROLEUM  
AND ENERGY STUDIES**



**End Semester Examination – May, 2017**

**Program/course: MBA (Energy Trading)**  
**Subject: Energy Derivatives and Risk Management**  
**Code : MBEF 918**  
**No. of page/s: 3**

**Semester – II**  
**Max. Marks: 100**  
**Duration: 3 Hrs**

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Note: All sections are compulsory.

**Section – A (10 X 2=20 Marks)**

**Explain the following in not more than 2 lines**

- 1.) Market order
- 2.) Volcker rules
- 3.) Special margin
- 4.) Operational risk
- 5.) Trade novation
- 6.) Stack and roll hedge
- 7.) Backwardation
- 8.) Costless collars
- 9.) Vanilla swap
- 10.) Insider Trading

**Section – B (4 X 5 = 20 Marks)**

**Answer the following questions in brief:**

- 1.) What do you understand by Intrinsic value of an option? Explain with the help of an example.
- 2.) Explain the need of software usage in the Energy Trading industry?
- 3.) Differentiate between REMIT and EMIR?
- 4.) Explain the impact of Dodd Franc Act in the Energy Industry?

### **Section – C (30 Marks)**

**Answer the following questions in detail:**

- 1.) Analyse the scenarios mentioned below and explain which option strategy a trader should adopt? Explain each strategy with the help of an example. **(20 marks)**
  - a.) If a trader buys a call and buys a put at different strike price, He has limited risk appetite than other traders. His expectation is market would be more volatile.
  - b.) A strategy in which the investor is expecting big price movements in underlying asset price with increase in price more likely than an decrease.
- 2.) The Standard Portfolio Analysis of Risk (SPAN) margin system provides a method to integrate both futures and options on futures contracts into the same system to assess a portfolio's risk. Elucidate. **( 10 Marks)**

### **Section – D (5 X 6 = 30 Marks)**

**Refer the case below and answer the questions in the end of the case study.**

#### **Mexico Hedges its Oil Revenues**

Revenues from oil sales are a vital component of Mexico's budget, accounting for nearly 40 percent of the country's public sector income. In 2006, Mexico pumped 1.6 million barrels per day (mbpd). This had dropped to 1.4 mbpd in 2007, and was projected to fall further to 0.9 mbpd in the coming years. As a result of this falling oil production, Mexico's leverage to impact the market was falling, and it was feared that after 2010, Mexico would no longer be an exporter of oil.

In 2008, Mexico was reported to have locked in prices at \$70 to \$100 per barrel by buying put options for 480 million barrels at a cost of \$1.5 billion. This was nearly 90 percent of its 2009 oil exports, and the country was able to protect \$37 billion of the revenue from oil sales. This hedging was lauded by reports as a far sighted strategy, with oil prices falling from \$120 to \$60 level by the end of 2008. If Mexico had not placed this hedge, the country's budget would have been devastated.

Moreover, the decision to hedge with put options was such that the country could still benefit if oil prices went high by choosing not to exercise the options. The finance ministry's quarterly report said that from the country's \$10 billion oil stabilization fund, \$1.5 billion was spent on

‘financial investment’. It was hoped that the higher revenues Mexico would obtain by selling oil through the options, rather than in the open market, would easily exceed the hedging cost.

\$70 per barrel for Mexican crude oil mix is equivalent to \$82 for West Texas Intermediate (WTI). The hedge would prove to be profitable for Mexico if WTI oil traded in 2009 at sub-\$80 levels. Between \$80 and \$85 for WTI, the hedging cost would exceed any gains, and above \$85, the revenues from selling oil at higher prices would pay for the hedging costs and still leave a profit.

However, the real virtue of the hedge was that it would lock in a maximum revenue shortfall of \$3 billion, including the hedging cost, even if WTI oil prices fell to \$40. Without the hedge, at \$40 a barrel for WTI, Mexico stood to lose 59 percent of its budgeted oil revenue. If oil were to go back to the \$100 or \$120 levels, Mexico could still make \$10 billion to \$20 billion extra revenue by giving up only \$1.5 billion for this.

Mexico is among those oil producing countries that are fairly transparent about their hedging strategies, while others are more secretive. It was reported that Barclays Capital and Goldman Sachs had arranged this hedge. Now, with a drastic fall in oil Prices, the banks were selling oil in the derivatives market to manage their risk, possibly adding to the downward pressure on oil prices.

### **Questions:**

1. Explain the reason that led Mexico to hedge its oil revenues? Analyze as to why were put options chosen for this over futures?
2. Evaluate the hedging programme used by Mexico?
3. In your opinion, what might Barclays Capital and Goldman Sachs have done to manage their risk as put option sellers?
4. What would have been the result of this hedge if oil prices had stuck to the \$80 to \$85 per barrel range in 2009? What if oil prices had averaged at \$50 per barrel in 2009, and what if they had been, on an average, \$110 per barrel in 2009?
5. Explain the reason that many oil producing countries are tight-lipped about their hedging programmes?