

**SET I**

<b>Name:</b>	
<b>Enrolment No:</b>	

**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**  
**End Semester Examination, May 2019**

**Course: Energy Derivatives and Risk Management**

**CC:OGET 2004**

**Programme: MBA (Energy Trading)**

**Semester: II**

**Time: 03 hrs.**

**Max. Marks: 100**

**Instructions: The students can ask for graph sheets**

**SECTION A**

S. No.		Marks	CO
Q 1	<b>Explain the following in not more than 2 lines</b>  1.) Trade Compression 2.) Basel Accords 3.) Limit order 4.) Price risk 5.) Hedger 6.) Hedge Ratio 7.) Insider Trading 8.) REMIT 9.) Vanilla swap 10.) Call option	<b>20</b>	<b>CO 1,2,3,4</b>

**SECTION B**

Q 1.	Differentiate between the following: a.) American and European option b.) Contango and Backwardation	<b>5</b>	<b>CO 2,3,4</b>
Q 2.	Explain the concept of Mark to market while settling the daily transactions.	<b>5</b>	<b>CO 2</b>
Q 3.	Explain how basis risk can arise in a hedging transaction.	<b>5</b>	<b>CO 1</b>
Q 4.	An electronic trading system allows the trading members to enter orders with various conditions attached to them as per their requirements. Explain carefully different type of orders?	<b>5</b>	<b>CO 2,3</b>

**SECTION-C**

Q 1.	Analyse a strategy with the help of an example in which the investor is expecting big price movements in underlying asset price with decrease in price more likely than an increase.	15	CO 2,3
Q 2.	Forward contract is a non-standardized contract between two parties to buy or sell an asset at a specified future time at a price agreed upon today whereas futures contract is a standardized contract. Explain major differences between the two contracts?	15	CO 2

**SECTION-D**

Q1.	<p style="text-align: center;"><b>Refer the case “Sumitomo Derivatives Losses” below and answer the questions in the end of the case study.</b></p> <p>This case explains the causes of the losses and the impact on the financial world due to the Sumitomo Copper Derivatives trades caused by excessive manipulation by one of its key and trusted employees Yasuo Hamanaka. He was believed to be an expert in Risk Management. He had a star trader status and was vested with executive decision-making powers by the firm.</p> <p>Sumitomo owned large amounts of copper that was warehoused and stored in factories as well as numerous futures contracts. Hamanaka controlled 5% of the worlds copper supply, which may sound like a very small and insignificant amount, but given the fact that copper is illiquid because it is physical in nature and the logistics of buying and selling it are not as simple as financial <a href="#">commodities</a>, a five percentage holding is quite significant.</p> <p>Sumitomo also benefitted from the commissions on the other copper transactions that were handled by the company. Commissions were handled by the percentage of the value of the commodity being sold and delivered.</p> <p><b>Causes of the Losses</b></p> <p>There were some losses that Sumitomo had incurred just when Hamanaka had taken charge. He tried to recover the losses by taking huge positions in copper commodity futures on the London Metal Exchange. He tried to use the firm’s large cash reserves to both corner and squeeze the market and kept the price artificially high for the entire decade leading up to 1995 and garnished premium profits on the sale of Sumitomo’s physical assets.</p> <p>This of course attracted the attention of the exchange and it gave a warning to Hamanaka who then struck a deal via Merrill Lynch for USD 150 million, which enabled him to trade at LME. He borrowed money from several banks without any authorization from his seniors. He used the funds either to buy copper or pay for the</p>	<p style="text-align: center;"><b>2 X 15 = 30</b></p>	<p style="text-align: center;"><b>CO 2,3,4</b></p>
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collateral he was required to deposit at the LME to cover loss making positions. By 1990 he was reporting huge trading profits to the top management by showing invoices of the fictitious options trades which he had created through some nexus with some brokers. Whenever anyone attempted to short the market he would pour more cash into positions thereby sustaining the price and outlasting the shorts, simply because he had more cash. The long cash positions forced anyone shorting copper to deliver the goods or close out their position at a premium.

Unlike the US, the LME had no mandatory position reporting and no statistics showing open interest. Basically traders knew the price was too high, but they did not have the exact figures of how much Hamanaka controlled and how much money he had in reserve. In the end most cut their losses and had Hamanaka have his way. Nearly a decade after this market manipulation took place in 1995 due to the resurgence of the mining in China the price of copper started to revive which further inflated the prices. Sumitomo was exposed to losses because the market was headed for a big drop and shorting the positions then would result in an even bigger loss at a faster rate.

Analysts felt that the debacle was a result of Sumitomo's poor managerial, financial and operational control systems, which enabled Hamanaka to carry out unauthorized trading activities undetected by the top management. There was a lack of effective monitoring and supervision of his trading activities.

The sorts of risks that cause this loss are market risk, operational risk – supervision and fraud – market manipulation.

### **The Aftermath**

Analysts were concerned about the Sumitomo losses as it came after two major corporate disasters – [Barings](#) and Daiwa and felt that it would lead to a serious introspection among various financial regulators and trading firms to improve existing regulation and trading procedures.

Sumitomo was able to overcome the losses since it had a net worth of \$6bn and another \$8bn in hidden reserves. The losses estimated to be \$2.6bn amounted to only 10 per cent of Sumitomo's annual sales. Sumitomo was also able to prevent further escalation of losses by aggressive liquidation of its uncovered position under its new president Miyahara. Hamanaka was of course transferred out of his trading post.

Hamanaka was charged with forging one of his supervisor's signatures on a form and convicted. Sumitomo's reputation was tarnished as many people believed that the

company could not have been ignorant of Hamanaka's hold on the copper market, especially because it profited for years from it.

Traders argued that Sumitomo must have known of Hamanaka's wrongdoing because the company threw more money at Hamanaka every time speculators tried to shake his price. Sumitomo responded by implicating JPMorgan Chase and Merrill Lynch as funders of the scheme, revealing that the banks had granted loans structured as future derivatives. Sumitomo, JPMorgan Chase and Merrill Lynch all were found guilty to some extent. As a result, JPMorgan Chase's case on a similar charge, related to the Enron scandal and Mahonia Energy, was hurt. Meanwhile, Hamanaka served his sentence without comment. Since the copper market manipulation, new protocols have been added to the LME to make a repeat less likely.

Q1. Explain the causes of the losses and the impact on the economy due to the Sumitomo Copper Derivatives trades?

Q2. Which hedging strategies should the company must have applied in order to avoid occurrence of these losses.

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**SECTION A**

S. No.		Marks	CO
Q 1	<b>Explain the following in not more than 2 lines</b>  11.) Novation 12.) Dodd Franc Act 13.) Limit order 14.) Basis risk 15.) Speculator 16.) Stack and roll hedge 17.) Rogue Trader 18.) CFTC 19.) Vanilla swap 20.) Legal confirmation	<b>20</b>	<b>CO 1,2,3,4</b>

**SECTION B**

Q 1.	Differentiate between the following: c.) Call and Put option d.) REMIT and EMIR	<b>5</b>	<b>CO 2,3,4</b>
Q 2.	Explain the concept of SPAN margin system applied in the exchange.	<b>5</b>	<b>CO 1</b>
Q 3.	Explain how counter party credit risk can arise in a hedging transaction.	<b>5</b>	<b>CO 1</b>
Q 4.	Margin is the deposit money that needs to be paid to buy or sell each contract in an exchange. In this light, explain various kinds of margins?	<b>5</b>	<b>CO 2,3</b>

**SECTION-C**

Q 1.	Analyse a strategy with the help of an example in which the investor is expecting big price movements in underlying asset price with increase in price more likely than an decrease.	<b>15</b>	<b>CO 2,3</b>
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Q 2.	In March 2011, the International Swaps and Derivatives Association (ISDA) Commodities Steering Committee (COSC) and Commodities Major Dealers Implementation Group (CMD) made a commitment to global supervisors to continue to drive a high level of product, processing and legal standardization, with a goal of securing further operational efficiency, mitigating operational risk and increasing the netting and clearing potential for appropriate products. In this light. Explain the various steps which are involved in the commodity markets trade processing lifecycle.	15	CO 1
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**SECTION-D**

Q1.	<p><b>Refer the case below and answer the questions in the end of the case study.</b></p> <p align="center"><b>Mexico Hedges its Oil Revenues</b></p> <p>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.</p> <p>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.</p> <p>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.</p> <p>\$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.</p> <p>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.</p>	<p align="center"><b>5 X 6 = 30</b></p>	<p align="center"><b>CO 2,3,4</b></p>
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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 future?
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?