Name:

Enrolment No:

UPES
UNIVERSITY WITH A PURPOSE

UNIVE₹ITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2019

Course: Energy Trading Markets and Risk Management **Semester: III**
Program: MA EE **Time: 03 Hour**
Course code: OGET 8006 **Max. Marks: 100**
Instructions:

	SECTION -A		**(20 Marks)**
1	Daily mark to market settlement is done_____ a) Till the date of contract expiry b) As long as the contract makes a loss c) On the last day of week d) On the last trading day of the month	**2**	**CO 2**
2	Which of the following exchanges was the first to start trading commodity futures? a) Chicago Board of Trade b) Interest Rate c) Chicago Mercantile Exchange d) London International Financial Futures and Options Exchange	**2**	**CO 2**
3	Oil is selling at a spot price of $42.00 per barrel. Oil can be stored at a cost of $0.42 per barrel per month. The opportunity cost of capital is 7.2% per year (or 0.6% per month). What is the gain or loss realized by an oil refinery that floats its exposure and purchases oil on the spot market in 2 months at a price of $43.00 per barrel, instead of hedging with a forward contract? a) $0.35 gain b) $0.35 loss c) $1.00 gain d) $1.00 loss	**2**	**CO 2**
4	The 6-month futures price for oil is $96.60 per barrel (or 2.30 cents per gallon). The 6-month futures prices for gasoline and heating oil are 2.50 cents and 2.15 cents, respectively. What is the gross margin on a simple 3-2-1 crack spread? a) $0.25 b) $0.35 c) $0.54 d) $0.68	**2**	**CO 2**
5	All of the positions listed will benefit from a price decline, except: a) Short put b) Long put c) Short call	**2**	**CO 3**

	d) Short stock		
6	A put option is purchased and held for 1 year. The Exercise price on the underlying asset is $40. If the current price of the asset is $36.45 and the future value of the original option premium is (-$1.62), what is the put profit, if any, at the end of the year? a) $1.62 b) $1.93 c) $3.55 d) $5.17	**2**	**CO 3**
7	The spot price of gasoline is 258 cents per gallon and the annualized risk free interest rate is 4.0%. Given a lease rate of 1.0%, a continuously paid storage rate of 0.5%, and a convenience yield of 0.75%, what is the no-arbitrage price range of a 1-year forward contract (in cents)? a) 265.19 to 267.19 b) 258 to 265.19 c) 258 to 267.19 d) 247.16 to 265.19	**2**	**CO 4**
8	Nine-month gold futures are trading for $1565 per ounce. The spot price is $1509 per ounce. LIBOR during each of the upcoming 4 quarter is listed as 1.04%, 1.22%, 1.30%, and 1.35%, respectively. Calculate the 9-month lease rate on the futures contract. a) 2.4% b) 2.1% c) 1.3% d) 0.0%	**2**	**CO 3**
9	Forward prices for gold, in dollar per ounce, for the next five year are 1350, 1400, 1560, 1675, and 1756, respectively. A mine can be opened for 3 year at a cost of $2,000. Annual mining costs are a constant $500 and interest rates are 5.0%. When should the mine be opened to maximize NPV? a) Year 1 b) Year 2 c) Year 3 d) Never	**2**	**CO 4**
10	The 6-month futures price for oil is $96.60 per barrel (or 2.30 cents per gallon). The 6-month futures prices for gasoline and heating oil are 2.50 cents and 2.15 cents, respectively. What is the gross margin on a simple 3-2-1 crack spread? a) $0.25 b) $0.35 c) $0.54 d) D) $0.68	**2**	**CO 3**
SECTION-B			**(20 Marks)**
11	What function does the convenience yield serve in setting forward prices and how does	**5**	**CO 3**

	this influence arbitrage opportunities?		
12	Why is the cash-and-carry strategy employed in the financial futures market not readily available in the commodity futures market?	**5**	**CO 3**
13	A trader in gold holds stock of 1 Kg valued at ₹ 15 lacs at the spot price of ₹ 15,000 per 10 gms. The 3-m futures contract for size of 100 gms on gold is ₹ 15,400 per 10 gms. In order to protect against the fall in value of the gold the trader decides to sell 10 contracts in gold for 3-m delivery. However after one month the trader is required to sell the stock of gold at ₹ 14,500 and therefore also cancels his position in futures at ₹ 14,700. Find out the price the trader realized.	**5**	**CO 4**
14	The risk of spot prices on gold as measured from its standard deviation is placed at ₹ 120. Similarly, the price risk of the 3-m futures contract on gold is estimated to be ₹ 150. The co-efficient of correlation between the two is placed at 0.85. In order to hedge spot position on gold what ratio of futures contract would be optimal.	**5**	**CO 3**
	SECTION-C		**(30 Marks)**
	Answer any two		
15	Find out the payoffs of the following positions on European options on a stock whose price at maturity is ₹100: a) Long call with exercise price of ₹ 90 b) Short call with exercise price of ₹ 80 c) Long put with exercise price of ₹ 110 d) Short put with exercise price of ₹ 110 e) Long call with exercise price of ₹ 100 f) Short put with exercise price of ₹100	**15**	**CO 4**
16	A stock is trading at ₹105.00. You are willing to write a call on the stock exercisable at the end of 3 months with strike price of ₹110.00. If the risk free rate of interest is 12% p.a. and stock has exhibited volatility of 30%, based on the past data, what premium for the call would you like to charge for writing the call?	**15**	**CO 4**
17	The value of 3-m at-the-money European call option on an asset whose current price is ₹ 100 in terms of Black Scholes Model is expressed as follows: Call value c = 100 x 0.5678 – 100 x 0.9901 x 0.5382 a. What is the expected change in the value of the call if spot value goes up to ₹102? b. What is the expected change in the value of the put if the spot value moves to₹105?	**15**	**CO 4**
	SECTION-D		**(30 Marks)**
18	a. Crude oil futures and Natural Gas Futures have annual volatility of 20% and 30% respectively. You are updating volatility on weekly basis. In the past week, the returns of Crude oil futures and Natural Gas Futures were 3% and – 2% respectively. What is your revised estimate of annual volatility for coming week using EWMA method with 95% decay rate and 52 weeks per annum? b. If the coefficient of correlation between Stock A and Stock B is 0.7 in part a, what would be the correlation between them for the coming week?	**30**	**CO 4**