

<b>Name:</b>	 <b>UPES</b> <small>UNIVERSITY OF TOMORROW</small>
<b>Enrolment No:</b>	

**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**

**End Semester Examination, December 2023**

**Course: Energy Economics-II**

**Semester: V**

**Program: BA-Economics (Hons)**

**Time : 03 hrs.**

**Course Code: ECON-3026P**

**Max. Marks: 100**

**Instructions:** This questions paper has four sections A, B, C & D. You are required to attempt all the sections. Please read the instructions given with the respective sections carefully.

**SECTION A**

**20Marks**

S. No.	Attempt all the questions. Each question carries equal marks.	Marks	CO								
			<b>CO1</b>								
<b>Q 1</b>	<p>Match the definition of Load Management options</p> <table border="1" style="width: 100%;"> <tr> <td style="width: 20%;">Peak Clipping</td> <td>It aims at reducing energy demand through efficient use of energy in efficient appliances or by changing lifestyles.</td> </tr> <tr> <td>Valley Filling</td> <td>This aims demand reduction during the on-peak hours.</td> </tr> <tr> <td>Load shifting</td> <td>The aim here is to promote use of energy during off-peak periods so that the level of average utilization of the facilities improves.</td> </tr> <tr> <td>Energy Conservation</td> <td>This aims at moving loads from on-peak to off-peak periods without changing the pattern of energy usage</td> </tr> </table>	Peak Clipping	It aims at reducing energy demand through efficient use of energy in efficient appliances or by changing lifestyles.	Valley Filling	This aims demand reduction during the on-peak hours.	Load shifting	The aim here is to promote use of energy during off-peak periods so that the level of average utilization of the facilities improves.	Energy Conservation	This aims at moving loads from on-peak to off-peak periods without changing the pattern of energy usage	<b>04</b>	<b>CO1</b>
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<b>Q 2</b>	<p>The assets in the energy industry do not have alternative uses other than their use in the energy sector. This statement refers to which characteristics of energy sector:</p> <ol style="list-style-type: none"> <li>Capital Intensiveness</li> <li>Long gestation period</li> <li>Big Size</li> <li>Asset Specificity</li> </ol>	<b>02</b>	<b>CO1</b>								
<b>Q 3</b>	<p>“We include the price-related contingencies in the economic analysis.” Identify the statement as</p> <ol style="list-style-type: none"> <li>True</li> <li>False</li> </ol>	<b>02</b>	<b>CO1</b>								
<b>Q 4</b>	<p>if the size of the project is small compared to the world market, the demand faced by the project output is infinitely elastic. Consequently, the output is incremental and the appropriate price for valuation is the free on board price at the port of delivery, as the project is unable to influence the prices in the global market. This is the case of:</p> <ol style="list-style-type: none"> <li>Exportable input</li> <li>Imported input</li> </ol>	<b>02</b>	<b>CO1</b>								

	c) Exportable project output d) Import substitute output		
<b>Q 5</b>	Economic price of land can be determined with the help of the options given below: a) Loss in economic activities b) Willingness to pay for the amenities. c) Displaced commercial and industrial activities. All the above	<b>02</b>	<b>CO1</b>
<b>Q 6</b>	An energy saving lamp which consumes 14 W costs £2 while an incandescent lamp of equivalent luminosity (75 W) costs £0.5. Assuming 10 h of lighting per day and a cost of 10 pence per kWh of electricity consumption, determine the payback period. a) 24.6 days b) 23.6 days c) 22.6 days d) 25.6 days	<b>04</b>	<b>CO1</b>
<b>Q.7</b>	If the probability of striking oil is 15%, and the NPV of developing the discovered field is £100 million and if exploration costs £10 million, what is the Expected Monetary Value? a. £5 million b. £5.5 million c. £5.6 million d. £5.1 million	<b>02</b>	<b>CO1</b>
<b>Q.8</b>	If plant capacity is 500 MW, plant is operating 24*7, PLF is 80 % and plant availability is 100%, what will be the number of million units generated in a year: a. 3505 MU b. 3504 MU c. 3405 MU d. 5304 MU	<b>02</b>	<b>CO1</b>
<b>SECTION B</b> <b>4Q*5M = 20Marks</b>			
<b>Q</b>	Attempt all the short answer questions.		<b>CO2</b>
<b>Q 11</b>	What is the order of recovery in case of production sharing contracts? Explain briefly each of the items?	<b>05</b>	<b>CO2</b>
<b>Q 12</b>	Plants with high operating cost and low capital cost are most suitable as peaking plants, vice-versa in case of base load plants. Do you agree with the given statement. Please support your answer with the help of facts and figures.	<b>05</b>	<b>CO2</b>
<b>Q 13</b>	“If the flow rate of oil is proportionate to the pressure in the reservoir and the rate at which the pressure falls is proportionate to the flow of oil.” Discuss with respect to the production profile of petroleum reservoir.	<b>05</b>	<b>CO2</b>
<b>Q 14</b>	Share your views on depletion dimension. What is Hotelling’s r percent formula and why resource owner will wait to supply in future date?	<b>05</b>	<b>CO2</b>

**SECTION C**  
**3Q\*10M = 30Marks**

<b>Q</b>			<b>CO3</b>																																																																				
<b>Q 16</b>	<p>The following table presents components of Price Build Up of Domestic LPG (Subsidized) at Delhi</p> <p style="text-align: center;"><b>Price Build Up of Domestic LPG (Subsidized) at Delhi</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%; text-align: center;">Sr. No.</th> <th style="width: 45%; text-align: center;">Elements</th> <th style="width: 15%; text-align: center;">Units</th> <th style="width: 35%; text-align: center;">Effective 1<sup>st</sup> April, 2014</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">01.</td> <td>FOB Price at Arab Gulf of LPG</td> <td style="text-align: center;">\$/MT</td> <td style="text-align: center;">874.95</td> </tr> <tr> <td style="text-align: center;">02.</td> <td>Ocean Freight from AG to Indian Ports</td> <td style="text-align: center;">\$/MT</td> <td style="text-align: center;">46.11</td> </tr> <tr> <td style="text-align: center;">03.</td> <td>C&amp;F (Cost &amp; Freight) Price</td> <td style="text-align: center;">\$/MT</td> <td style="text-align: center;">921.06</td> </tr> <tr> <td></td> <td>Or Rs./Cylinder</td> <td style="text-align: center;">Rs./Cylinder</td> <td style="text-align: center;">800.08</td> </tr> <tr> <td style="text-align: center;">04.</td> <td>Excise Duty</td> <td style="text-align: center;">Rs./Cylinder</td> <td style="text-align: center;">0.00</td> </tr> <tr> <td style="text-align: center;">05.</td> <td>Custom Duty</td> <td style="text-align: center;">Rs./Cylinder</td> <td style="text-align: center;">NIL</td> </tr> <tr> <td style="text-align: center;">06.</td> <td>Subsidy by Central Government</td> <td style="text-align: center;">Rs./Cylinder</td> <td style="text-align: center;">22.58</td> </tr> <tr> <td style="text-align: center;">07.</td> <td>Marketing Cost of OMCs</td> <td style="text-align: center;">Rs./Cylinder</td> <td style="text-align: center;">10.52</td> </tr> <tr> <td style="text-align: center;">08.</td> <td>Bottling Charges (Filling and Cylinder Cost)</td> <td style="text-align: center;">Rs./Cylinder</td> <td style="text-align: center;">38.68</td> </tr> <tr> <td style="text-align: center;">09.</td> <td>VAT (including VAT on distributor commission) applicable for Delhi</td> <td style="text-align: center;">Rs./Cylinder</td> <td style="text-align: center;">0.00</td> </tr> <tr> <td style="text-align: center;">10.</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">11.</td> <td>Price Charged to distributor (Bottling Plant Price)</td> <td style="text-align: center;">Rs./Cylinder</td> <td style="text-align: center;">373.41</td> </tr> <tr> <td style="text-align: center;">12.</td> <td>Inland Freight and Delivery Charges</td> <td style="text-align: center;">Rs./Cylinder</td> <td style="text-align: center;">39.45</td> </tr> <tr> <td></td> <td>Marketing Margin of OMCs</td> <td style="text-align: center;">Rs./Cylinder</td> <td style="text-align: center;">6.84</td> </tr> <tr> <td style="text-align: center;">13.</td> <td>Distributor Commission: Establishment Charges –Rs. 24.24/cylinder &amp; Delivery Charges- Rs. 16.47/cylinder</td> <td style="text-align: center;">Rs./Cylinder</td> <td style="text-align: center;">40.71</td> </tr> <tr> <td style="text-align: center;">14.</td> <td>Import Charges</td> <td style="text-align: center;">Rs./Cylinder</td> <td style="text-align: center;">6.47</td> </tr> </tbody> </table>	Sr. No.	Elements	Units	Effective 1 <sup>st</sup> April, 2014	01.	FOB Price at Arab Gulf of LPG	\$/MT	874.95	02.	Ocean Freight from AG to Indian Ports	\$/MT	46.11	03.	C&F (Cost & Freight) Price	\$/MT	921.06		Or Rs./Cylinder	Rs./Cylinder	800.08	04.	Excise Duty	Rs./Cylinder	0.00	05.	Custom Duty	Rs./Cylinder	NIL	06.	Subsidy by Central Government	Rs./Cylinder	22.58	07.	Marketing Cost of OMCs	Rs./Cylinder	10.52	08.	Bottling Charges (Filling and Cylinder Cost)	Rs./Cylinder	38.68	09.	VAT (including VAT on distributor commission) applicable for Delhi	Rs./Cylinder	0.00	10.				11.	Price Charged to distributor (Bottling Plant Price)	Rs./Cylinder	373.41	12.	Inland Freight and Delivery Charges	Rs./Cylinder	39.45		Marketing Margin of OMCs	Rs./Cylinder	6.84	13.	Distributor Commission: Establishment Charges –Rs. 24.24/cylinder & Delivery Charges- Rs. 16.47/cylinder	Rs./Cylinder	40.71	14.	Import Charges	Rs./Cylinder	6.47	<b>10</b>	<b>CO3</b>
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	<p>You are required to calculate following inputs from the above given information:</p> <ol style="list-style-type: none"> <li>Import Parity Price</li> <li>Refinery Transfer Price (RTP) for domestic LPG</li> <li>Total Desired Price</li> <li>Under recovery to Oil marketing companies</li> <li>Retail Selling Price</li> </ol>																																		
<p><b>Q 17</b></p>	<p>Calculate the economic and financial prices at the project site for the following two cases. Note LM means local money, CIF is cost insurance freight:</p> <p>Case_1: Exportable Output: Crude Oil</p> <table border="1" data-bbox="418 632 1122 974"> <thead> <tr> <th>Description</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>FOB price</td> <td>20 \$/barrel</td> </tr> <tr> <td>Export tax</td> <td>5%</td> </tr> <tr> <td>Handling charge</td> <td>20 LM/bbl</td> </tr> <tr> <td>Transport cost from field to port</td> <td>60 LM/bbl</td> </tr> <tr> <td>Official exchange rate</td> <td>30 LM/\$</td> </tr> <tr> <td>Shadow exchange rate</td> <td>36 LM/\$</td> </tr> <tr> <td>Economic value of handling and transport</td> <td>90% of the value</td> </tr> </tbody> </table> <p>Case_2: Importable Input: Coal</p> <table border="1" data-bbox="418 1050 1122 1461"> <thead> <tr> <th>Description</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>CIF price</td> <td>28 \$/t</td> </tr> <tr> <td>Import tax</td> <td>30% of CIF</td> </tr> <tr> <td>Handling charge</td> <td>60 LM/t</td> </tr> <tr> <td>Transport cost from port to project site</td> <td>200 LM/t</td> </tr> <tr> <td>Official exchange rate</td> <td>30 LM/\$</td> </tr> <tr> <td>Shadow exchange rate</td> <td>36 LM/\$</td> </tr> <tr> <td>Economic value of handling and transport</td> <td>90% of the value</td> </tr> </tbody> </table>	Description	Value	FOB price	20 \$/barrel	Export tax	5%	Handling charge	20 LM/bbl	Transport cost from field to port	60 LM/bbl	Official exchange rate	30 LM/\$	Shadow exchange rate	36 LM/\$	Economic value of handling and transport	90% of the value	Description	Value	CIF price	28 \$/t	Import tax	30% of CIF	Handling charge	60 LM/t	Transport cost from port to project site	200 LM/t	Official exchange rate	30 LM/\$	Shadow exchange rate	36 LM/\$	Economic value of handling and transport	90% of the value	<p><b>10</b></p>	<p><b>CO3</b></p>
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<p><b>Q 18</b></p>	<p>Tyler Company enters into a concession agreement with the Canadian government. Tyler pays the government, in US dollars, a \$ 5,000,000 signing bonus and agrees to pay the government royalties of 10 % of gross production and a 5 % severance tax. Tyler bears all of the costs associated with exploration, development and production.</p> <p>Tyler spends \$5,000,000 on exploration and drills costs, and in 2012 has gross revenue of \$ 7,000,000 and production cost \$ 1,000,000. The income tax allow deduction of all production costs, with exploration and drilling costs deductible over a five year period. The tax rate is 40%.</p> <p>Prepare the Revenue Sharing Statement between Tyler Company and the Canadian Government.</p>	<p><b>10</b></p>	<p><b>CO3</b></p>																																

**SECTION D**  
**2Q\*15M = 20Marks**

Q	Answer Both Questions		<b>CO4</b>																														
Q.19	<p align="center"><b>Price Discrimination by BSES in India</b></p> <p>The Electricity Act of 2003 has created a new paradigm for the development of the power sector in the country. It has abolished the monopoly of the state electricity boards created through the Electricity (Supply) Act of 1980 and has created a new competitive framework for the development of the power sector in the country, with focus on the consumers and the safeguarding of their interests by independent regulatory commissions. The Act has eliminated/reduced entry barriers in the entire chain of the electricity supply business. With this background, BSES, a company of Anil Ambani's Reliance, has entered for power supply in Delhi and Mumbai.</p> <p>In the supply of power, price discrimination is inevitable. Even in a normal situation, when a monopoly supplier faces different markets, prices differ from one market to another. Monopoly power and price discrimination have been described as Siamese twins. However, in India, it is not only the varying demand curves in the different markets but also the socio-economic consideration that lead to different prices. Subsidies are, once again, inevitable in such a situation. In determining the cost to various users, there are obviously many problems. Determination of the cost to serve is not easy in a multi-user situation.</p> <p align="center"><b>Electricity Charged by BSES in Delhi in 2007</b></p> <table border="1" data-bbox="302 1102 1094 1671"> <thead> <tr> <th>User</th> <th>KW</th> <th>Units consumed/ month</th> <th>Rate (Rs./Unit/month)</th> </tr> </thead> <tbody> <tr> <td rowspan="4">Domestic</td> <td rowspan="4">2-5</td> <td>0-100</td> <td>2.4</td> </tr> <tr> <td>101-200</td> <td>2.4</td> </tr> <tr> <td>201-400</td> <td>3.9</td> </tr> <tr> <td>&gt; 400</td> <td>4.6</td> </tr> <tr> <td rowspan="2">Non-Domestic</td> <td rowspan="2">upto KW</td> <td></td> <td>5.35</td> </tr> <tr> <td>10-100</td> <td>4.87</td> </tr> <tr> <td rowspan="2">Industrial</td> <td rowspan="2">upto 10 KW</td> <td></td> <td>5</td> </tr> <tr> <td>10-100 KW</td> <td>4.32</td> </tr> <tr> <td>Agriculture</td> <td></td> <td></td> <td>1.5</td> </tr> </tbody> </table> <p><b>(Source: Managerial Economics by Dominick Salvatore, 2008)</b></p> <p>Discuss the concept of price discrimination and its applicability in Power Sector with the help of given case let.</p>	User	KW	Units consumed/ month	Rate (Rs./Unit/month)	Domestic	2-5	0-100	2.4	101-200	2.4	201-400	3.9	> 400	4.6	Non-Domestic	upto KW		5.35	10-100	4.87	Industrial	upto 10 KW		5	10-100 KW	4.32	Agriculture			1.5	<b>15</b>	<b>CO4</b>
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**Q.20**

A refinery is debating whether to purchase Crude A or B  
Crude Oil A - \$ 50/bbl    Crude Oil B - \$ 48/bbl  
Refining Cost A = \$ 4/bbl    B- 4.25/bbl

Components	Crude Yield (%)		Value (US \$/bbl)	
	A	B	A	B
Fuel Gas	10	10	45	45
Motor Gas	30	15	65	65
Unfinished MG	5	20	55	55
Jet Fuel	5	0	65	65
Diesel Fuel	25	20	65	65
Unfinished DF	5	10	55	55
Asphalt	5	5	40	40
Fuel Oil	5	10	35	35
Other	10	10	25	25

Request you to help the refiners in deciding which Crude is to be procured?

**15**

**CO4**