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| **Name:**<br><br>**Enrolment No:** | UPES<br>UNIVERSITY WITH A PURPOSE |

# UNIVERSITY OF PETROLEUM & ENERGY STUDIES

**End Semester Examination – May, 2019**

**Program/course: MBA (ET)** **Semester : IInd**
**Subject: Energy Trading II (Power and Emissions)** **Max. Marks : 100**
**Code: OGET7005** **Duration : 3 Hrs**
**No. of page/s: 4**

***All questions shall be strictly answered in chronological order.***

| **SECTION A** | | **[20 Marks]** | |
|---|---|---|---|
| **Ques 1** | Write the full forms of the following terms:<br>a) PAT<br>b) RPC<br>c) CERC<br>d) MCP | **2** | **CO1** |
| **Ques 2** | In the event of a dispute amongst the parties to a Power Purchase Agreement, the supplier is free to stop the power supply:<br>a) As soon as the dispute arises<br>b) When the supply period finishes<br>c) When the onward supply contract of buyer finishes<br>d) All of the above | **2** | **CO2** |
| **Ques 3** | What is the need of Force Majeure clause in a power purchase agreement. | **2** | **CO1, CO2** |
| **Ques 4** | According to the trading market regulations issued by CERC, a category I trading licensee has to maintain an net worth of<br>a) 50 Crores<br>b) 60 Crores<br>c) 40 Crores<br>d) 25 Crores | **2** | **CO1** |
| **Ques 5** | A firm open access booking for 24 hours is required to be reduced to 16 hours. How many days clear notice does the SLDC need to revise this open access schedule? | **2** | **CO2** |
| **Ques 6** | Except for the fact that DAM deals with purchase of power for a single day and TAM deals with purchase of power for a week, what is the primary difference between DAM and TAM? | **2** | **CO2, CO3** |
| **Ques 7** | Which utility is the issuing authority for RECs? | **2** | **CO1** |
| **Ques8** | While drafting a Long Term Power Purchase Agreement how is the Tariff mentioned. | **2** | **CO1** |
| **Ques9** | What is the purpose of Earnest Money Deposit in a power purchase process | **2** | **CO1** |
| **Ques 10** | Why are Power Exchange transactions referred to as Collective Tranactions? | **2** | **CO1** |

<table>
<tr><td colspan="2"><u>SECTION B</u></td><td colspan="2">[20 marks]</td></tr>
<tr><td>Ques 11</td><td>M/s Green Energy Pvt. Limited owns and operates a Solar Power Station in the North Indian State of Rajasthan. Even after the high demand for Solar Power, M/s Green Energy Pvt. Ltd. has decided to register the power plant for Renewable Energy Certificate and has decided to sell the power at conventional tariff.<br><br>
<table>
<tr><td>Tariff Prevailing in the Region</td><td>Rs. 4.50/kWh – Rs. 5.50/kWh</td></tr>
<tr><td>Floor Price</td><td>Rs. 1500/REC</td></tr>
<tr><td>Forbearance Price</td><td>Rs. 3500/REC</td></tr>
<tr><td>Preferential Tariff</td><td>Rs. 6.10/kWh</td></tr>
</table>
M/s Green Energy Pvt. Ltd. has decided to sell the power on preferential tariff. Giving valid reasons, discuss for or against the decision.</td><td>10</td><td>CO2, CO3</td></tr>
<tr><td>Ques 12</td><td>According to the Report on Short-term Power Market in India: 2017-18 published by CERC, following table shows the percentage of Volume of Short Term Transactions of electricity in India against the total power Generated for the last 5 years.<br><br>
<table>
<tr><th>Year</th><th>Volume of Short Term Transactions of electricity (BUs)</th><th>Total Electricity Generation (BUs)</th><th>Volume of Short-term Transactions of Electricity as % of Total Electricity Generation</th></tr>
<tr><td>2013-14</td><td>104.64</td><td>967.15</td><td>11%</td></tr>
<tr><td>2014-15</td><td>98.99</td><td>1048.67</td><td>9%</td></tr>
<tr><td>2015-16</td><td>115.23</td><td>1107.82</td><td>10%</td></tr>
<tr><td>2016-17</td><td>119.23</td><td>1157.94</td><td>10%</td></tr>
<tr><td>2017-18</td><td>127.62</td><td>1202.97</td><td>11%</td></tr>
</table>
Considering suitable assumptions, comment how the Volume of Short Term Transactions of electricity can be improved.</td><td>10</td><td>CO1, CO2, CO3</td></tr>
<tr><td colspan="2"><u>SECTION C</u></td><td colspan="2">[30 marks]</td></tr>
<tr><td>Ques 13</td><td>M/s Regional Energy Supply Company and M/s State Energy Supply Company engage in Banking of power.<br><br>
Period of banking: 1st October 2019 to 31st December 2019<br><br>
Quantum Banked by M/s Regional Energy:
<table>
<tr><td>01.10.2018 to 15.10.2018</td><td>00.00 to 06.00 & 23.00 to 24.00</td><td>70</td></tr>
</table></td><td>15</td><td>CO1, CO4</td></tr>
</table>

| | | | |
|---|---|---|---|
| | | | |
| | 16.10.2018 to 31.10.2018 | 00.00 to 24.00 | 30 |
| | 01.11.2018 to 12.11.2018 | 00.00 to 06.00 & 23.00 to 24.00 | 50 |
| | 13.11.2018 to 30.11.2018 | 00.00 to 24.00 | 60 |
| | 01.12.2018 to 31.12.2018 | 00.00 to 24.00 | 95 |

Calculate the volume (in units) and Quantum of Power (MW) returnable under the following condition:

Period of Return: 1st March 2020 to 31st May 2020

Duration of Return of power: 00.00 to 24.00 hrs.

Return has to be 90% of the energy banked.

| | | | |
|---|---|---|---|
| **Ques 14** | M/s Tri Metal Smelters Ltd, located in Karnataka and connected at 132kV has the following power demand on a typical day:<br><br>00.00 to 08.00 Hrs: 15MW<br>08.00 to 15.00 Hrs: 25MW<br>15.00 to 24.00 Hrs: 20MW<br><br>The CPP Installed within the premises has a capacity of 20 MW and generation cost of Rs. 3.25/kWh.<br>MCP of Exchange is Rs. 3.00/kWh<br>Calculate and show which source of power should be used by M/s Tri Metal Smelters Ltd so that the cost of power procurement is the lowest.<br>Applicable transmission charges and losses: | **15** | **CO2, CO3** |

| Region/State | Losses | Charges |
|---|---|---|
| Karnataka Withdrawal | 1.20% | Rs. 0.09/kWh |
| Karnataka State | 2.30% | Rs. 0.22/kWh |
| Karnataka Distribution | 10% | Rs. 0.35/kWh |

| | | | |
|---|---|---|---|
| | **SECTION D** | **[30 Marks]** | |
| **Ques 15** | M/s Round the Clock Power Limited, a private distribution company operating in Tamil Nadu has floated a tender for purchase of 300 MW RTC Power for a period of 3 months starting 1st June 2020. The first leg of the bidding process has concluded and a lowest tariff of Rs. 2.95/kWh has been discovered. The tariff is the net cost of supply at the buyer's bus bar. M/s Round the Clock Power Limited has now initiated the process of Reverse Auction.<br><br>M/s Goodwill Thermal Power Station, a coal based thermal power station located in Chhattisgarh connected to 220kV PGCIL Substation is invited to match the lowest tariff. | **30** | **CO4, CO5** |

Considering the cost of generation to be Rs. 1.95/kWh, advise if M/s Goodwill Thermal Power Station should accept to match the lowest tariff or not.

M/s Goodwill Thermal Power Station has hired you as their Power Trader for a trading margin of Rs. 0.03/kWh and the management of M/s Goodwill Thermal Power Station has decided not to operate the plant if their profit margin goes below Rs. 0.02/kWh.

Following schedule of Transmission Charges and Losses may be used:

| State/Utility | Transmission Charges (Rs/MWh) | Transmission Losses (%) |
|---|---|---|
| Andhra Pradesh STU | 35 | 2.30 |
| Andhra Pradesh Withdrawal | 45 | 1.24 |
| Goodwill Thermal Power Station | 43 | 1.75 |
| Chhattisgarh Injection | 55 | 1.50 |
| Chhattisgarh STU | 42 | 2.50 |

All other charges applicable as per regulations

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# UNIVERSITY OF PETROLEUM & ENERGY STUDIES

**End Semester Examination – May, 2019**

**Program/course: MBA (ET)** — **Semester : IInd**
**Subject: Energy Trading II (Power and Emissions)** — **Max. Marks : 100**
**Code: OGET7005** — **Duration : 3 Hrs**
**No. of page/s: 4**

***All questions shall be strictly answered in chronological order.***

| | | | |
|---|---|---|---|
| **SECTION A** | | **[20 Marks]** | |
| **Ques 1** | Write the full forms of the following terms:<br>a) PAT<br>b) RPO<br>c) PGCIL<br>d) MCV | **2** | **CO1** |
| **Ques 2** | A firm open access booking for 100 MW is required to be reduced to 75 hours. How many days clear notice does the SLDC need to revise this open access schedule? | **2** | **CO2** |
| **Ques 3** | What is the need of Security Deposit clause in a power purchase agreement. | **2** | **CO1, CO2** |
| **Ques 4** | According to the trading market regulations issued by CERC, a category II trading licensee can trade a maximum of<br>a) 500 Million Units<br>b) 1500 Million Units<br>c) 100 Million Units<br>d) 200 Million Units | **2** | **CO1** |
| **Ques 5** | In the event of a dispute amongst the parties to a Power Purchase Agreement, the supplier is free to stop the power supply:<br>a) As soon as the dispute arises<br>b) When the supply period finishes<br>c) When the onward supply contract of buyer finishes<br>d) All of the above | **2** | **CO2** |
| **Ques 6** | For the role that the Power Exchange plays in a Power Trading transaction, the Power Exchange should obtain a trading license. Argue for or against the statement | **2** | **CO2, CO3** |
| **Ques 7** | Renewable Energy Certificates can be banked (True/False) | **2** | **CO1** |
| **Ques 8** | What is the primary component of Variable Cost for a power plant? | **2** | **CO1** |
| **Ques 9** | What is the purpose of Contract Performance Guarantee in a power purchase process | **2** | **CO1** |
| **Ques 10** | What is the primary difference between a bilateral and a collective transaction? | **2** | **CO1** |
| **SECTION B** | | **[20 marks]** | |
| **Ques 11** | M/s Green Energy Pvt. Limited owns and operates a Solar Power | **10** | **CO2, CO3** |

| | | | |
|---|---|---|---|
| | Station in the North Indian State of Rajasthan. Even after the high demand for Solar Power, M/s Green Energy Pvt. Ltd. has decided to register the power plant for Renewable Energy Certificate and has decided to sell the power at conventional tariff.<br><br>Tariff Prevailing in the Region: Rs. 4.50/kWh – Rs. 5.50/kWh<br>Floor Price: Rs. 1500/REC<br>Forbearance Price: Rs. 3500/REC<br>Preferential Tariff: Rs. 6.10/kWh<br><br>In light of the above information answer the following questions:<br><br>a) Should M/s Green Energy Pvt. Ltd. sell the power on Preferential Tariff or follow the REC route for sale of Power? Give reasons and justification for your choice | | |
| **Ques 12** | According to the Renewable Energy Certificate Registry of India, following table shows the number of Opening Balance of RECs, REC Issued, REC Redeemed and Closing Balance of RECs for the last 6 months.<br><br>Month / Opening Balance / REC Issued / REC Redeemed / Closing Balance<br>Oct 2018 / 2666006 / 672851 / 714529 / 2624328<br>Nov 2018 / 2624328 / 643599 / 534655 / 2733272<br>Dec 2018 / 2733272 / 379090 / 639126 / 2473236<br>Jan 2019 / 2473236 / 673404 / 903517 / 2243123<br>Feb 2019 / 2243123 / 2092011 / 1256448 / 3078686<br>Mar 2019 / 3078686 / 344468 / 1215171 / 2207983<br><br>Considering suitable assumptions, comment how to boost the REC Trading in India. | **10** | **CO1, CO2, CO3** |
| **SECTION C** | | **[30 marks]** | |
| **Ques 13** | M/s Reliable Energy and M/s Efficient Energy engage in Banking of power.<br><br>Period of banking: 1st October 2019 to 31st December 2019<br><br>Quantum Banked by M/s Reliable Energy:<br><br>Period of Supply / Duration (Hrs) / Quantum (MW) / Open Access Approved (MW)<br>01.10.2018 to 15.10.2018 / 00.00 to 06.00 & 23.00 to 24.00 / 60 / 40 | **15** | **CO1, CO4** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | |
| | 16.10.2018 to 31.10.2018 | 00.00 to 24.00 | 50 | 30 | | |
| | 01.11.2018 to 12.11.2018 | 00.00 to 06.00 & 23.00 to 24.00 | 70 | 45 | | |
| | 13.11.2018 to 30.11.2018 | 00.00 to 24.00 | 90 | 60 | | |
| | 01.12.2018 to 31.12.2018 | 00.00 to 24.00 | 65 | 35 | | |
| | Calculate the volume (in units) and Quantum of Power (MW) returnable under the following condition:<br><br>Period of Return: 1st March 2020 to 31st May 2020<br><br>Duration of Return of power: 00.00 to 24.00 hrs.<br><br>Return has to be 110% of the energy banked. | | | | | |
| **Ques 14** | M/s Hard Steel Ltd, located in Kerala and connected at 132kV has the following power demand on a typical day:<br><br>00.00 to 08.00 Hrs: 15MW<br>08.00 to 15.00 Hrs: 25MW<br>15.00 to 24.00 Hrs: 20MW<br><br>The CPP Installed within the premises has a capacity of 20 MW and generation cost of Rs. 3.45/kWh.<br>MCP of Exchange is Rs. 3.00/kWh<br>Calculate and show which source of power should be used by M/s Hard Steel Ltd so that the cost of power procurement is the lowest.<br>Applicable transmission charges and losses: | | | | **15** | **CO2, CO3** |
| | Region/State | Losses | Charges | | | |
| | Kerala Withdrawal | 1.20% | Rs. 0.09/kWh | | | |
| | Kerala State | 2.30% | Rs. 0.22/kWh | | | |
| | Kerala Distribution | 10% | Rs. 0.35/kWh | | | |
| | **SECTION D** | | | | **[30 Marks]** | |
| **Ques 15** | M/s Round the Clock Power Limited, a private distribution company operating in Andhra Pradesh has floated a tender for purchase of 250 MW RTC Power for a period of 3 months starting 1st June 2019. The first leg of the bidding process has concluded and a lowest tariff of Rs. 3.05/kWh has been discovered. The tariff is the net cost of supply at the buyer's bus bar. M/s Round the Clock Power Limited has now initiated the process of Reverse Auction.<br><br>M/s Goodwill Thermal Power Station, a coal based thermal power station located in Chhattisgarh connected to 220kV PGCIL Substation | | | | **30** | **CO4, CO5** |

is invited to match the lowest tariff.

Considering the cost of generation to be Rs. 2.05/kWh, advise if M/s Goodwill Thermal Power Station should accept to match the lowest tariff or not.

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| Chhattisgarh Injection | 55 | 1.50 |
| Chhattisgarh STU | 42 | 2.50 |

All other charges applicable as per regulations