Enrolment No:

UPES
UNIVERSITY WITH A PURPOSE

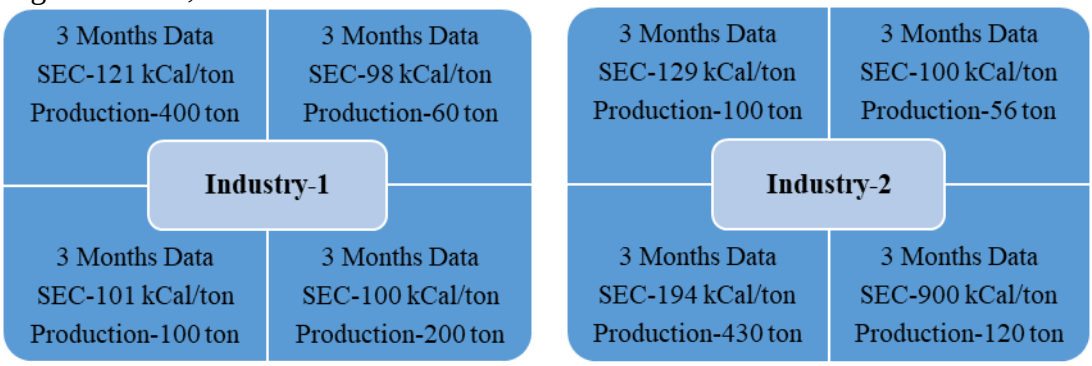
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, July 2020

Course: Energy Audit **Semester: II**
Program: M Tech Energy Systems **Time: 03 hrs.**
Course Code: EPEC-7029 **Max. Marks: 100**

Instructions:

1. **Attempt all the questions (Theory, Numerical, Case study etc.) on A4 size blank sheets.**
2. **Attempt all questions serially as per question paper.**
3. **Answer should be neat and clean. Draw a free hand sketch for circuits/tables/schematics wherever required.**
4. **Scan the whole answer script and check the resolution carefully before upload on the blackboard. Note that answer scripts will be considered for evaluation only through Blackboard. No other mode of submission is acceptable.**
5. **You are expected to be honest about each attempt which you make to progress in life**

SECTION A 40 Marks

S. No.		Marks	CO
Q 1	During the Energy Audit of two pharmaceutical industries average SEC and production data was recorded for every 3 months in a year (4*3=12 one year) which is given below,  Make suitable assumptions and plot monthly Specific Energy Consumption of each Pharma Industry. It is proposed to implement energy efficiency project in both the industries by replacing the LDO fired boiler by biomass-fired boiler where it was calculated that energy dependency would be cut by 38.7% each month. Keeping the operating hours same for both the industries determine the new monthly Specific Energy Consumption for each industry and show the results by using the common plot for both industry, give your comments on the performance of both industries.	**30**	**CO1, CO3**
Q 2	Explain in detail how UDAY scheme has helped in reducing the energy intensity from Indian Economy. Discuss the impact of this scheme on Government, Industry and consumers, state and DISCOM.	**10**	**CO2**

SECTION B 60 Marks

NOTE : The submission time of the Question Paper Answer Sheet is 24 Hhrs from the scheduled time (*exceptional provision due to extraordinary circumstance due to COVID-19 and due to internet connectivity issues in the far-flung areas*).
No Submission will be entertained after 24 Hrs

<table>
<tr><td>Q 3</td><td>The Energy- production data (for Jan-June, 2019) of an industry follows a relationship: Calculated energy consumption = 0.5 P +220. A waste heat recovery system was installed at end of June 2019 and further data was gathered up to December 2019. Using CUSUM technique, calculate energy savings in terms of ton of oil equivalent (toe) and the reduction in specific energy consumption achieved with the installation of waste heat recovery system. The plant data is given in the table below.
<table>
<tr><th>2019 Month</th><th>Actual Energy Consumption, toe/month</th><th>Actual production, ton/month</th></tr>
<tr><td>Jan</td><td>620</td><td>760</td></tr>
<tr><td>Feb</td><td>690</td><td>960</td></tr>
<tr><td>Mar</td><td>635</td><td>790</td></tr>
<tr><td>Apr</td><td>628</td><td>830</td></tr>
<tr><td>May</td><td>545</td><td>610</td></tr>
<tr><td>Jun</td><td>540</td><td>670</td></tr>
<tr><td>Jul</td><td>590</td><td>760</td></tr>
<tr><td>Aug</td><td>605</td><td>820</td></tr>
<tr><td>Sep</td><td>670</td><td>940</td></tr>
<tr><td>Oct</td><td>582</td><td>750</td></tr>
<tr><td>Nov</td><td>512</td><td>610</td></tr>
<tr><td>Dec</td><td>540</td><td>670</td></tr>
</table></td><td>10</td><td>CO2</td></tr>
<tr><td>Q 4</td><td>Explain the principle of continual improvement of ISO-50001 Energy Management System. In addition, define NC, Preventive action and corrective action as per ISO-50001 standards.</td><td>10</td><td>CO2</td></tr>
<tr><td>Q 5</td><td>Explain the following giving relevant examples,
• Energy cost
• Bachat Lamp Yojna</td><td>10</td><td>CO1, CO3</td></tr>
<tr><td>Q 6</td><td>List the objectives and benefits of Energy Conservation Building Code.</td><td>10</td><td>CO3</td></tr>
<tr><td>Q 7</td><td>Explain how plant energy performance of Thermal Power plant is calculated.</td><td>10</td><td>CO2</td></tr>
<tr><td>Q 8</td><td>A company invests Rs.6 lakhs and completes an energy efficiency project at the beginning of year 1. The firm is investing its own money and expects an internal rate of return, IRR, of at least 20% on constant positive annual net cash flow of Rs. 1 lakh, over a period of 10 years, starting with year 1.
(a) Will the project meet the firm’s expectations?
(b) What is the IRR of this measure?</td><td>10</td><td>CO1</td></tr>
</table>

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