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| Name: |  |
| Enrolment No: | |

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, April/May 2018

Course: Process Optimization (EPEC 7014)
Program: M.Tech. – Energy System
Time: 03 hrs.
Instructions: All questions are compulsory

Semester: II
Max. Marks: 100

SECTION A (5 x 4 marks)


| Q# | | Marks | CO |
|-----|--|-------|-----|
| Q 1 | Describe the “Affinity Laws” | 4 | CO1 |
| Q 2 | Describe the purpose of Material & Energy balance and how to apply for findings | 4 | CO2 |
| Q 3 | Draw the composite curve for Heating utility & Cooling utility | 4 | CO3 |
| Q 4 | Briefly describe the performance parameters of a thermal Power Plant | 4 | CO4 |
| Q 5 | Illustrate a case of textile plant where various process need to optimized for energy conservation | 4 | CO5 |

SECTION B (4 x 10 marks)

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|-----|---|----|-----|
| Q 6 | Describe the energy conservation opportunities lying with electrical distribution system in an industry | 10 | CO1 |
| Q 7 | Draw a schematic diagram for material & energy balance in a typical boiler plant system | 10 | CO2 |
| Q 8 | Elaborate the steps involved for determining the Pinch point D_T min | 10 | CO3 |
| Q 9 | Explain the auxiliary consumption reduction techniques in a thermal power plant | 10 | CO4 |
| OR | | | |
| | Illustrate the energy saving opportunities lying with a commercial building with optimization of visual & thermal comfort | 10 | CO5 |

SECTION-C (2 x 20 marks)

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|------|--|----|-----|
| Q 10 | Explain the Reactive power management. Find out all the benefits of improving power factor from 0.6 to 0.99 of a 1000 kW load. | 20 | CO1 |
| Q 11 | Discuss in detail the energy optimization opportunities in a Integrated Steel Plant | 20 | CO4 |
| OR | | | |
| | Discuss in detail the energy optimization opportunities in a cement plant | 20 | CO4 |

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SECTION A (5 x 4 marks)

| Q# | | Marks | CO |
|-----|--|-------|-----|
| Q 1 | Describe the “Pump characteristic Curve” and its significance | 4 | CO1 |
| Q 2 | Illustrate the steps for making M&E balance diagram of a system | 4 | CO2 |
| Q 3 | Describe the Pinch point and Target | 4 | CO3 |
| Q 4 | Briefly explain the high energy consuming section / equipment of a steel plant | 4 | CO4 |
| Q 5 | Illustrate a case of steel re-rolling mill, where various process need to optimized for energy conservation. | 4 | CO5 |

SECTION B (4 x 10 marks)

| | | | |
|-----|--|----|-----|
| Q 6 | Describe the energy conservation opportunities lying with compressed air system in an industry | 10 | CO1 |
| Q 7 | Draw a schematic diagram for material & energy balance in a typical Cooling Tower system | 10 | CO2 |
| Q 8 | Explain the benefits and application of Pinch technology | 10 | CO3 |
| Q 9 | Explain the energy conservation possibilities in a textile plant compressed air system | 10 | CO4 |
| OR | | | |
| | Explain the various level of energy audit of a commercial building as per ASHRAE standard | 10 | CO5 |

SECTION-C (2 x 20 marks)

| | | | |
|------|--|----|-----|
| Q 10 | Explain the effect of Harmonics in an electrical system, reasons and its remedies. | 20 | CO1 |
| Q 11 | Discuss in detail the energy optimization opportunities in a Textile Plant | 20 | CO4 |
| OR | | | |
| | Discuss in detail the energy optimization opportunities in a thermal power plant | 20 | CO4 |