



B.E DEGREE EXAMINATIONS: NOV/DEC 2022

(Regulation 2018)

Fifth Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

U18EEE0002: Electrical Energy Utilization and Conservation

COURSE OUTCOMES

- CO1:** Design illumination systems and Heating Elements depending on the requirements.
CO2: Understand the concepts of electric heating, welding, electric traction and braking system.
CO3: Understand the concepts of electro chemical processes.
CO4: Estimate the different types of tariff structures, impact of tariff and methods of optimizing the tariff by energy conservation.
CO5: Understand the concepts of energy management and audit.

Time: Three Hours

Maximum Marks: 100

Answer all the Questions: -

PART A (10 x 2 = 20 Marks)

(Answer not more than 40 words)

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|---|-----|-------------------|
| 1. State the Lambert's Cosine Law of illumination. | CO1 | [K ₁] |
| 2. A 200 V lamp takes a current of 3.2 A. It produces a total flux of 4860 lumens. Calculate MSCP of lamp. | CO1 | [K ₃] |
| 3. Define the term Tractive Effort in traction. | CO2 | [K ₁] |
| 4. Mention the properties of heating material used in electric heating? | CO2 | [K ₂] |
| 5. Name the different types of charging methods used in battery. | CO3 | [K ₁] |
| 6. Compare the primary and secondary cells. | CO3 | [K ₂] |
| 7. List the factors affecting the electricity tariff. | CO4 | [K ₂] |
| 8. Write any two initiatives taken by our Indian Government for energy conservation through BEE, Ministry of Power. | CO4 | [K ₂] |
| 9. Write an example for fuel and energy substitution. | CO5 | [K ₂] |
| 10. State the purposes of energy invoices. | CO5 | [K ₂] |

Answer any FIVE Questions: -

PART B (5 x 16 = 80 Marks)

(Answer not more than 400 words)

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|--|----|-----|-------------------|
| 11. a) It is desired to illuminate a drawing hall with an average illumination of 250 lux. | 10 | CO1 | [K ₃] |
|--|----|-----|-------------------|

The area of the hall is 30mX20m. The lamps are fitted at 5 m height. Find out the number and size of lamps required for an efficiency of 12 lumens/watt. Utilization factor is 0.4, maintenance factor is 0.85 and space height ratio is unity. Draw their spacing layout.

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|--------|--|----|-----|-------------------|
| b) | Explain the working of any one gaseous discharge lamp. | 6 | CO1 | [K ₂] |
| 12. a) | Describe the mechanism of train movement and state advantages and disadvantages of an electric traction system. | 10 | CO2 | [K ₂] |
| b) | State the advantages of electric braking and Brief about the different methods of electric braking. | 6 | CO2 | [K ₂] |
| 13. a) | Explain the process how the electrolysis works and name the factors affecting the product of electrolysis. | 6 | CO3 | [K ₂] |
| b) | With a neat sketch explain the construction and working of Lead acid battery. List the advantages of Lead acid battery. | 10 | CO3 | [K ₂] |
| 14. a) | List the different types of tariff structure used in our country and explain any two types of tariffs. | 12 | CO4 | [K ₂] |
| b) | Explain how synchronous condenser is used to improve the power factor. | 4 | CO4 | [K ₂] |
| 15. a) | Discuss the need of Energy Audit and write the step-by-step procedure for various types of energy audit. | 12 | CO5 | [K ₂] |
| b) | Name the instruments used for energy audit in electrical and mechanical systems. | 4 | CO5 | [K ₂] |
| 16. a) | Differentiate core type and coreless type induction furnace. | 4 | CO1 | [K ₂] |
| b) | Explain the supply systems used in electric traction and discuss the term plant production factor and plant energy performance in energy management. | 12 | CO2 | [K ₂] |
