EE-404B

UTILIZATION OF ELECTRICAL ENERGY (OPEN ELECTIVE)

COURSE OBJECTIVES:

- 1. To know about the different types of lamps & lighting schemes.
- 2. To know about the different types electric heating methods.
- 3. To know the design heating elements such as furnaces and ovens.
- 4. To know to utilize the electrical energy for production of heat and welding process.
- 5. To provide specific knowledge on Principles and characteristics of storage batteries.

COURSE OUTCOMES:

After successful completion of the course, the students are able to

- 1. get overall idea for the different types of lamps & lighting schemes.
- 2. know about the different types electric heating methods.
- 3. know the designing of heat elements such as furnaces and ovens.
- 4. know how to utilize the electrical energy for production of heat and welding process.
- 5. gain knowledge on principles and characteristics of storage batteries.

UNIT I

Illumination : Introduction- terms used in illumination-laws of illumination - Square law methods of calculation.

Gas discharge lamps - Fluorescent lamps - Arc lamps - Filament lamps - Comparison between filament and fluorescent lamps.

UNIT II

Lighting schemes & Introduction to Electric heating : Factory lighting - flood lighting and street lighting-design of lighting schemes-introduction to Compact Fluorescent Lamps.

Introduction-Modes of heat transfer - Stefan's law - Classification of electric heating methods

UNIT III

Electric Heating element Design and types of furnaces : Design of heating element - Construction and working of different types of induction furnaces -resistance furnace - arc furnaces.

Dielectric heating, Dipole formation, generation of dielectric heat and applications.

UNIT IV

Welding: Introduction- Types of welding - resistance and arc welding -Characteristics of Carbon and metallic arc welding - comparison, welding equipment.

Requirements of good weld, comparisons of A.C and D.C weld (Excluding electronic controls)

UNIT V

Storage batteries : Types of cells. Lead acid cell, Nickel Iron cell, Chemical changes during charging and discharging. Applications - rating - classification-dry cell and wet cells.

Methods of charging & common troubles : Charging and discharging of lead acid cells, methods of charging lead acid batteries - over discharging common troubles with lead acid batteries and remedies -Nickel cadmium batteries.

Text Book - 1 (12)

Text Book - 1 (12)

Text Book - 1 (12)

Text Book - 2 (12)

Text Book - 1 (12)

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LEARNING RESOURCES:

TEXT BOOK(s):

- 1. J.B. Gupta Utilization Electric Power and Electric Traction, Katson books publishers, Tenth Edition, 2012.
- 2. Utilization, generation & conservation of electrical energy by Sunil S Rao, Khanna publishers, Sixth Edition, 2005.

REFERENCE BOOK(s):

- 1. Partab H Art and Science of Utilization of Electrical Energy, Dhanpat Rai and Sons, New Delhi, Second Edition, 2009.
- 2. R.K.Rajput Utilization of Electric Power, Laxmi publications Private Limited, Second Edition, 2013.
- 3. G.C.Garg Utilization of Electric Power and Traction, Kanna publishers, Ninth Edition, 2014.

WEB RESOURCES:

- 1. http://nptel.iitm.ac.in/video.php?subjectId=108105060
- 2. http://web.mit.edu/lien hard/www/ahttv201.pdf
- 3. http://www.comp-as.com/pdf/Article03.pdf
- 4. www.srmuniv.ac.in/downloads/welding.doc