

SUNDARGARH ENGINEERING SCHOOL, KIREI
LESSON PLAN

Subject : Utilization Of Electrical Energy And Traction

Discipline : Electrical Engineering

Faculty : Srikant Das

Semester : 5th

Week	Weekly classes	Theory Topics
1 st	1 st	1. ELECTROLYTIC PROCESS 1.1 Definition and Basic principle of Electro Deposition.
	2 nd	1.2 Important terms regarding electrolysis. 1.3 Faradays Laws of Electrolysis.
	3 rd	1.4 Definitions of current efficiency, Energy efficiency.
	4 th	1.5 Principle of Electro Deposition.
2 nd	1 st	1.6 Factors affecting the amount of Electro Deposition.
	2 nd	1.7 Factors governing the electro deposition.
	3 rd	1.8 State simple example of extraction of metal
	4 th	1.9 Application of Electrolysis
3 rd	1 st	2. ELECTRICAL HEATING 2.1. Advantages of electrical heating.
	2 nd	2.2. Explain mode of heat transfer and Stephen's Law.
	3 rd	2.3. Discuss principle of Resistance heating. 2.3.1 Direct Resistance heating. 2.3.2 Indirect Resistance heating
	4 th	2.4. Explain working principle of direct arc furnace and indirect arc furnace
4 th	1 st	2.5. Principle of Induction heating.
	2 nd	2.6. Working principle of direct core type, vertical core type and indirect core type Induction furnace
	3 rd	2.7. Principle of coreless induction furnace and skin effect
	4 th	2.8. Principle of dielectric heating and its application. 2.9. Principle of Microwave heating and its application
5 th	1 st	3. PRINCIPLES OF ARC WELDING 3.1 Explain principle of arc welding.
	2 nd	3.2 Discuss D. C. & A. C. arc phenomena
	3 rd	3.3 D.C. & A. C. arc welding plants of single and multi-

		operation type
	4 th	3.3 D.C. & A. C. arc welding plants of single and multi-operation type (Contd..)
6 th	1 st	3.4 Types of arc welding
	2 nd	3.5 Explain principles of resistance welding
	3 rd	3.6 Descriptive study of different resistance welding methods
	4 th	3.6 Descriptive study of different resistance welding method(Contd....)
7 th	1 st	4. ILLUMINATION 4 .1 Nature of Radiation and its spectrum
	2 nd	4 .2 Terms used in Illuminations. i. Luminous intensity ii. Lumen iii. Intensity of illumination iv. MHCP v. MSCP vi. MHSCP vii. Brightness viii. Solid angle ix. Luminous efficiency
	3 rd	4 .3 Explain the inverse square law and the cosine law. 4 .4 Explain polar curves.
	4 th	4 .5 Describe light distribution and control. Explain related definitions like maintenance factor and depreciation factors
8 th	1 st	4 .6 Design simple lighting schemes and depreciation factor. 4 .7 Constructional feature and working of Filament lamps, effect of variation of voltage on working of filament lamps.
	2 nd	4 .8 Explain Discharge lamps
	3 rd	4 .9 State Basic idea about excitation in gas discharge lamps.
	4 th	4 . 10 State constructional factures and operation of: - Fluorescent lamp. (PL and PLL Lamps)
9 th	1 st	4 .11 Sodium vapor lamps
	2 nd	4 .12 High pressure mercury vapour lamps.
	3 rd	4 .13 Neon sign lamps.
	4 th	4 .14 High lumen output & low consumption fluorescent lamps
10 th	1 st	5. INDUSTRIAL DRIVES 5 .1 State group and individual drive
	2 nd	5 .2 Method of choice of electric drives.
	3 rd	5 .2 Method of choice of electric drives.(Contd..)
	4 th	5 .3 Explain starting and running characteristics of DC and AC motor.

11 th	1 st	5.4 State Application of : 5.4.1 DC motor
	2 nd	5.4.2 3 phase induction motor
	3 rd	5.4.3 3 phase synchronous motors
	4 th	5.4.3 3 phase synchronous motors.(Contd..)
12 th	1 st	5.4.4 Single phase induction, series motor, universal motor and repulsion motor
	2 nd	5.4.4 Single phase induction, series motor, universal motor and repulsion motor(Contd..)
	3 rd	6. ELECTRIC TRACTION
	4 th	6. 1. Explain system of traction.
13 th	1 st	6. 2. System of Track electrification. (Contd..)
	2 nd 3 rd	6. 3. Running Characteristics of DC and AC traction motor.
	4 th	6. 4. Explain control of motor 6.4.1 Tapped field control
14 th	1 st	6.4.2 Rheostatic control
	2 nd	6.4.3 Series parallel control
	3 rd	6.4.4 Metadyne control
	4 th	6. 5. Explain Braking of the following types.
		6.5.1 Regenerative Braking and 6.5.3 Magnetic Braking

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