UTKALMANI GOPABANDHU INSTITUTE OF ENGINEERING, ROURKELA

LESSON PLAN

SUBJECT- TH.4 UTILIZATION OF ELECTRICAL ENERGY & TRACTION

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DEPARTMENT OF ELECTICAL ENGINEERING (Session: 2020-21)

Weeks	Lecture Days	Topics to be covered
1	Day- 1	1.1. Definition and Basic principle of Electro Deposition.
	Day- 2	1.2. Important terms regarding electrolysis.
	Day- 3	1.3. Faradays Laws of Electrolysis. 1.4. Definitions of current efficiency,Energy efficiency.
	Day- 4	1.5. Principle of Electro Deposition.
2	Day- 5	1.6. Factors affecting the amount of Electro Deposition.
	Day- 6	1.7. Factors governing the electro deposition.
	Day- 7	1.8. State simple example of extraction of metals. 1.9. Application of Electrolysis.
	Day- 8	CLASS TEST-1
3	Day- 9	2.1. Advantages of electrical heating. 2.2. Mode of heat transfer and Stephen's Law.
	Day- 10	2.3. Principle of Resistance heating. (Direct resistance and indirect resistanceheating.)
	Day- 11	2.4. Discuss working principle of direct arc furnace and indirect arc furnace.
	Day- 12	2.5. Principle of Induction heating.
4	Day- 13	2.5.1. Working principle of direct core type, vertical core type and indirect coretype Induction furnace.
	Day- 14	2.5.2. Principle of coreless induction furnace and skin effect.
	Day- 15	2.6. Principle of dielectric heating and its application.
	Day- 16	2.7. Principle of Microwave heating and its application.
5	Day- 17	CLASS TEST-2
	Day- 18	3.1. Explain principle of arc welding.
	Day- 19	3.2. Discuss D. C. & A. C. Arc phenomena.
	Day- 20	3.3. D.C. & A. C. arc welding plants of single and multi-operation type.
6	Day- 21	3.4. Types of arc welding.
	Day- 22	3.5. Explain principles of resistance welding.
	Day- 23	3.6. Descriptive study of different resistance welding methods.
	Day- 24	CLASS TEST-3
7	Day- 25	4.1. Nature of Radiation and its spectrum.
	Day-26	4.2. Terms used in Illuminations. [Lumen, Luminous intensity, Intensity of illumination, MHCP, MSCP, MHSCP, Solid angle, Brightness, Luminous efficiency.]

	Day- 27	4.3. Explain the inverse square law and the cosine law.
	Day- 28	4.4. Explain polar curves.
8	Day- 29	4.5. Describe light distribution and control. Explain related definitions like maintenance factor and depreciation factors.
	Day- 30	4.6. Design simple lighting schemes and depreciation factor.
	Day- 31	4.7. Constructional feature and working of Filament lamps, effect of variation of voltage on working of filament lamps.
	Day- 32	4.8. Explain Discharge lamps.
9	Day- 33	4.9. State Basic idea about excitation in gas discharge lamps
	Day- 34	4.10. State constructional factures and operation of Fluorescent lamp. (PL and PLL Lamps)
	Day- 35	4.11. Sodium vapor lamps.
	Day- 36	4.12. High pressure mercury vapor lamps.
10	Day- 37	4.13. Neon sign lamps.
	Day- 38	4.14. High lumen output & low consumption fluorescent lamps
	Day- 39	CLASS TEST
	Day- 40	Revision
11	Day- 41	5.1. State group and individual drive. 5.2. Method of choice of electric drives.
	Day- 42	5.3. Explain starting and running characteristics of DC motor.
	Day- 43	5.3. Explain starting and running characteristics of AC motor.
	Day- 44	5.4. State Application of:DC motor; 3-phase induction motor; 3 phase synchronous motors;Single phase induction, series motor, universal motor and repulsion motor.
12	Day- 45	CLASS TEST-5
	Day- 46	6.1. Explain system of traction.
	Day- 47	6.2. System of Track electrification.
	Day- 48	6.2. System of Track electrification.
13	Day- 49	6.3. Running Characteristics of DC traction motor
	Day- 50	6.3. Running Characteristics of AC traction motor.
	Day- 51	6.4. Explain control of motor: 6.4.1. Tapped field control.
	Day- 52	6.4.2. Rheostatic control.
14	Day- 53	6.4.3. Series parallel control.
	Day- 54	6.4.4. Multi-unit control.
	Day- 55	6.4.5. Metadyne control.
	Day- 56	6.5. Explain Braking of the following types: 6.5.1. Regenerative Braking.
15	Day- 57	6.5.2. Braking with 1-phase series motor.
	Day- 58	6.5.3. Magnetic Braking.
	Day- 59	Class Test-6
	Day- 60	Revision