**Handout**

**Subject Name: UTILIZATION OF ELECTRIC POWER**

**Prepared by : B. Susmitha, Asst.Professor EEE**

**Year and Sem, Department: IV Year II Sem, EEE**

**Unit-I: (Electric Drives)**

**Important points / Definitions:**

* An electrical drive is defined as a form of machine equipment designed to convert electrical energy into mechanical energy and provide electrical control of the processes.
* Motors commonly used in electric drives are DC motors, induction motors, synchronous motors, blushless DC motors, stepper motors, and switched reluctance motors.
* Electric drive that is used to drive one or more than two machines from line shaft through belts and pulleys is known as group drive.
* In individual drive, a single electric motor is used to drive one individual machine. Such a drive is very common in most of the industries.
* In multi-motor drives, several separate motors are provided for operating different parts of the same machine.
* **DC Drives**: In general, a **DC drive** converts an **Alternating Current** (**AC**) into **Direct Current** (**DC**) to run a **DC** motor.

**Short Questions (Minimum 10 previous JNTUH Questions – Year to be mentioned)**

1. What do you mean by Load Equalization? [Nov-2018]
2. Give the examples for Continuous and Intermittent Loads? [Nov-2018]
3. What are the advantages of electric drives? [May-2018]
4. What types of motors are used in electric traction?[May-2018]
5. Which motor is mainly used in electric drives? Why?[May-2019]
6. What are inductive loads? List some inductive loads.[May-2019]
7. Give reason why the method of load equalization cannot be adopted with synchronous motors.[Nov-2017]
8. What are the essential requirements of rolling mill drive? [Nov-2017]
9. What are the main components in an electric drive?[Nov-2016]
10. List any six applications of electric drives.[Nov-2016]

**Long Questions (Minimum 10 previous JNTUH Questions – Year to be mentioned)**

1. Explain different methods available to control the speed of a DC motor. [Nov-2018]

2. Compare Group and Individual drives. [Nov-2018]

3. Explain the starting and operating characteristics of different DC motors. [Nov-2018]

4. What are the advantages of AC drives over DC drives.[May-2018]

5. How are the electrical loads classified according to their duty? Explain with examples.[May-2018][Nov-2017]

6. What is the need for speed control of electric drives? Explain the scheme used for the speed control of induction motor.[May-2018]

7. What is meant by load equalization? Explain.[May-2018] [May-2019]

8. What is an electric drive? List its advantages and applications.[May-2019]

9. Explain the speed control scheme normally used to control the speed of a DC motor below its rated speed. [May-2019]

10. Discuss various types of industrial loads. [May-2019]

11. What type of drive is being used in modern day industry, ‘A group drive or ‘an individual drive? Discuss the advantages of one over the other.[Nov-2017]

12. Assuming an exponential law of temperature rise , calculate the final steady state temperature on full load and the time constant for an electric motor whose temperature rise after one hour is 250C and after two hours is 450C. [Nov-2017]

**Fill in the Blanks / Choose the Best: (Minimum 10 to 15 with Answers)**

1. In tramways which of the following motors is used **D.C series motor**
2. In a domestic cake baking oven, the temperature is controlled by **thermostat**
3. Light duty cranes are generally used in **power houses**
4. Drive which can be used for derricks and winches is **D.C motors**
5. Motor preferred for blowers is **squirrel cage induction motors**
6. In overhead travelling cranes **short time rated motors are preferred**
7. Motors, because of their inherent characteristics motor, best suited for the rolling mills are **D.C motors**
8. Which of the following motor is preferred for automatic drives **Ward Leonard controlled dc motors**
9. **Group** drive is also called as Line shaft drive
10. The drive which is used for metal-cutting machines tools, rolling mills etc. are **multimotor drive**

**Unit-II: (Electric Heating and Electric Welding)**

**Important points / Definitions:**

* Electric heating equipment is cheaper; they do not require much skilled persons; therefore, maintenance cost is less.
* MODES OF TRANSFER OF HEAT: Conduction, Convection, Radiation
* The rate of the conduction of heat along the substance depends upon the temperature gradient.
* The materials normally used as heating elements are either alloys of nickel–chromium, nickel–chromium–iron, nickel– chromium–aluminum, or nickel–copper.
* Nickel–chromium–iron alloy is cheaper when compared to simple nickel–chromium alloy.
* Heating element may fail due to any one of the following reasons.

Formation of hot spots.

Oxidation of the element and intermittency of operation.

Embrittlement caused by gain growth.

Contamination and corrosion.

* METHODS OF ELECTRIC HEATING: Direct resistance heating, Indirect resistance heating
* Dielectric heating: In this method of electric heating, the heat developed in a non-metallic material due to inter- atomic friction, known as dielectric loss.
* The efficiency of the resistance oven lies in between 60% and 80%.

**Short Questions (Minimum 10 previous JNTUH Questions – Year to be mentioned)**

1. List advantages of electric welding. [May-2018]
2. What are the advantages of electrical heating? [May-2018]
3. What is arc welding? [May-2019]
4. Mention the advantages of electrical heating. [May-2019]
5. Compare AC and DC welding in any three aspects. [Nov-2018]
6. Why Induction Heating is done at high frequencies? [Nov-2018]
7. Why is it necessary to use welding transformer? [Nov-2017]
8. State the principle of Induction heating.[Nov-2017]
9. What are the main advantages of electric welding?[Nov-2016]
10. Mention different heating methods.[Nov-2016]

**Long Questions (Minimum 10 previous JNTUH Questions – Year to be mentioned)**

1. Explain the various methods of electric resistance welding with neat sketches. [May-2018]

2. With a neat diagram, explain the working of metallic Arc welding.[May-2018]

3. Explain the advantages and disadvantages of electric welding.[May-2019]

4. With a neat diagram, explain the process of Dielectric heating.[May-2019]

5. Explain various types of arc welding processes used in industries. [May-2019]

6. Explain the Operation of Arc Welding Plant with the help of a neat sketch. [Nov-2018]

7. Explain how insulating materials are heated using Dielectric Heating. [Nov-2018]

8. Explain the principle of Resistance Heating. Give its applications. [Nov-2018]

9. State the advantages of electrically produced heat by means of arc furnaces. Distinguish between the direct and indirect type of arc furnaces. State their field of application. [Nov-2017]

10. Explain the principle of dielectric heating. Also write the applications of Dielectric heating. [Nov-2016]

**Fill in the Blanks / Choose the Best: (Minimum 10 to 15 with Answers)**

1. Spot welding is used to weld metal pieces whose thickness **Lesser than 12 mm**
2. The electrodes used for projection welding are **Flat and larger in diameter**
3. Seam welding is not used for the **Welding alloys of copper**
4. Which one of the following is the type of transformer used in arc welding **Step down**
5. The welding machine, which is used to convert AC welding supply to DC welding supply is **Rectifier set**
6. The size of a welding machine is determined by **Output amperage**
7. High frequency for induction heating can be generated by **spark gap oscillator**
8. Steel rails are welded by **thermit welding**
9. The ideal method of heating plastics is **Dielectric heating**
10. Radiant heating is used for **drying of paints**