Department of Biochemistry

Laboratory Instrumentation Lecture 7 – **Thermostat Incubator**, **Hotplate Magnetic Stirrer, Digital Lab Scale**

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- *Thermostat Incubator – FFM-30B*

1. Definition

A Thermostat Incubator (FFM-30B) is a laboratory device used to maintain biological samples at a constant, controlled temperature, often for microbial culture growth or enzyme incubation.

Thermostat Incubator

2. Principle / Mechanism of Operation

Works by circulating warm air or water to maintain uniform temperature inside the chamber.

Thermostat regulates the heating element to achieve stable temperature.

Samples reach and maintain the set temperature, ensuring reproducible experimental conditions.

3. Operating Unit

°C (Degree Celsius) – main unit for temperature control.

Electrical units: kW (power), V (voltage), Hz (frequency).

4. Applications in Biochemistry

Incubation of bacterial or yeast cultures.

Enzyme reaction studies.

Temperature-sensitive assays.

Sample stabilization prior to analysis.

5. Short Questions

Q1: What is the main purpose of a thermostat incubator?

Answer: To maintain samples at a constant controlled temperature.

Q2: What is the main unit of operation?

Answer: Degree Celsius (°C).

- ***Hotplate Magnetic Stirrer – BS2H***

1. General Definition

A Hotplate Magnetic Stirrer (BS2H) is a laboratory instrument that heats and stirs liquids simultaneously using a magnetic stir bar and a heated surface.

Hotplate Magnetic Stirrer – BS2H

2. Principle / Mechanism of Operation

Magnetic stir bar placed inside the solution rotates due to an external magnetic field.

Electrical heating warms the solution to a desired temperature.

Provides uniform mixing and controlled heating for reactions.

3. Operating Unit

°C for temperature.

RPM (revolutions per minute) for stirring speed.

Electrical units: kW, V, Hz.

4. Applications in Biochemistry

Dissolving solids in buffers or media.

Mixing reagents during chemical or enzyme reactions.

Heating solutions for protein denaturation or enzymatic assays.

Maintaining homogeneity in reaction mixtures.

5. Short Questions

Q1: How does a magnetic stirrer work?

Answer: A magnetic stir bar rotates inside the solution due to an external magnetic field.

Q2: What units are used to control the hotplate stirrer?

Answer: °C for temperature and RPM for stirring speed.

- Digital Lab Scale – BLS 100-S

1. General Definition

A Digital Laboratory Scale (BLS 100-S) is a precision instrument used to weigh samples accurately, essential for preparing solutions and reagents.

2. Principle / Mechanism of Operation

Uses a load cell sensor to convert the weight of the sample into an electrical signal.

Digital display shows weight in selected units.

Highly sensitive and precise for micrograms to grams depending on capacity.

3. Operating Unit

g (grams) – main unit of mass.

Can also display mg (milligrams) or kg depending on scale range.

4. Applications in Biochemistry

Weighing reagents for solution preparation.

Measuring solid samples for assays.

Quantitative sample preparation for enzymatic or molecular experiments.

5. Short Questions

Q1: What is the main unit of a digital lab scale?

Answer: Gram (g).

Q2: Why is precision important in biochemical experiments?

Answer: Accurate measurements ensure reproducibility and correct reagent concentrations.