limit

- **Uncoated USP tablets** → 5-30 min.
- **Enteric coated tablets**→ are to show no evidence of disintegration after 1 hour in simulated gastric fluid.
- These tablets are then tested in simulated intestinal fluid and are to disintegrate in 2 hours plus the time specified in the monograph.
- **Limit:**
  - The tablets should disintegrate within 30 minutes (uncoated tablets).
  - If one tablet fails to disintegrate within 30 minutes, the disintegration test is repeated on 12 additional tablets. Not less than 16 out of the total 18 tablets tested disintegrate completely within 30 minutes

- **Method:**
- Place one tablet in each of the six tubes of the basket (tablets are selected randomly).
- Position the basket rack in 1- L beaker containing distilled water (as the disintegration medium) maintained at 37 ^{o}C.
- Start the apparatus (to move the basket assembly containing the tablets), and record the time required for all of the six tablets to break into particles and to pass to the disintegration medium.
- .

Disintegration conditions

- medium
  - Water.
  - HCl pH=1.2 simulated gastric juice.
  - Simulated intestinal fluid (pH=7.4).

  Temp=37C.

5.Dissolution test

- This test determines the amount of active ingredient(s) released from a solid oral dosage form, such as a tablet or a capsule, under controlled conditions using a known volume of dissolution medium within a predetermined length of time.

The formulation and manufacturing factors affecting the dissolution of a tablet

a) The particle size of the drug substance
b) The solubility and hygroscopicity of the formulation
c) The type and concentration of the disintegrant, binder and lubricant used
d) The manufacturing method, particularly, the compactness of the granulation and the compression force

- Dissolution test measures the rate of drug release (amount / time).
- Terms:
- Q=The amount of dissolved active ingredient in dissolution.
- The limit of Q may be different in different monographs according to the nature of the formulation and its active ingredients.

Example: determine the Q form the following monographes

Dissolution ⟨711⟩ —

Medium: pH 5.8 phosphate buffer (see *Buffer Solutions* in the section *Reagents, Indicators, and Solutions*); 900 mL.

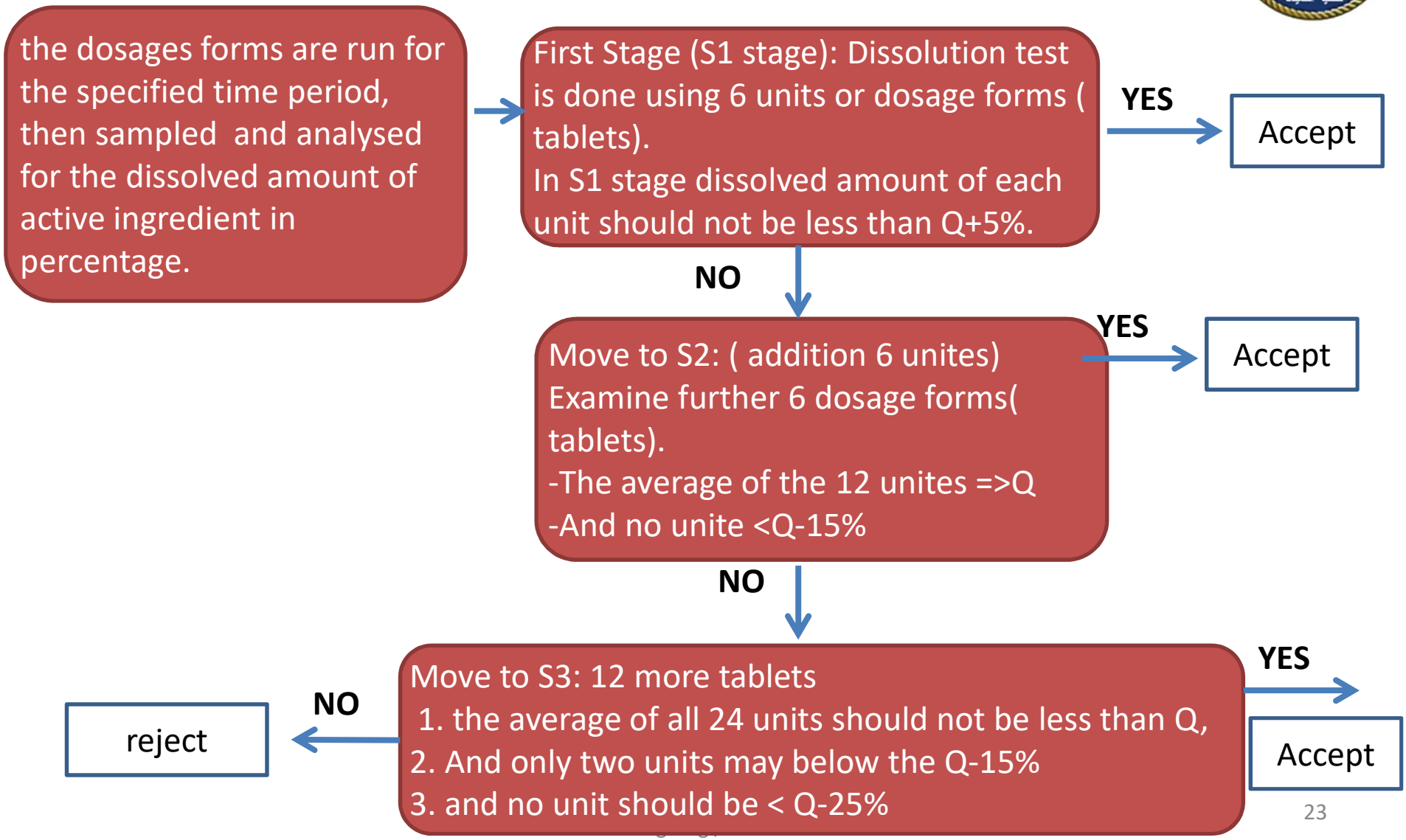
Apparatus 2: 50 rpm.

Time: 30 minutes.

Procedure— Determine the amount of $C_8H_9NO_2$ dissolved by employing UV absorption at the wavelength of maximum absorbance at about 243 nm on filtered portions of the solution under test, suitably diluted with *Dissolution Medium*, if necessary, in comparison with a Standard solution having a known concentration of *USP Acetaminophen RS* in the same *Medium*.

Tolerances— Not less than 80% (*Q*) of the labeled amount of $C_8H_9NO_2$ is dissolved in 30 minutes.

Dissolution procedure according USP



6.Mechanical strength

5. Hardness→ the strength of the core
6. Friability→ the strength of the shell.

Hardness test

- A tablet should possess some degree of mechanical strength to withstand the mechanical shocks caused by handling during manufacturing, packaging, shipping, and dispensing.
- Hardness is the load required to crush the tablet when placed on its edge.
- The main principle of hardness measurement of a tablet involves subjecting the tablet to an increasing load until the tablet breaks or fractures.
- the aim of Measurement of the hardness is :
  - to Select the proper compression force
  - very hard tablet has long disintegration time
  - The soft tablet may not withstand the subsequent process such as coating or packaging.

➢What would be your action toward a batch having a high hardness???

The hardness of a tablet depends upon

- ✓ Amount to of the powder in the die
- ✓ Compression force
- ✓ The method of tableting (wet granulation harder tablets).
- ✓ Amount of binder
- ✓ The tablet diameter ------- larger tablets require a greater force to cause fracture and are therefore, harder than smaller tablets.

How to measure the hardness

- Measure 20 tablets → and take the average
  - Normal tablet hardness within: **(NO OFFICIAL VALUE)**
    - 4-10kg (1Kg=10 newton)
    - 3kg for chewable tablets:
    - 10-20Kg for coated tablets:

Friability Test

- It measures the tendency of tablet to powder, chip, and fragment which affect tablet elegance, patients acceptance and weight variation and content uniformity.
- It measures the surface hardness of the tablets which is required to withstand the tumbling motion during coating or packaging, transportation, and shipping.

- The machine is called friabilator or friability tester

Questions

What are the factors that might affect each aspect of tablets dosage form quality control parameters?.

if the hardness test or friability test is out of accepted limits, the batch should be rejected. T/F and why????.

What is the main difference between hardness and friability.

Possible Exam question

- If you have performed a content uniformity test for set of 30 tablets for levothyroxine (50ug) according USP. And each tablet have been found to contain as following:
- 55, 75, 80 60, 55,51, 44, 58,54,….etc.
- Would you reject or accept the batch. Explain in details.