Basic Pharmaceutics for NTS Tests (Complete)

1. **Melting point and heat of fusion. The melting point** of a solid is the temperature at which the solid is transformed to a liquid. When 1 g of a solid is heated and melts, the heat absorbed in the process is referred to as **the latent heat of fusion.**
2. **A solution** is a homogeneous system in which a solute is molecularly dispersed, or dissolved, in a solvent. The solvent is the predominant species.
3. **Saturated solutions** are solutions that, at a given temperature and pressure, contain the maximum amount of solute that can be accommodated by the solvent. If the saturation, or solubility, limit is exceeded, a fraction of the solute can separate from the solution and exist in equilibrium with it.
4. **Solutes can be gases, liquids, or solids, and nonelectrolytes or electrolytes.**
5. **Nonelectrolytes** are substances that do not form ions when dissolved in water.
6. **Nonelectrolytes** are
    - **estradiol,**
    - **glycerin,**
    - **urea,**
    - **Sucrose.**
7. **Strong electrolytes (e.g., sodium chloride, hydrochloric acid) are completely ionized in water** at all concentrations.
8. **Weak electrolytes (e.g., aspirin, atropine) are partially ionized in water.**
9. **The colligative properties of a solution** depend on the total number of ionic and nonionic solute molecules in the solution**. These properties depend on ionization** but are independent of other chemical properties of the solute.

10. **Colligative properties include the following:**
    - Lowering of vapor pressure
    - Elevation of the boiling point
    - Depression of the freezing point
    - Osmotic pressure
11. **. The vapor pressure** is the pressure at which equilibrium is established between the molecules of A in the liquid state and the molecules of A in the gaseous (vapor) state in a closed, evacuated container**.** The vapor pressure is **temperature dependent, but independent of the amount of liquid and vapor.**
12. **The boiling point** is the temperature at which the vapor pressure **of a liquid equals an external pressure of 760 mm Hg. (DDC Test)**
13. A solution of a **nonvolatile solute has a higher boiling point than a pure solvent** because the solute lowers the vapor pressure of the solvent. **(Pharmacist test)**
14. **Kb is the molal boiling point elevation constant.**
15. **The freezing point, or melting point,** of a pure compound is the temperature at which the solid and the liquid phases are in equilibrium under a p ressure of 1 atmosphere (atm).
16. **Osmotic pressure** is the pressure that must be applied to the solution to prevent the flow of pure solvent into the concentrated solution.
17. **Buffer action** is the resistance to a change in pH.
18. **Buffer capacity** is the ability of a buffer solution to resist changes in pH.
19. The smaller the pH change caused by addition of a given amount of acid or base, the greater the buffer capacity of the solution.
20. **A suspension** is a two-phase system that is composed of a solid material dispersed in an oily or aqueous liquid. **The particle size of the dispersed solid is usually 0.5micometer.**
21. **An emulsion** is a heterogeneous system that consists of at least one immiscible liquid that is intimately dispersed in another in the form of droplets**. The droplet diameter usually exceeds 0.1 micrometer.**

22. **Problems with stability** can determine whether a given formulation is accepted or rejected. **(NTS MCQ)**
23. **The decomposition of active ingredients** in a dosage form occurs through several pathways. **(e.g., hydrolysis, oxidation, photolysis)**
24. **Hydrolysis** is the most common type of degradation because many medicinal compounds are esters, amides, or lactams.
25. **H and OH** are the most common catalysts of hydrolytic degradation in solution.
26. **Esters usually undergo hydrolytic reactions** that cause drug instability. Because esters are rapidly degraded in aqueous solution, formulators are reluctant to incorporate drugs that have ester functional groups into liquid dosage forms.
27. **Commonly used antioxidants include**
    - ascorbic acid,
    - butylated hydroxyanisole (BHA),
    - butylated hydroxytoluene (BHT),
    - propyl gallate,
    - sodium bisulfite,
    - sodium sulfite,
    - tocopherols.
28. **The shelf life of a drug** preparation is the amount of time that the product can be stored before it becomes unfit for use, through either chemical decomposition or physical deterioration.
29. **Water is the most commonly used vehicle for drug solutions. The USP recognizes seven types of water** for the preparation of dosage forms.
30. **Purified water USP** is water **obtained by distillation, ion exchange, reverse osmosis, or other suitable treatment.**
31. Traditionally, **the alcohol content of elixirs has varied from 5% to 40%**
32. **Elixirs are not the preferred vehicle for salts** because alcohol accentuates saline taste. Salts also have limited solubility in alcohol. Therefore, the alcoholic content of salt-containing elixirs must be low.

33. **Aromatic elixir NF** contains approximately **22% alcohol.**
34. **Iso-alcoholic elixir** is a **combination of low-alcoholic elixir, an elixir with low alcoholic content (8% to 10% alcohol), and high-alcoholic elixir, an elixir with high alcoholic content (73% to 78% alcohol).**
35. **Aromatic waters** are clear, saturated aqueous solutions of volatile oils or other aromatic or volatile substances.
36. **Distillation** is a universal method. It is the **only method,** however, **for preparing strong rose water and orange flower water.**
37. **Dispersant (e.g., talc)**
38. **Spirits, or essences,** are alcoholic or hydroalcoholic solutions of volatile substances that contain 50% to 90% alcohol.
39. **Tinctures** are alcoholic or hydroalcoholic solutions of chemicals or soluble constituents of vegetable drugs**.**
40. **Fluid extracts** are liquid extracts of vegetable drugs that contain alcohol as a solvent, preservative, or both.
41. **Mouthwashes** are solutions that are used to cleanse the mouth or treat diseases of the oral mucous membrane**.** They often **contain alcohol or glycerin to aid in dissolving the volatile ingredients.**
42. **Astringents** are **locally applied solutions** that **precipitate protein.** They **reduce cell permeability** without causing injury. **Astringents cause constriction**, with wrinkling and blanching of the skin. Because **astringents reduce secretions,** they can be **used as antiperspirants.**
43. **Aluminum acetate and aluminum subacetate** solutions are used as **wet dressings in contact dermatitis. The precipitation** is minimized **by the addition of boric acid.**
44. **Calcium hydroxide solution** is a mild stringent that is **used in lotions as a reactant and an alkalizer.**
45. **Antibacterial topical solutions (e.g., benzalkonium chloride, strong iodine, povidone–iodine**) kill bacteria when applied to the **skin or mucous membrane** in the proper strength and under appropriate conditions.

46. **Drug degradation in suspension or solid dosage forms occurs much more slowly than degradation in solution form.**
47. **Carboxymethylcellulose** is an **anionic** material that is **soluble in water and is usually used to increase viscosity.**
48. **The liquid droplet** is known as the **dispersed, internal, or discontinuous phase.**
49. **The other liquid is known as the dispersion medium, external phase, or continuous phase.**
50. **Methyl cellulose is nonionic and induces viscosity.**
51. **The sorbitan esters known as Spans** are hydrophobic in nature **and form w/o emulsions.**
52. **T e polysorbates known as Tweens** are hydrophilic and tend to **form o/w emulsions.**
53. **Wet gum (English) method**
54. **Dry gum (continental) method**
55. **Cold cream** is a **w/o emulsion.**
56. **Vanishing cream** is an **o/w emulsion.**
57. **Witepsol bases contain** natural saturated fatty acid chains between C12 and C18. **Lauric acid is the major component.** All 12 bases of this series are colorless and almost odorless.
58. **Trituration.** The substance is reduced to small particles by rubbing it in a mortar with a pestle. Trituration also describes the process by which fine powders are intimately mixed in a mortar.
59. **Pulverization by intervention.** Substances are reduced and subdivided with an additional material (i.e., solvent) that is easily removed after pulverization. This technique is oft en used with gummy substances that reagglomerate or resist grinding. **For example, camphor is readily reduced after a small amount of alcohol or other volatile solvent is added.** The solvent is then permitted to evaporate.
60. **Levigation.** The particle size of the substance is reduced by adding a suitable nonsolvent (levigating agent) to form a paste. The paste is then rubbed in a mortar and pestle or using an ointment slab and spatula. This method is oft en used to prevent a gritty feel

when solids are incorporated into dermatologic or ophthalmic ointments and suspensions.

61. **Mineral oil** is a common **levigating agent.**
62. **Sifting**. Powders are mixed by passing them through sifters similar to those used to sift flour. This process results in a light, fluff y product. Usually, it is not acceptable for incorporating potent drugs into a diluent base.
63. **Tumbling** is the process of mixing powders in a large container rotated by a motorized process. These blenders are widely used in industry, as are large-volume powder mixers that use motorized blades to blend the powder in a large mixing vessel.
64. **Powder papers can be** of any convenient size that fits the required dose. **Four basic types are used:**
    - **Vegetable parchment** is a thin, semiopaque, moisture-resistant paper.
    - **White bond** is an opaque paper that has no moisture-resistant properties.
    - **Glassine** is a glazed, transparent, moisture-resistant paper.
    - **Waxed paper** is a transparent waterproof paper.
65. Empty **capsules are numbered from 000,** which is the largest size that can be swallowed, to **5, the smallest size**. **The approximate capacity of capsules ranges from 600 to 30 mg for capsules from 000 to 5, respectively.**
66. **Soft gelatin capsules** are usually **prepared by the plate process or by the rotary or reciprocating die process.**
67. **Lubricants** reduce the friction that occurs between the walls of the tablet and the walls of the die cavity when the tablet is ejected. **Talc, magnesium stearate, and calcium stearate are commonly used.**
68. **Antiadherents** reduce sticking, or adhesion, of the tablet granulation or powder to the faces of the punches or the die walls.
69. **Glidants** promote the flow of the tablet granulation or powder by reducing friction among particles.

70. **Artificial sweeteners**, like flavors, are typically used only with chewable tablets or tablets that are intended to dissolve in the mouth.
    - **Some sweetness may come from the diluent (e.g., mannitol, lactose**). Other agents (e.g., saccharin, aspartame) may also be added.
    - **Saccharin has an unpleasant aftertaste.**
    - **Aspartame is not stable in the presence of moisture and heat.**
71. **Common disintegrants include:**
    - cornstarch and potato starch,
    - starch derivatives (e.g., sodium starch glycolate),
    - cellulose derivatives (e.g., sodium carboxymethylcellulose, croscarmellose sodium),
    - Clays (e.g., Veegum, bentonite), and cation exchange resins.
72. **Capping:** is the partial or complete separation of the top or bottom crown from the main body of the tablet.
73. **Lamination:** is separation of a tablet into two or more distinct layers. Th ese problems are usually caused by entrapment of air during processing.
74. **Picking:** is removal of the surface material of a tablet by a punch.
75. **Sticking:** is adhesion of tablet material to a die wall. These problems are caused by excessive moisture or the inclusion of substances with low melting temperatures in the formulation. c.
76. **Mottling:** is unequal color distribution, with light or dark areas standing out on an otherwise uniform surface. This problem occurs when a drug has a different color than the tablet excipients or when a drug has colored degradation products. Colorants solve the problem but can create other problems.
77. Facilitated diffusion : is also a carrier-mediated transport system. However, facilitated diffusion occurs with (i.e., in the direction of) a concentration gradient and **does not require energy**.
78. **Polymorphism** is the ability of a drug to exist in more than one crystalline form.

79. **Relative bioavailability (RBA)** is the systemic availability of the drug from a dosage form as compared to a reference standard given by the same route of administration
80. **Bioavailability studies are performed** : **for both approved active drug ingredients and therapeutic moieties not yet approved for marketing by the FDA**
81. **Biopharmaceutics** is the science that examines this interrelationship of **the physicochemical properties of the drug,** the dosage form in which the drug is given, and the route of administration on the rate and extent of systemic drug absorption.
82. **Molarity (M)** is the expression of the number of moles of solute dissolved per liter of solution. It is calculated by dividing the moles of solute by the volume of solution in liters.
83. **The normality (N) of a solution** is the number of gram-equivalent weights (equivalents) of solute per liter of solution.
84. **Molality (m)** is the moles of solute dissolved per kilogram of solvent.
85. **Pharmacokinetics** is the study of the time course of drug movement in the body during absorption, distribution, and elimination (excretion and biotransformation).
86. **Pharmacodynamics** is the study of the relation of the drug concentration or amount at the site of action (receptor) and its pharmacologic response as a function of time.
87. **Facilitated diffusion** is also a carrier-mediated transport system. However, facilitated diffusion occurs with (i.e., in the direction of) a concentration gradient and **does not require energy.**
88. **The Noyes–Whitney equation** describes the rate at which a solid drug dissolves.
89. **Fick's law** is similar to the Noyes–Whitney equation in that both equations describe drug movement caused by a concentration gradient. Fick's law generally refers to passive diffusion, or passive transport, of drugs.
90. **The law of mass action** describes the rate of a chemical reaction,
91. **The Michaelis–Menten** equation involves enzyme kinetics.
92. **The Henderson–Hasselbalch** equation gives the pH of a buffer solution.