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**(DEEMED TO BE UNIVERSITY), PUNE, INDIA**  
**PhD Entrance Test – 2023**  
**SECTION-II: Pharmaceutics - 50 Marks**

<b>Section II</b>	
<b>1</b>	<p><b>Physical Pharmaceutics covering the following aspects:</b>  <b>Solids:</b> Handling of solids, pharmaceutical granulation, compression and compaction properties of binary mixtures, lubricant sensitivity, characterization of granules and compacts.  <b>Dissolution:</b> Theory of dissolution, concept of drug release. Dissolution test apparatus: different designs, factors affecting dissolution rate. Dissolution of different dosage forms: solids, suspensions, topicals, suppositories and controlled release systems.  <b>Pharmaceutical aspects of solubilization :</b> Solubilization of drugs by following approaches: use of surfactants for solubilization; solid dispersions, cyclodextrin inclusion complexes, cosolvency etc.</p>
<b>2</b>	<p><b>Pharmaceutical preformulations:</b>  Drug Excipient interactions: different methods  Drug Stability and Kinetics: General considerations &amp; concepts, half-life determination, Influence of temperature, light, solvent, catalytic species and other factors, Accelerated stability study, expiration dating.</p>
<b>3</b>	<p><b>Novel Drug Delivery Systems covering the following aspects:</b>  Design, development, manufacture and evaluation of the following:  <b>Oral Drug Delivery Systems:</b> Osmotic DDS, Ion exchange controlled DDS, Hydrodynamically balanced DDS  <b>Mucosal DDS:</b> Physiological basis of mucosal delivery with reference to oral mucosal, nasal, vaginal and rectal routes. Bioadhesion and bioadhesive polymers, DDS for mucosal administration. In-vitro, ex-vivo and in-vivo evaluation techniques  <b>Transdermal DDS:</b> Percutaneous absorption and penetration enhancers, development of transdermal gels, patches with reference to components and evaluation. Iontophoretic and Sonophoretic DDS.  <b>Microspheres:</b> Methods to obtain microcapsules/ microspheres, their evaluation and applications  <b>Nanoparticulate and Colloidal systems:</b> Polymeric and lipid nanoparticles, liposomes, niosomes, and polymeric micelles.</p>
<b>4</b>	<p><b>Biopharmaceutics and Pharmacokinetics covering the following aspects:</b>  <b>Absorption, Distribution, Metabolism, Excretion</b>  <b>Pharmacokinetics :</b> Pharmacokinetics models, Laplace transformations and concept of compartment modeling. One compartment model : intravenous injection, intravenous infusion, extravascular route  <b>Bio-availability and Bioequivalence:</b> Study design, protocols and regulatory requirements and statistical consideration in data analysis.</p>

**References:**

1. A.Martin, P.Bustamante and A.H.Chun; Physical Pharmacy;Waverly.
2. N.G.Stanley-Wood, Enlargement and compaction of particle solids; Butterworths.
3. D.M.Parikh, Handbook of Pharmaceutical Granulation Technology; Marcel Dekker.
4. H.G.Brittain; Physical Characterization of Pharmaceutical solids; Marcel Dekker.
5. Lieberman, Rieser and Banker; Pharmaceutical dosage forms; Disperse system; Marcel Dekker.
6. M.N. Rubinstein, Pharmaceutical Technology, Drug Stability, John Wiley and Sons.
7. Martin R hodes, Principles of Powder Technology, John Wiley and Sons.
8. James J. Wells, Pharmaceutical Preformulation, Ellis Horwood Ltd.
- 9.P. H. List and P. C. Schmidt; Pharmaceutical technology, C R Spres.
10. Robinson, Novel Drug Delivery System, Marcel Dekker.

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