Birla Institute of Technology and Science, Pilani
First Semester 2023-24
Pharmaceutical Formulations II (PHA F315)
Comprehensive Examination

Max. Marks: 35 **Part A (Closed Book)** **Duration: 90 Minutes**

Q1. Discuss the drug-related and formulation-related factors that control drug absorption after an intra-muscular injection. **[2+2=4]**

Q2. What are the advantages of lung-targeted drug delivery? What are the challenges associated with lung targeting? What are the formulation-related factors that control lung-targeted delivery? **[2+2+2=6]**

Q3. What is RES interaction? How does it influence nanoparticle-mediated drug delivery? Discuss how thermosensitive liposomes can improve tumor-targeted drug delivery compared to simple liposomes. **[2+3+3 = 8]**

Q4. How do antibody-drug conjugates show better efficacy than the drug alone? Discuss with **an example**. **[3]**

Q5. What is the difference between simple and complex coacervation-phase separation methods? Which one would produce microcapsules with a slower release profile? Justify. **[3+3]**

Q6. Discuss how drug-related factors (at least 5) influence transdermal delivery of a drug. **[5]**

Q7. What are the differences between dissolution-controlled encapsulation systems and diffusion-controlled reservoir systems? Which one is better, in your opinion? **[3]**

Birla Institute of Technology and Science, Pilani
First Semester 2023-24
Pharmaceutical Formulations II (PHA F315)
Comprehensive Examination

Max. Marks: 35 **Part B (Open Book)** **Duration: 90 Minutes**

Q1. After intravenous administration, how does the pharmacokinetics and biodistribution pattern vary between a non-PEGylated and PEGylated liposome? Which one would be better suited for cancer treatment and why? **[3+3]**

Q2. What types of drugs are available as only parenteral formulations? Two drugs, A and B, both non-ionic and highly soluble in water, need to be dispensed together as a parenteral formulation. The dose of drug A is 12mg, and B is 50mg. The formulation should be a 2 mL vial. What should be the formula of an isotonic formulation? (MW of A: 553; B: 632). **[2+5]**

Q3. What is the reason for the high surface tension of water? How does the addition of a surface-active agent reduce the surface tension? Why the reduction of surface tension is very important in pharmaceutical formulations? **[2+2+2]**

Q4. What would be the effect of the following on the particle size and release rate in a spray drying operation: **i)** increase in feed rate, **ii)** decrease in air temperature, **iii)** use of a higher MW polymer? Explain. **[3+3+3]**

Q5. What are the challenges associated with oral delivery of a protein drug, and how to address those? **[3]**

Q6. You wanted to make a nanoparticle using the emulsion-solvent evaporation method. You have dissolved a non-polar polymer PLGA in dichloro methane (DCM), a non-polar, water-immiscible solvent. That solution was then added to pure distilled water with sonication to make the nanoemulsion. DCM was then evaporated to make the nanoparticles. However, the prepared nanoparticles were found to be unstable and formed aggregates. What was the problem, and what should be done to prevent such aggregate formation? **[4]**

◊◊◊◊◊ All the best! ◊◊◊◊◊