Mid Semester Examination
Course Name: Analytical Biotechnology (BT 601)
Time: 9.00-11.00, Dated: 26/02/2025
Total Marks: 30

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1. **a)** Find the Kp when 2 gm compound in 100 ml water was shaken with 10 ml of ether and 1.2 gm was extracted to ether layer.
   b) How much would be extracted if the original solution was shaken with 5 ml of ether?
2. Derive step-wise the equations from A1 to A11 for the apparent partition coefficient (APC) in partitioning of a dibasic acid between an oil and an aqueous phase.
3. Derive step-wise the mathematical expression of Beer's Lambert law [Upto equation 11].
4. **a)** Derive step-wise K_d from the kinetic parameters in SPR.
   b) Write the Sensogram for the followings: Equilibrium, Competition and Epitope binding.
5. **a)** Show a complete Sensogram showing Association, Dissociation and Regeneration.
   b) Mention two points to explain the **drift** below the base line during regeneration in Sensogram.
6. How do you use GLC to determine the amount of a particular compound if the compounds present in the mixture are known in advance?
7. **a)** Show the SERS plot for long-term stability of Bacillus Spores on AgFON for 1 day, 15 days and 40 days.
   b) Derive the Langmuir *Adsorption Isotherm* equation for Bacillus Spores in SERS and plot it.
8. **a)** How do you create a circularly polarized light with two light waves?
   b) *How do you quantitatively explain that 1nm cubes are more reactive than a single 1 cm cube?*
9. **a)** *Show the schematic of Device assembly and electronic circuit in a PDT setup.*
   b) *Show three Device performance characteristic plots of the PDT setup.*
10. **a)** *Draw the schematic for detection of Apoptosis by Flowcytometry.*
    b) *What are the different quadrants of Flow data in detection of apoptosis after drug treatment.*

(Marks: 3x 10=30)
