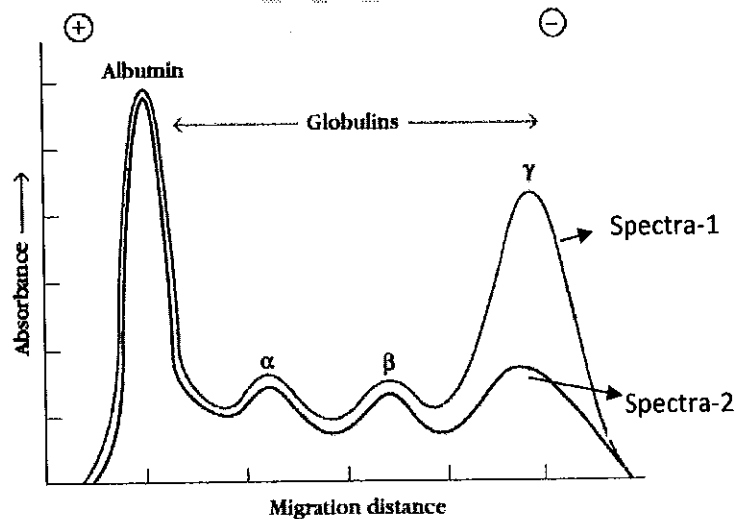


Note: All questions are compulsory. Marks are indicated against each question in square brackets.

1. Draw diagrams illustrating the general structure, including the domains, of class I MHC molecules, class II MHC molecules, and membrane-bound antibody on B cells. Label each chain and the domains within it, the antigen-binding regions, and regions that have the immunoglobulin-fold structure. Also explain the concept of MHC restriction [6] [CO-2]
2. A. Tiselius and E. A.Kabat, in 1939 performed an experiment in which they immunized rabbits with the protein ovalbumin (the albumin of egg whites) and then divided the immunized rabbits' serum into two aliquots. Electrophoresis of one serum aliquot revealed four peaks (spectra-1). The other serum aliquot was reacted with ovalbumin, and the precipitate that formed was removed; the remaining serum proteins, which did not react with the antigen, were then electrophoresed and again four peak were observed (spectra-2). A comparison of the electrophoretic profiles of these two serum aliquots are given in the figure. What you think about this experiment and what would be your conclusion based on the following results. [4]. [CO-2]



3. Polyclonal antibody response facilitates the localization, phagocytosis, and complement-mediated lysis of antigen; it thus has clear advantages for the organism in vivo. Unfortunately, the antibody heterogeneity that increases immune protection in vivo often reduces the efficacy of an antiserum for various in vitro uses (most research, diagnostic, and therapeutic purposes). To overcome the limitation of polyclonal antibody in in-vitro uses monoclonal antibody are preferred. Detail out the production methods of Monoclonal antibody and also explain the uses of monoclonal antibody in clinical laboratory e.g. Immunotoxin. [5] [CO-1]
4. Antibody affinity and Avidity both are important immunological activity, according to you which of these properties of an antibody better reflects its ability to contribute to the humoral immune response to invading bacteria and why? Also explain the immunological difference between Antigenicity and Immunogenicity. [5] [CO-2]
5. Indicate whether each of the following statements is true or false. If you think a statement is true or false, explain why. [5] [CO-3]
- Although each B cell carries two alleles encoding the immunoglobulin heavy and light chains, only one allele is expressed.
 - V κ gene segments sometimes join to C λ gene segments.
 - Separate exons encode the transmembrane portion of each membrane immunoglobulin.
 - With the exception of a switch to IgD, immunoglobulin class switching is mediated by DNA rearrangements.
 - Primary transcripts are processed into functional mRNA by removal of introns, capping, and addition of a poly-A tail.