

COURSE CODE (CREDITS): 14M11BT212 (3)

MAX. MARKS: 25

COURSE NAME: IMMUNOTECHNOLOGY

COURSE INSTRUCTORS: Dr. Rahul & Dr. Jitendraa

MAX. TIME: 1 Hour 30 Min

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

Q1. If a protein is localized at the inner membrane of a bacteria and this need to be proved with the help of antigen-antibody interaction. Design an experimental method to prove the localization of the protein. [3]

Q2. ATP synthesis in mitochondria is done with the help of F1FO particles, however ATP synthesis occur only, when F1 protein subunits make an interaction with the FO subunits. You are given the antibody against a protein of F1 particle. What will happen, if you incubate the isolated supra-molecular aggregate solution with the anti-F1 antibody? [3]

Q3. If you need to screen the level of a protein antigen in a group of 50 individuals in 24 hours and you have the choice of western blot as well as ELISA. Which of the immunological method will be your choice? Justify your answer. [2]

Q4. With respect to Monoclonal Antibody production using hybridoma technology answer the following: [2 X 2 = 4]

- Significance of Aminopterin for selection of Hybridoma cells.
- Need of using HGPRT⁻ myeloma cells for production of hybridoma cells.

Q5. A company used murine monoclonal antibodies for therapy against cancer in humans. The therapy suffered from serious drawbacks. Provide a critical evaluation of the problem and suggest all possible strategies to combat the limitations of the therapy. Draw diagrams if required. [4]

Q6. Illustrate with diagrams the maturation and development of a progenitor B-cell, showing sequence of Ig-gene rearrangements that contribute to expression and production of antibodies. [4]

Q7. In context of Antibody diversity and gene rearrangement write short notes on the following: [Any Five] [1 X 5 = 5]

- One-gene-one-protein hypothesis for antibody diversity
- One-turn/two-turn joining rule
- Allelic exclusion theory and its significance
- Junctional flexibility and its role in producing antibody diversity
- Arrangement of Heavy Chain constant gene segments and its significance
- Alternative splicing of a long primary mRNA and its significance in expression of antibody
- Significance of having multiple gene segments for coding of single antibody molecule