



VII SEMESTER B.TECH. (BIOTECHNOLOGY)

MID-SEMESTER EXAMINATIONS, DECEMBER 2021

22nd DECEMBER, TIME: 9.00 – 11.00

SUBJECT: GENOMICS AND PROTEOMICS (BIO 4066)

REVISED CREDIT SYSTEM

MAX. MARKS: 20

Instructions to Candidates:

- ❖ Answer **ALL** the questions.
- ❖ Missing data may be suitable assumed.

1A. The specificity of the primers is a critical feature of a successful PCR. If the primers anneal at more than one position in the target DNA then products additional to the one being sought will be synthesized. Explore the factors that determine primer specificity and evaluate the influence of the annealing temperature on the outcome of a PCR **(5 marks)**

1B. What are the ideal features of a DNA marker that will be used to construct a genetic map? To what extent can RFLPs, SSLPs, or SNPs be considered “ideal” DNA markers? **(3 marks)**

1C. A malfunctioned human cell has produced a protein that is improperly or misfolded. The so called “misfolded protein” is believed to cause serious threat to the individual by aggregating and inhibiting the functions of other proteins. How does cell combat against the misfolded protein? **(2 marks)**

2A. Pranav obtained three samples (a) myoglobin (b) hemoglobin and (c) insulin having protein without names designated on the respective tubes. Using gel-based proteomics, how can we determine which tube contains which protein and how to estimate the number of subunits present. Use a graphical representation of a gel and mark it. [Hint Myoglobin is a globular protein of 17 kDa, Hemoglobin is an iron containing tetramer protein of 68 kDa and Insulin is of 5.8 kDa with two polypeptide chains linked through disulphide bridge]. **(4 marks)**

2B. Q-PCR utilizes enhanced fluorescence with the help of ethidium bromide (intercalates DNA) as well as SYBR Green I. Where does SYBR Green I bind to DNA? What problem both these dyes possess? Suggest an alternate approach. **(4 marks)**

2C. In mass spectrometric separation, what is the effect of a number of charges on a molecular ion separation? Also mention why it is necessary to have a free path or vacuum. **(2 marks)**