RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES, MIHINTALE

B.Sc. (Special) Degree in Applied Biology

Fourth Year Semester I Examination – April/ May 2015

MIB 4203 – TECHNIQUES AND STRATEGIES OF MOLECULAR BIOLOGY

Time: Two (02) hours

Answer ALL questions.

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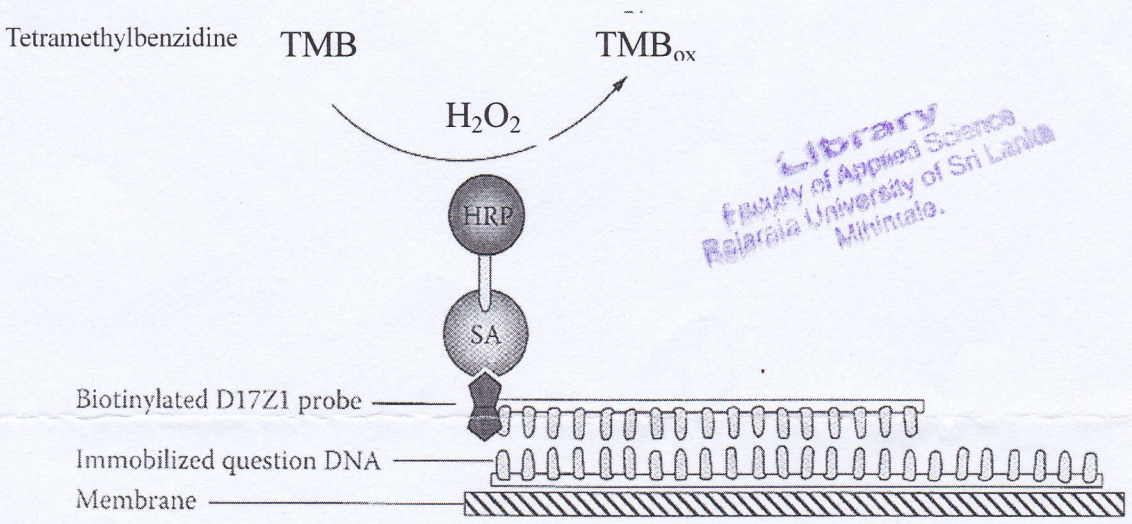
1. a) Describe Define the following using **no more than a single sentence** for each

   i. Southern blot

   ii. Northern blot

   iii. Western blot **(30 Marks)**

   b) Describe the functions of molecules involved in detection of a specific DNA sequence by biotinilation. Use the following diagram as a guide. **(35 Marks)**



c) Figure 1 shows the absorption spectra of chlorophyll a and chlorophyll b.

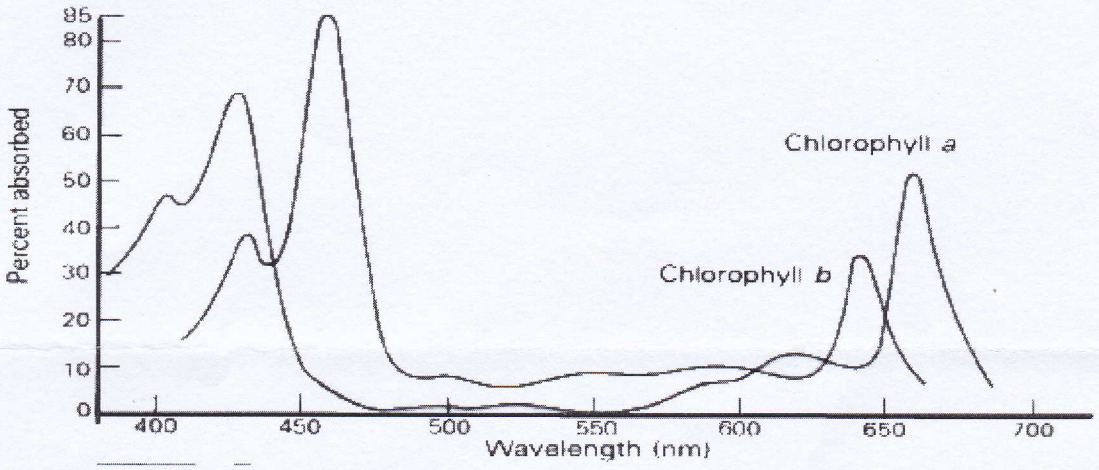


Figure 1. Absorption spectra of chlorophyll a and chlorophyll b

i. Assume that you are required to assess the level of contamination of isolated **chlorophyll a** with **chlorophyll b.** Propose a strategy based on the above spectra and provide reasons for your choice. **(25 Marks)**

ii. Although the proposed approach for question 1(c)i may be used to assess the contamination of **chlorophyll b** with **chlorophyll a**, it will not be as sensitive as for the above (Chlorophyll a with chlorophyll b). Mention the reason for this. **(10 Marks)**

2. a) Compare and contrast BACS and YACS. **(50 Marks)**

b) Describe how posttranscriptional gene silencing (PTGS) be achieved by siRNA. **(50 Marks)**

3. a) Describe the modified yeast two hybrid assay for membrane proteins and justify the need for modification. **(40 Marks)**

b) A group of scientists claims that protein **A** exists in two forms, the unphosphorylated and phosphorylated. While the unphosphorylated form is found in the cytoplasm, the phosphorylated form is found only in the nucleus. Signal **X** perceived by receptor **Y** causes the autophosphorylation of **Y** and subsequent transfer of the phosphate group to **A**. If the DNA sequences of both X and the auto kinase involved is known, design a method to prove or disprove the claim. **(60 Marks)**

4. **a)** With the help of labeled diagrams, illustrate tandem affinity assay and appraise its importance compared to other protein purification methods. **(40 Marks)**

b) Briefly describe the principle behind MALDI-TOF **(30 Marks)**

c) Critically analyze **three** ionization techniques of your choice in terms of importance in protein sequencing. **(30 Marks)**

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