

Q1/ Choose the correct answer? (20 Marks)

- For transferring 1 mL of solution, A micropipette with a total holding volume of .  
a. 100-1000 $\mu$ l    b. 100-500 $\mu$ l    c. 10-100 $\mu$ l    d. 5-20 $\mu$ l
- Which solution protects the DNA and RNA from dissolving and adjusts the pH to 7.5 for RNA and 8.0 for DNA?  
a. EDTA                      b. Tris-HCl                      c. Tris-EDTA                      d. Cations
- Which Buffer is used to run the gel electrophoresis?  
a. 1X TEA                      b. 1X TEB                      c. 1X TFE                      d. 1X TAE
- which material is used to remove salt and precipitate DNA?  
a. Isopropanol                      b. 70% Alcohol                      c. Na<sup>+</sup> & K<sup>+</sup>                      d. Phenol-Chlorophom
- One of the following stains functions as intercalating agent in the gel elect.?  
a. BPB                      b. BtBr                      c. EtBr                      d. SDS

Q2/ True and False (20 Marks)

- Pyrimidine includes Cytosine (C), Adenine (A) and Uracil (U).F
- The role of SDS in DNA extraction is to denatures the proteins in the cell membrane.T
- Supercoiled DNA is a type of DNA conformations that migrates faster than linear DNA and relaxed circular DNA.T
- Centrifuge is a molecular tool that is used for spinning and removing of nucleic acids or proteins from solution. F
- The double-stranded DNA is separated into two single strands of DNA, when the extension step of the PCR happens. F

Q3/ Answer the following? (10 marks)

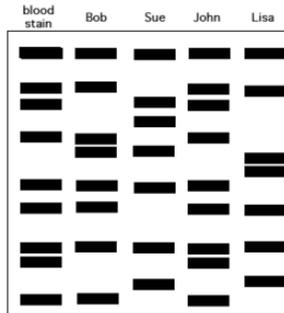
- What are the materials used to extract Banana DNA, count only?  
Several factors effect on DNA migration through DNA gel, Count only

Q4/ Complete the following gaps with convenient words? (35 Marks)

DNA is an invisible structure in the cell nucleus that encodes .....1 Nucleotide is a building block of DNA or RNA, consisting of .....2 DNA is isolated from cell membrane, lipids and proteins using .....3 DNA can be amplified to millions of copies via .....4 to find the annealing temperature, A generic formula for calculating the primer T<sub>m</sub> is .....5 Then, Gel electrophoresis is used to separate DNA based on the.....6 DNA in the Gel electrophoresis is cut into fragments by a specific chemical called as .....7

Q5/ Based on these results whose blood was found in the blood stain at the crime scene? (15 Marks)

- a. Bob      b. Sue      c. John      d. Lisa



Q6/ Multiple Choice Questions?

1. The DNA sequence synthesized by Sanger method. What is the original DNA sequence?

- a. 5-'ATGCCTGACT-3'    b. 5-'AGTCAGGCAT-3'    c. 5-'TCAGTCCGTA-3'  
 d. 5'-AACCCAAGTT-3'      →→

2. What enzyme helps join the recombinant plasmid together after the restriction enzyme?

- a. Restriction Enzymes      b. DNA Polymerase      c. DNA Ligase      d. Both a and c

3. RNA Polymerase      Southern blot is the technique for \_\_\_\_\_ blot

- a. RNA      b. DNA      c. Protein      d. Both a & b

4. In Southern blotting, \_\_\_\_\_ type paper is used for blot transfer

- a. Filter paper      b. paper towel      c. Nitrocellulose membrane      d. None

5. Which detergent is used to denature double-stranded DNA in Southern blot?

- a. Alkali      b. Tris-NaCl      c. blocking reagent      d. Both a and b

6. In an SDS-PAGE experiment, proteins are separated on the basis of their.....

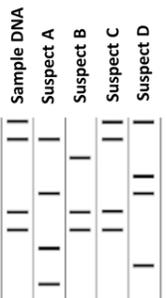
- a. Negatively charged chain    b. change to mass ratio    c. Molecular weight    d. Both a and c

7. In an SDS-PAGE gel,

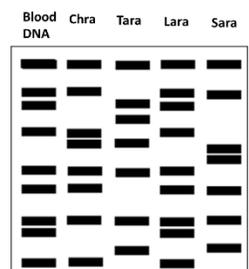
- a. SDS denatures proteins      b. Proteins have same charge to mass ratio      c. Both a and b

8. Which suspect is linked to the crime scene by this DNA analysis? →

- a. Suspect A      b. Suspect B      c. Suspect C      d. Suspect A & B



9. To determine if that protein is overexpressed in the cells. What technique would best demonstrate that this protein is expressed?
- a. Southern Blot      b. Northern Blot      c. Western Blot      d. both a & c
10. Which of the following is a primary factor that dictates how far a protein will migrate during SDS-PAGE?
- a. Size      b. Degree of secondary structure      c. Number of subunits
11. Which of the following techniques would be most useful to study gene expression?
- a. Southern blot      b. Northern blot      c. Western blot      d. Eastern blot
12. Based on these results whose blood was found in the blood stain at the crime scene?
- a. Chra      b. Tara      c. Lara      d. Sara →
13. What applications can gel electrophoresis be used for?
- a. Parental Testing      b. Criminal Investigations      c. DNA Endangered Species DNA      d. All of them
14. Which of the following probes are most commonly used in Western blotting?
- a. Nucleic acid      b. Antibody      c. nonfat dry milk      d. Bovine serum albumin
15. In a WB, the primary antibody binds to the \_\_\_\_\_ while the secondary antibody binds to the \_\_\_\_\_.
- a. target protein; primary antibody      b. secondary antibody; target protein      c. nylon membrane; target protein
16. ddNTP is different from dNTP in having
- a. OH in place of H in 2 position of dNTP
- b. H in place of OH in 2 position of dNTP
- c. OH in place of H in 3 position of dNTP
- d. H in place of OH in 3 position of Dntp
17. Automated DNA sequencing is an improvement of Sanger method where
- a. ddNTPs are used for chain termination
- b. Fluorescently labelled dNTPs are used for chain termination
- c. Fluorescently labelled ddNTPs are used for chain termination
- d. PCR used for making sequence template



18. What might happen if you forgot to add glycerol to your loading buffer and then used it for SDS-PAGE?
- Your proteins wouldn't be negatively charged
  - You wouldn't be able to see your proteins
  - It would be difficult to load your proteins
  - Your proteins would aggregate into dimers/trimers
19. What might happen if you forgot to add SDS to your cell lysis and then used it for SDS-PAGE?
- Your proteins wouldn't be negatively charged
  - It would be difficult to reduce disulfide bonds
  - It would be difficult to load your proteins
  - Your proteins would aggregate into Heterodimer/ Homodimer
20. In Southern blotting \_\_\_\_\_ type of gel is used for the separation of molecular bands.
- Agarose
  - Starch
  - Polyacrylamide
  - both a & c
21. What are the potential problems with Polyacrylamide gels?
- Over loaded, Low concentration of protein, using a higher voltage, and Frowning
  - Over loaded, Low concentration of protein, PH imbalance and Frowning
  - Over loaded, Visualization of protein bands, Tearing and Frowning
  - Over loaded, Low concentration of protein, Tearing and Frowning
22. One of the advantages of Southern Blot is.....
- Detecting multiple homologous genes in a genome.
  - Detecting the Gene Expression
  - Identifying disulfide bonds between proteins
  - Both a & b
23. At what temperature does the Denature step of PCR occur?
- 95° C
  - 45° C
  - 55° C
  - 72° C
24. .... are widely used in detection of proteins.
- Horse-radish peroxidase
  - alkaline phosphatase
  - Coomassie Blue
  - both a & c
25. What pH value of Tris/HCl buffer for stacking and separating gel
- pH: 6.6 & pH:8.8
  - pH: 6.6 & pH:8.6
  - pH: 6.8 & pH:8.8
  - pH: 6.8 & pH:8.6