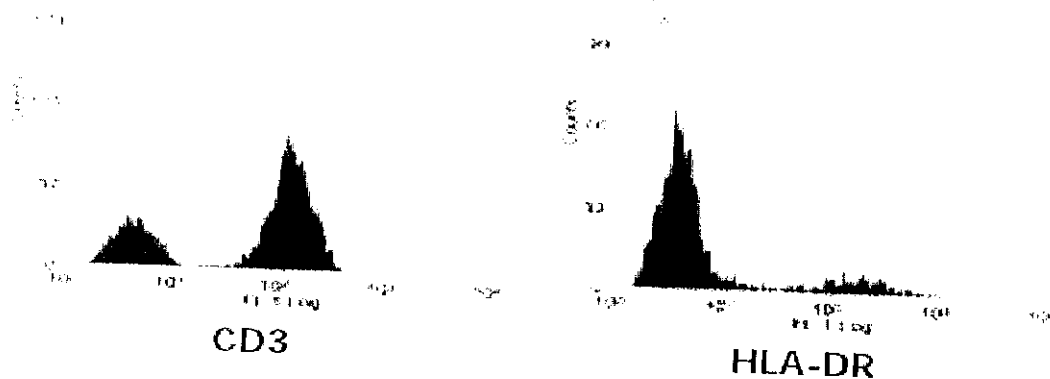


Note: All questions are compulsory. Marks are indicated against each question in square brackets.

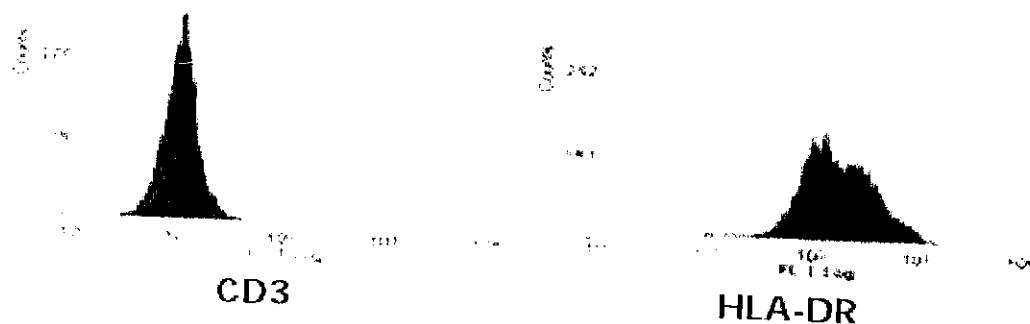
Q1. **Case study:** Vikram has clinical symptoms of a lump in his neck with difficulty in swallowing. He is diagnosed of Oral cancer. How can you use microarray technology to streamline his treatment strategy using his gene expression profile? Provide a flow chart or diagram to illustrate the steps you would use. [4]

Q2. Given below is a flow-cytometry data indicating fluorescence obtained using Anti-CD3 and Anti-HLA-DR antibodies from two individuals Gyan and Asha. Explain the data obtained in both cases and predict the diseased condition using given fluorescence data. [4]

GYAN.



ASHA.



Q3. Discuss the two common methods, used in a real-time PCR based experiment for quantification of m-RNA in a sample. Provide details of both methods and compare their advantages and disadvantages. [5]

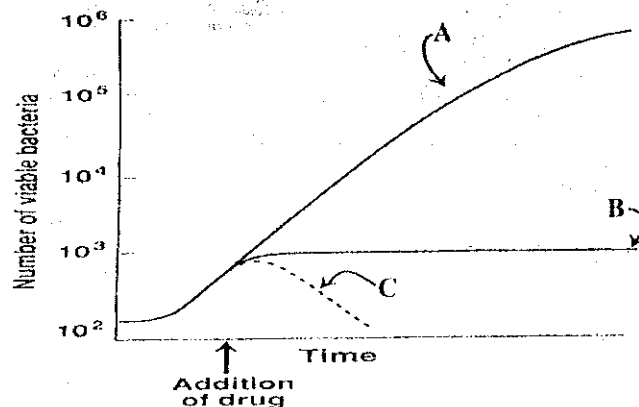
Q4. With reference to flow cytometry answer the following:

[1 X 5 = 5]

- What are dot and histo plot.
- Draw a histogram plot showing phases of a human cell cycle.
- Name two stains commonly used for cell cycle studies.
- Draw a histogram as well as dot plot indicating cells undergoing apoptosis / necrosis.
- How can increase in number of apoptotic / necrotic cells be used for diagnosis of clinical conditions.

Q5. In a treatment strategy against pathogenic Multidrug-resistant *Staphylococcus aureus*, two different drugs were tested by addition at early log stage of the bacteria. [1.5+1.5+2 = 5]

- Compare the mode of inhibition of the two drugs **B and C** in comparison to the control **A (no drug)** with reason for your answer.
- Which drug do you think should be administered for such MDR infections?
- What are narrow and broad spectrum antibiotics; differentiate under what conditions each must be used.



Q6. Draw and explain life cycle of a malarial parasite. Indicate stages of the plasmodium life cycle which may be targeted for vaccine intervention strategies and importance of each stage for development of vaccine. [2.5 X 2 = 5]

Q7. With reference to DNA Vaccines answer the following:

[1 X 5 = 5 + 2 = 7]

- What are DNA Vaccines and DNA vaccination?
- Draw a flow chart enlisting the steps for preparation of DNA vaccines
- Modes of delivery of the DNA Vaccines.
- Advantages of a DNA vaccine over conventional vaccine?
- Applications of a DNA vaccine.
- Mechanism of action of DNA Vaccines.