14. State two important factors that control the penetration of the electron transport mediator (ETM) close to the enzyme active center inside the protein matrix in 2nd generation amperometric biosensors.

15. (a) State a major drawback of 2nd generation amperometric biosensors. (b) What is the plausible approach to overcome this drawback?

16. Draw the general configuration of a flow injection calorimetric biosensor used to detect dichlorvos. Label appropriately all the parts of the sensor.

17. With the following hypothetical reaction, write the biocatalytic reactions and linked electrode reactions for both 2nd and 3rd generation amperometric biosensors. You may use any electron transfer mediator of your choice.
Substrate(2H)+FAD-oxidase → product + $FADH_2$-oxidase

18. Write two major advantages of direct electron transfer (DET)-based detection approach for developing 3rd generation amperometric biosensors.

19. Show the standard plot to calculate the charge transfer co-efficient (for both anodic and cathodic reaction), which in turn is used to calculate Electron transfer rate constant of redox protein film through protein film voltammetry.

20. (A) State the electrochemical property of a protein molecule to ascribe it as molecular transducer. (B) List two major drawbacks of current methods for diagnosing tuberculosis.

END