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SARDAR PATEL UNIVERSITY

M. Sc. Integrated Biotechnology (IGBT) 6th Semester
Theory Exam – April, 2015
PS06CIGB04 – Biosensors and Biocrystallography
28th April 2015 (Tuesday), 2:30 pm to 5:30 pm

Maximum Marks: 70

Note: 1) All the Questions are compulsory.
2) Figures on the right indicate marks.

Q.1 Choose the correct option. **1x8= 8**

(i) Self generating type transducers are _____ transducers.
a. Active b. Passive c. Secondary d. Inverse

(ii) The amount of uncertainity in a measurement with respect to an absolute standard is known as_____
a. precision b. resolution c. accuracy d. sensitivity

(iii) The father of biosensor is __
a. Clark b. Verneuil c. Albert d. Edison

(iv) Biochip is used in
a. Gene identification and mapping b. Drug screening
c. DNA sequencing d. all of these

(v) _____bonds have purely electrostatic attraction between oppositely charged atoms.
a. H- bond b. Ionic bond c. Van der waals d. covalent

(vi) There are _____ types of crystal systems.
a. 7 b. 14 c. 21 d. 28

(vii) Luciferase enzyme is used in _____ biosensor.
a. Acoustic b. calorimetric c. optical d. none of these

(viii) NMP is a/an ____
a. Mediator b. organic conducting salt c. both a&b d. none of these

Q.2. Attempt any Seven of the following: **2x7= 14**

(i) Define transduction principle for electrical energy with examples.
(ii) Write the parameters required for dynamic characteristic.
(iii) Give the general features and components of biosensor in brief.
(iv) Write about any one example of microbial sensor.
(v) Give a brief note on most accepted theory of atomic model.
(vi) Enlist 4 differences between a conventional crystal and a macromolecular crystal.
(vii) Derive Bragg's law.

(viii) Write the conclusion of Lauve experiment for diffraction of X-rays.

(ix) Write a short note on 'immersion method' of immobilization.

Q. 3. (a) Define sensor. Write its principle and importance. 6

(b) Discuss in detail about the mechanical and thermal characteristics of sensors. 6

OR

(b) Define Ion Selective Electrodes. Describe the principal and working of potentiometric sensors. 6

Q. 4. (a) Describe the types of biosensors based on the use of different sensor device. 6

(b) Describe the method of construction and working principle of 'glutamine biosensor'. State various applications of glutamine biosensor. 6

OR

(b) What are bioreceptors? Elaborate the choice and selection of bioreceptors during construction of a biosensor. 6

Q. 5. (a) Define supersaturation. Discuss the principle, advantages and drawbacks of sitting and hanging drop methods for crystallization. 6

(b) Enlist and explain the physical properties of organic compounds. 6

OR

(b) How's crystallization process monitored? Add a note on conditions for macromolecular crystallization. 6

Q. 6. (a) Discuss in detail the powder and rotating crystal methods for diffraction of X-rays. 6

(b) Give detailed note on structure elucidation of protein crystals by x-ray cryastallography. 6

OR

(b) Describe any one method for production of X-rays. 6