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BT 620 BIOSENSORS

QUIZ-I

Date: 28.08.2024

Instructions: Total marks: 10. Each of the 09 questions carries 01 mark. An additional 01 mark will be awarded to the students submitting the answer sheet within 5.30 pm (sharp). More than a word in each gap leads to zero marks for Q.no. 2, 3. Answering more than required no. for each question leads to zero mark.

1. Identify the performance factor(s) for biosensors that attribute to their functional traits from the following list

A) Selectivity, (B) Cost, (C) Portability, (D) Design, (E) Market, (F) Sensitivity

2. Fill the gaps each with AN appropriate word

Organophosphates irreversibly inhibit acetylcholinesterase. Acetylcholine is the Neurotransmitter of the parasympathetic nervous system.

3. The sensitivity of calorimetric biosensors could be increased by increasing Enzymatic output by the intermediate reaction steps. Fill the gaps each with AN appropriate word.

4. In SPR phenomenon, if the evanescent field intensity decayed over a distance of 80 nm from the interface, then what would be the wavelength of the incident light?

(A) 160 nm, (B) 200 nm, (C) 240 nm, (D) 280 nm, (E) 290 nm, (F) None of the above.

5. Identify the correct relations among the amount of charge (C) developed, piezoelectric coefficient (d), force applied along the x-direction (F_x), the number of stacked elements (n), and crystal dimensions a, b for a longitudinal effect in piezoelectric materials from the following equations:

(A) $C_x = d_{xy} F_x n a/b$, (B) $C_x = d_{xx} F_x n b/a$, (C) $C_x = 2d_{xx} F_x n a/b$, (D) $C_x = d_{xx} F_x n$
(E) $C_x = 2d_{xy} F_x n$, (F) $C_x = d_{xy} F_x n$

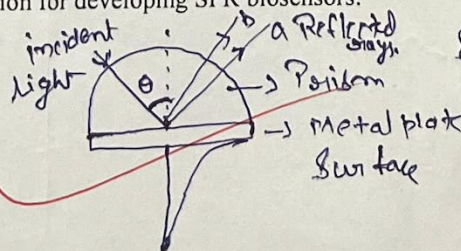
6. Larger quantum dots exhibits shorter / longer lifetime because they have more closely / widely spaced energy levels in which the electron-hole pair can be trapped. Strike off the wrong underlined words.

7. (A) Which of the following is not a terminal of an ISFET device? Tick the answer: (a) Gate, (b) Drain, (c) Source, (d) Membrane element, (e) Body.

8. Which physicochemical factor in solid is closely related to the formation of piezoelectric effect.

Dipole Moment

9. Draw the Kretschmann ATR configuration for developing SPR biosensors.



Shifted reflected light beam due to change in refractive index.

above Figure showing Kretschmann ATR Configuration