الإدارة المركزية للتعليم العام

مستشار مادة العلوم

Weekly Home Work

Lesson : Five

NANOTECHNOLOGY APPLICATIONS AND BIOSPHERE SUSTAINABILITY

Integrated Science

Secondary one

Second Term

2026

إعداد

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رئيس الإدارة المركزية للتعليم العام

والمشرف على مستشاري المواد الدراسية

Choose the correct answer

1- "Nanocomposites" are an example of ..... materials

A) (1) D
B) (2) D
C) (3) D
D) (0) D

2- Which type of nanomaterials is best suited for manufacturing "micro- filters "for water

A) 3D porous nanomaterials
B) 0D nanomaterials
C) 2D thin films
D) Quantum dots

3- "Nano chemistry" is concerned with studying changes in properties at a small scale. Which of the following falls within its interests?

A) Manufacturing massive devices
B) Studying planetary motion
C) Uranium decay
D) Manufacturing and describing nanomaterials in their varous forms

4- If the number of atoms exposed for reaction on the surface of a nanomaterial increases, this leads to

A) chemical inactivity
B) a massive increase in chemical activity
C) transformation of matter into gas
D) increase in melting point

5- The primary benefit of enclosing a cancer drug with nanoparticles is

A) increasing the drug's size for easier swallowing
B) changing the drug's taste
C) reducing effectiveness for safety
D) targeting cancerous cells only

6- Which of the following materials is most effective for creating a nanobridge between the two ends of a severed nerve?

A) Quantum dots
B) Flat graphene
C) Carbon nanotubes
D) Water molecule

7 - The movement of smart prosthetics limbs depends on

A) Nano-chip commands
B) large external batteries
C) wind movement
D) automatic muscle response

8- The primary fuel used in biofuel cells is

A) Gasoline
B) External hydrogen gas
C) Glucose
D) Nano coal

9- Thin films appear as examples of.....materials

A) One-dimensional Nanomaterials
B) Three-dimensional Nanomaterials
C) Zero-dimensional Nanomaterials
D) Two-dimensional Nanomaterials

10- Electrons in a biofuel cell move through an external circuit toward the

A) Cathode
B) Anode
C) Human body
D) Ground

11- The role of "carbon nanotubes" in biofuel cells is

A) storing glucose
B) coating the electrodes to increase surface area
C) preventing protons from reaching the cathode
D) cooling the medical device

12- Which of the following organelles in a living cell performs a function similar of the positive electrode in consuming oxygen and protons to produce water?

A) Mitochondria
B) Vacuole
C) Nucleus
D) Cell wall

13- Why are biofuel cells considered safe and clean implantable medical devices?

A) Because they only work in the dark
B) Because they are made of plastic
C) Because they use glucose as an energy source
D) Because they do not release any thermal energy

Essay

1- Explain: why traditional cancer treatments are called a double-edged sword.

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2- Explain: Nanomaterials have a higher capacity for chemical interaction.

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3- Explain the operating principle of Neural Nano-electrodes.

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4- Explain how nanotechnology can improve the efficiency of biofuel cells.

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Weekly Assessment

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المواد الدراسية

Lesson Five: Nanotechnology Applications and Biosphere Sustainability

Model (A)

Choose the correct answer:

1) Which of the following represents the most accurate explanation of the term "Nanotechnology"?

a) The study of dwarfs in ancient Greek times
b) The practical application of knowledge to control materials at the nanoscale
c) Measuring the lengths of materials using the traditional meter
d) The study of large molecules in their normal state

2) Which of the following properties does not typically change when matter is reduced to the nanoscale?

a) Electrical conductivity
b) Color
c) Melting point
d) Atomic mass of the element itself

3) "Nano-chips" implanted in the brain allow paralyzed patients to

a) walk by relying on their damaged muscles
b) see distant objects
c) Treat bone fractures
d) communicate via devices merely by thinking

4) The operating principle of Biofuel Cells is inspired by

a) wood combustion
b) wave movement
c) cellular respiration
d) solar energy

Essay Question

5- Explain the role of "blood glucose" and the sustainability of implanted medical devices.

Lesson Five: Nanotechnology Applications and Biosphere Sustainability

Model (B)

Choose the correct answer:

1) Why is nanotechnology considered a revolution in human interaction with the biosphere?

a) Because is increases the size of cells to be seen by the naked eye
b) Because it eliminates the need to study traditional chemistry
c) Because it relies only on radiation for treatment
d) Due to its ability to observe and control matter at the level of atoms and molecules

2) The change in material properties at the nanoscale is due to two main factors, which are

a) color and hardness
b) increase in the ratio of surface area to volume and quantum effects
c) melting point and electrical conductivity
d) atomic size and electron speed

3) Neural Nano-electrodes are used for

a) brainwashing b) cooling the Skull
c) recording neural signals and transmitting them to smart prosthetics limbs
d) increasing reading speed

4) The use of Nano-Gold in biofuel cells aims to

a) act as an electrical catalyst
b) prevent corrosion only
c) produce red light
d) make the device expensive

Essay Question

5- Explain: The classification of Quantum Dots based on their dimensions.

Lesson Five: Nanotechnology Applications and Biosphere Sustainability

Model (C)

Choose the correct answer

1) What is the result of one nanometer being one hundred thousand times smaller than the diameter of a human hair?

a) Inability to use it in medical applications
b) increase in the weight of materials when converted to the nanoscale
c) Nanomaterials possess unique properties not found in their normal states
d) Easy of seeing nanomaterials with a regular light microscope

2) Which of the following materials can be used as thin films?

a) Graphene
b) Gold nanoparticles
c) Porous materials
d) Nanowires

3) Carbon nanotubes are used in nerve treatment because they

a) kill bacteria in the nerve
b) transmit signals across the damaged area
c) give the nerve a distinctive color
d) reduce the nerve temperature

4) In a biofuel cell, glucose is oxidized at

a) the positive electrode (cathode)
b) inside the wires only
c) in the light lamp
d) negative electrode (anode)

Essay Question

5- Explain: The increase in hardness of Nano-copper compared to ordinary copper.