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الحديثة (2) سمي لنتحدث

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Modren Chemistry 2

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ملاحظة: زمن الامتحان ساعة واحدة – للإجابة على الأسئلة المؤتمتة والفراغات يرجى كتابة رموز الإجابات الصحيحة فقط (دون كتابة نص الأسئلة) في نفس الصفحة ولا تبعتها في الصفحات الأربعة.

First Question: Choose the correct answer (s) (50)

- 1- The origin, meaning and denotation of the prefix “ nano” is:
A)- French word meaning billion (10^{-9})
B)- Latin word meaning invisible (10^{-12})
☒ C)- Geek word meaning dwarf (thousand million)
D)- Spanish word meaning particle (10^{-12})
- 2- The frictional coefficient and hydrogen diffusion of Ni change as it is made in nanocrystalline form:
A)- The frictional coefficient increases twice and hydrogen diffusion becomes higher
☒ B)- The frictional coefficient decreases to half and hydrogen diffusion becomes higher
C)- The frictional coefficient increases twice and hydrogen diffusion becomes lower
D)- The frictional coefficient reduces to half and hydrogen diffusion becomes lower
- 3- Which of these historical works of art contain nanotechnology
A)- Lycurgus cup
B)- Scanning tunneling microscope
C)- Damascus steel swords
☒ D)- a) and c)
- 4- In 1990, by using scanning tunneling microscope, scientists at IBM positioned:
A)- Individual silver atoms on a nickel surface
☒ B)- Individual xenon atoms on a nickel surface
C)- Individual silver atoms on a silver surface
D)- Individual silver atoms on a xenon surface
- 5- A material with zero dimension in nano range is called
A)- Micro material
B)- Quantum wire
☒ C)- Quantum dot
D)- Quantum well
- 6- The general rule to determine if a compound can be separated by gas chromatography:
☒ A)- If it vaporizes without decomposition below 350 °C
B)- If it vaporizes without decomposition above 350 °C
C)- If it reacts without decomposition below 350 °C
D)- If it reacts without decomposition above 350 °C

What is the purpose of acid washing an inert phase

- ☒ A)- The hydronium ions react with nonbonding electrons of the oxygen and make it inert
B)- The hydronium compounds react with nonbonding electrons of the oxygen and make it inert
C)- The hydronium ions react with nonbonding electrons of the oxygen and make it active
D)- The hydronium ions react with bonding electrons of the oxygen and make it inert

8- What the a stationary phase used for in partition chromatography

- A)- It provides first phase for compounds to partition between it and the mobile phase
☒ B)- It provides second phase for compounds to partition between it and the mobile phase
C)- It provides second phase for compounds to partition between it and the solid phase
D)- It provides second phase for compounds to partition between it and the inert phase

9- To remove the problem of the oxygen (nonbonding electrons) of clay, which works an active site that can adsorb molecules

- A)- wash the material with a based
☒ B)- react the material with dichlorodimethylsilane
C)- react the material with dichlorodiphenyltrichloroethane
D)- wash the material with a based

Second Question: Fill the spaces with correct answer (24) كل مائة (2) علامة

(A) Elapsed (B) Ploughshares (C) Mobile (D) Centre (E) Discovery (F) Nitrogen (G) Clusters
(H) Retention (I) Semiconductor (J) Metals (K) Helium (L) Energies

- The ---- A ---- time between the injection and the ---D----- of a peak is called the ----H---- time t_r of that compound.
- The most common carrier gases (----C----phase) are ---K----- and -----F-----
- This -----E--- led to reduction of metal ores to produce ---J----- for the fabrication of items for -----B----- to swords.
- Quantum dots are ----G----- of atoms of -----I-----material, The electrons in this quantum dots have a range of -----L-----

Third Question: Write the full expression of these abbreviations (12)

1- FTIR 2 - F (dimension) 3- HETP 4 - DC

FTIR: Fourier transform infrared spectroscopy 4

F: Femto 2

HETP: Height equivalent to a theoretical plate 4

DC: Displacement Chromatography 2

Fourth Question; Translate from English to Arabic (14)

- The term 'nanotechnology' was first coined by Norio Taniguchi in 1974 to describe semiconductor processes such as thin film deposition and ion beam milling, where the features can be controlled at the nanometric level.

4
إن أول من ابتكر مصطلح (تقنية النانو) نوريوتانيغوتشي عام 1974 لوصف عمليات أنصاف النواقل مثلاً ترسيب الأفلام الرقيقة ومعالجة الشعاع الايوني, حيث يتم التحكم في السمات على مستوى النانو متر.

- As the emission frequency of a dot is dependent on the bandgap, it is possible to control the output wavelength of a dot with high precision.

3
نظراً لأن تردد الانبعاث لنقطة ما يعتمد على الفجوة الطاقية (الحزمة) ، فمن الممكن التحكم في الطول الموجي الناتج لنقطة بدقة عالية.

How do you remove mobile phase? This accomplish by heating the inert phase and desorbing the mobile phase. A few hours at 110 C⁰ is usually sufficient to reactive the inert phase.

3
كيف يمكنك إزالة الطور المتحرك؟ يتم تنفيذ ذلك بتسخين الطور الخامل و الانتزاز (عكس الامتزاز) الطور المتحرك. بضع ساعات عند الدرجة 110 مئوية عادة ما تكون كافية لإعادة تفعيل الطور الخامل.

- Small amounts of impurities in carrier gas can cause baseline problems (oil), reaction with a stationary phase (oxygen), and loss of sensitivity or several detectors (water), and hydrocarbons.

4
يمكن أن تسبب مقادير صغيرة من الشوائب الموجودة في الغاز الحامل بصعوبات (مشاكل) بخط الأساس, حيث أنه إما أن يكون هناك زيت أو تفاعل مع الطور الثابت (كان يتفاعل الأوكسجين مثلاً مع الطور الثابت) أو فقدان حساسية المكشافات عديدة (في حال وجود الماء) و وجود الفحوم الهيدروجينية.

Dr. Hanan Al chaghouri

Good Luck