Question Paper Name:	Advances in Chemistry and Physics of Materials
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Creation Date:	2019-03-30 20:10:04
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Advances in Chemistry and Physics of Materials

Group Number :	1
Group Id :	90958242
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Advances in Chemistry and Physics of Materials

Section Id :	90958242
Section Number :	1
Section type :	Online
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Number of Questions:	100
Number of Questions to be attempted:	100
Section Marks:	100
Display Number Panel:	Yes
Group All Questions:	No

Sub-Section Number:	1
Sub-Section Id:	90958244
Question Shuffling Allowed :	Yes

Question Number : 1 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following is an indirect bandgap semiconductor?

A. InAs

B. Si

C. GaAs

D. InP

Options :

1. A
2. B
3. C
4. D

Question Number : 2 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following semiconducting material is suitable for blue emission?

A. InAs

B. GaSb

C. GaAs

D. ZnO

Options :

1. A
2. B
3. C
4. D

Question Number : 3 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

When boron atoms are added to silicon, the Fermi level

A. shifts toward the conduction band

B. shifts towards the valance band

C. remains at the centre

D. none of these

Options :

1. A
2. B

4. D

Question Number : 4 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Fullerene, diamond and graphite are

A. allotropes of carbon

B. isomers of carbon

C. isochores of carbon

D. none of the above

Options :
1. A
2. B
3. C
4. D

Question Number : 5 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Which allotrope of carbon is a good conductor of electricity?

A. Graphite

B. Fullerenes

C. Diamond

D. All of these

Options :
1. A
2. B
3. C
4. D

Question Number : 6 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

wo identical atoms share electron pairs and exert a force on each other, then the bond formed is

A. non-polar covalent bond

B. polar covalent bond

C. double covalent bond

D. coordinate covalent bond

Options :

1. A
2. B
3. C
4. D

Question Number : 7 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Pure semiconductor behaves as_____ at absolute zero.

A. Conductor

B. Insulator

C. Semiconductor

D. none of these

Options :

1. A
2. B
3. C
4. D

Question Number : 8 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following compound semiconductor belongs to group II-VI?

A. CdS

B. GaN

C. GaAs

D. SiC

Options :

1. A
2. B

4. D

Question Number : 9 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Molecules in organic materials interact with each other through

A. covalent interactions

B. ionic interactions

C. weak intermolecular interactions

D. all of the above

Options :
1. A
2. B
3. C
4. D

Question Number : 10 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

A typical advantage of using organic materials in organic electronics is their

A. biodegradability

B. low cost

C. ease in structure diversification

D. all of the above

Options :
1. A
2. B
3. C
4. D

Question Number : 11 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

ic field-effect transistors can be fabricated in

A. four different configurations

B. two different configurations

C. three different configurations

D. any number of configurations

Options :

1. A
2. B
3. C
4. D

Question Number : 12 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Effective electrical diameter in the OFET devices

A. is fixed

B. varies with the source voltage

C. varies with drain voltage

D. varies with the gate voltage

Options :

1. A
2. B
3. C
4. D

Question Number : 13 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In the OFETs, the organic semiconductor layer can be deposited by

A. dropcasting

B. spin coating

C. thermal evaporation

D. all of the above

Options :

1. A

3. C
4. D

Question Number : 14 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Loss of planarity of repeated unit cells in a polymer may lead to

A. flexibility

B. hardness

C. non-uniformity in photophysical processes such as excitation

D. bending

Options :
1. A
2. B
3. C
4. D

Question Number : 15 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Among the oligoacenes, one of the most sought after organic semiconducting material is

A. tetracene

B. pentacene

C. hexacene

D. rubrene

Options :
1. A
2. B
3. C
4. D

Question Number : 16 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

n efficiency of the thieno[3,2-b]thiophene based organic semiconductors is due to

A. air stability

B. 2D charge transport

C. device stability for a prolonged period

D. all of the above

Options :

1. A
2. B
3. C
4. D

Question Number : 17 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Heterocirculenes are characterized by

A. structural planarity

B. high torsion angles

C. high dihedral angles

D. all of the above

Options :

1. A
2. B
3. C
4. D

Question Number : 18 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following properties attribute towards superior field-effect mobility?

A. Higher reorganization energy

B. Lower reorganization energy

C. Thermal stability

D. Photostability

Options :

1. A
2. B
3. C
4. D

Long hydrophobic substituents on small macrocyclic molecules assist in

A. supramolecular assembling

B. intermolecular stacking

C. solubilization

D. all of the above

Options :

1. A
2. B
3. C
4. D

Strong electron withdrawing groups on small molecules facilitate in

A. high on/off ratio

B. p-type charge transport

C. raising LUMO energy

D. electron injection

Options :

1. A
2. B
3. C
4. D

The key reaction leading to macrocyclization in tetrathia[22]porphyrin(2.1.2.1)s is

A. McMurry coupling

B. Wittig reaction

C. Knoevenagel reaction

D. HVZ reaction

2. B
3. C
4. D

Question Number : 22 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Loss of 2 electrons due to the oxidation process can be visualized by using which of the following technique?

A. FTIR

B. EPR

C. CV

D. All of the above

Options :
1. A
2. B
3. C
4. D

Question Number : 23 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

OFET devices based on co-crystals of tetrathia[22]porphyrins with fullerenes exhibit

A. flexibility

B. p-type charge transport

C. ambipolar charge transport

D. n-type charge transport

Options :
1. A
2. B
3. C
4. D

Question Number : 24 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

OFET devices based on tetrathia[22]porphyrins with 7,7',8,8'-tetracyanoquinodimethane, the latter act as

A. n-type semiconductor

B. p-type semiconductor

C. ambipolar semiconductor

D. gate dielectric

Options :

1. A
2. B
3. C
4. D

Question Number : 25 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Reducing gas has

A. low oxidation number

B. is usually hydrogen rich

C. both (a) and (c)

D. none of these

Options :

1. A
2. B
3. C
4. D

Question Number : 26 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following properties makes graphene based materials good candidates for sensing applications?

A. Large surface to volume ratio

B. Excellent electrical conductivity

C. Both (a) and (b)

D. None of these

Options :

1. A
2. B

4. D

Question Number : 27 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Gas sensing properties of phthalocyanines based chemiresistors depend upon

A. nature of metal ion

B. nature of substitutions at peripheral sites

C. nature of substitutions at non-peripheral sites

D. all of these

Options :
1. A
2. B
3. C
4. D

Question Number : 28 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Metal oxide based chemiresistive sensors generally operate at

A. room temperature

B. high temperature

C. below room temperature

D. none of the above

Options :
1. A
2. B
3. C
4. D

Question Number : 29 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

is the amount of solar insolation

A. outside atmosphere

B. at equator

C. at a place with sun at zenith

D. at poles

Options :

1. A
2. B
3. C
4. D

Question Number : 30 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

EM radiation by sun is emitted from

A. Photosphere

B. Protosphere

C. Crona

D. Chromosphere

Options :

1. A
2. B
3. C
4. D

Question Number : 31 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Under normal sunlight conditions, _____ recombination dominates.

A. surface

B. Auger

C. Shockley-Read-Hall (SRH)

D. none of these

Options :

1. A
2. B

4. D

Question Number : 32 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

If the saturation current density increase, open circuit voltage will

A. decrease

B. also increase

C. first decrease than increase

D. none of these

Options :
1. A
2. B
3. C
4. D

Question Number : 33 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

In a typical solar cell, series resistance should be

A. as small as possible

B. as large as possible

C. operating point dependent

D. none of these

Options :
1. A
2. B
3. C
4. D

Question Number : 34 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

r cells to work at maximum efficiency, the ideal band gap of the material should be

A. <1 eV

B. 1-2 eV

C. >2 eV

D. 5 eV

Options :

1. A
2. B
3. C
4. D

Question Number : 35 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

_____ material is used for single layer antireflection coating.

A. Zinc sulphide

B. Silicon nitride

C. Zinc fluoride

D. none of these

Options :

1. A
2. B
3. C
4. D

Question Number : 36 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

I_{sc} is determined by

A. equilibrium carrier concentration

B. non-equilibrium carrier concentration

C. emitter doping

D. base doping

Options :

1. A
2. B

4. D

Question Number : 37 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Buried contact solar cells are _____ % more efficient than screen printed solar cells.

A. 5

B. 25

C. 100

D. 200

Options :
1. A
2. B
3. C
4. D

Question Number : 38 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Emitter thickness in silicon solar cells is ≈ _____ μm.

A. 100

B. 1000

C. 0.001

D. 1

Options :
1. A
2. B
3. C
4. D

Question Number : 39 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

abundant low-cost carbon-based materials (CNTs and graphene) based counter electrodes in DSSCs are compatible with

A. liquid electrolytes

B. solid electrolytes

C. gel-based electrolytes

D. all of the above

Options :

1. A
2. B
3. C
4. D

Question Number : 40 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Hole transporting layers have been proposed to overcome the

A. instability of liquid electrolytes

B. recombination of electrons

C. electrolyte leakage

D. all of the above

Options :

1. A
2. B
3. C
4. D

Question Number : 41 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Imidazole has been regarded as the best hole transporting layer because of its properties including

A. amorphous nature

B. solubility

C. both (a) and (b)

D. none of these

Options :

1. A
2. B

4. D

Question Number : 42 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

The use of rGO/Ag or rGO/MoS_2 nps as CE in DSSCs enhances the

A. transparency of DSSCs

B. oxidation and reduction reaction at CE and electrolyte interface

C. both (a) and (b)

D. none of these

Options :
1. A
2. B
3. C
4. D

Question Number : 43 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

The power conversion efficiency of DSSCs can be enhanced by

A. inhibiting the charge recombinations

B. increasing absorption ability of dye molecules

C. fastening electron charge transport

D. all of the above

Options :
1. A
2. B
3. C
4. D

Question Number : 44 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

...ping of rare earth metals in TiO_2 semiconductor brings

A. higher absorption coefficient

B. luminescence conversions

C. less recombination rate

D. non-luminescent conversions

Options :

1. A
2. B
3. C
4. D

Question Number : 45 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following is/are used as down conversion phosphors?

A. Eu^{3+}

B. Er^{3+}

C. Both (a) and (b)

D. None of these

Options :

1. A
2. B
3. C
4. D

Question Number : 46 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In DSSCs, photons are absorbed by

A. dye molecules

B. platinum counter electrode

C. TiO_2 semiconductor

D. electrolyte

Options :

1. A

3. C
4. D

Question Number : 47 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

V_{OC} in DSSCs is defined as the difference between fermi energy level of photoanode and the

A. redox potential of electrolyte

B. HOMO level of dye molecules

C. platinum counter electrode potential

D. LUMO level of dye molecules

Options :
1. A
2. B
3. C
4. D

Question Number : 48 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Incorporation of mesoporous silica in TiO_2 leads to

A. reduced electron hole recombination

B. scattering of absorbed light

C. generation of large number of charge carriers

D. all of the above

Options :
1. A
2. B
3. C
4. D

Question Number : 49 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Electrodes used in Li-ion batteries are made from

A. carbon and lithium sulphide

B. $LiCoO_2$ and carbon

C. Li and graphite

D. copper and graphite

Options :

1. A
2. B
3. C
4. D

Question Number : 50 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Supercapacitors have

A. higher energy density than batteries

B. lesser energy density than batteries

C. lesser energy density than superconductors

D. all the above

Options :

1. A
2. B
3. C
4. D

Question Number : 51 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Flat plate solar collector systems are used for

A. water heating applications

B. generating electricity

C. energy storage

D. converting solar energy into chemical energy

Options :

1. A

3. C
4. D

Question Number : 52 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Electric power generated by wind turbines depend upon

A. wind speed

B. wind density

C. area of blades of the turbine

D. all the above

Options :
1. A
2. B
3. C
4. D

Question Number : 53 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Float glass is

A. transparent to visible light

B. transparent to ultraviolet radiation

C. transparent to infrared radiation

D. opaque to visible light but transparent to infrared radiation

Options :
1. A
2. B
3. C
4. D

Question Number : 54 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

nuclear fission reactor,

A. control rods cannot absorb neutrons

B. heavy water slows down the neutrons

C. heavy water increases the speed of neutrons

D. all the above

Options :

1. A
2. B
3. C
4. D

Question Number : 55 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Lithium-ion batteries

A. use a non-aqueous electrolyte

B. are cheaper than lead-acid batteries

C. have higher energy density than lead-acid batteries

D. both (a) and (c)

Options :

1. A
2. B
3. C
4. D

Question Number : 56 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In a capacitor, the dielectric material can be made from

A. paper

B. copper

C. mica

D. both (a) and (c)

Options :

1. A
2. B

4. D

Question Number : 57 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

The spin-orbit coupling strength in MoS_2 and WS_2 is of the order of, _____, respectively.

A. 10 meV and 40 meV

B. 400 meV and 100 meV

C. 140 meV and 400 meV

D. 40 meV and 10 meV

Options :
1. A
2. B
3. C
4. D

Question Number : 58 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Which of the following polytype is metallic in nature?

A. Trigonal prismatic (1T)

B. Hexagonal (2H)

C. Rhombohedral (3R)

D. None of these

Options :
1. A
2. B
3. C
4. D

Question Number : 59 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Spin-orbit coupling strength in WS_2 is larger than MoS_2, because

A. atomic size of W is smaller than Mo

B. atomic size of W is larger than Mo

C. number of free electrons are larger in W than in Mo

D. none

Options :

1. A
2. B
3. C
4. D

Question Number : 60 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Thermal ablation can be used to obtain monolayer. Which of the following is correct for thermal ablation?

A. It is a non-destructive technique

B. Better thermal transfer between layers allow ablation of upper layers

C. Poor thermal transfer between layers allow ablation of upper layers

D. None of these

Options :

1. A
2. B
3. C
4. D

Question Number : 61 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Spin-orbit coupling arises due to

A. interaction of electron with external field

B. interaction of electron with internal field arising due to spin motion

C. interaction of electron spin with internal field arising due to orbital motion of electron

D. None of these

Options :

1. A
2. B
3. C

Question Number : 62 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following relationship between responsivity (R) and quantum efficiency (η) for photo detection is correct, where symbols have their usual meaning?

A. $R = \lambda\eta$

B. $R = \lambda/\eta$

C. $R = \frac{\eta}{\lambda}$

D. $R = \eta e/h\nu$

Options :

1. A
2. B
3. C
4. D

Question Number : 63 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The maximum reported value of photoresponsivity (A/W) of MoS_2 phototransistor is of the order of

A. 150

B. 250

C. 550

D. 850

Options :

1. A
2. B
3. C
4. D

Question Number : 64 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

ocaloric effect is the entropy exchange between the two energy states under

A. isothermal condition

B. adiabatic condition

C. isobaric condition

D. isochoric condition

Options :

1. A
2. B
3. C
4. D

Question Number : 65 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Thermodynamics of ECE/MCE can be easily understood by

A. thermocouple and thermometer

B. infrared camera

C. scanning thermal microscopy

D. indirect measurements

Options :

1. A
2. B
3. C
4. D

Question Number : 66 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The measurements of the caloric effect can be easily made from the

A. first order transition

B. second order transition

C. both (a) and (b)

D. none of these

Options :

1. A
2. B
3. C

Question Number : 67 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Radioluminescence refers to the emission of light as a result of

A. chemical reaction

B. passage of an electric current

C. catalytic activity

D. none of the above

Options :

1. A
2. B
3. C
4. D

Question Number : 68 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In the displacement approach, the receptor and the fluorophore

A. are covalently bonded

B. form a molecular ensemble

C. form a stable compound

D. none of the above

Options :

1. A
2. B
3. C
4. D

Question Number : 69 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The emission band of excimer in contrast to monomer emission is

A. blueshifted

B. redshifted

C. hyperchromically shifted

D. both (b) and (c)

Options :

1. A
2. B
3. C
4. D

Question Number : 70 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

TDI was synthesized from naphthalene monoimides and perylene monoimides using

A. cross-coupling

B. cross-coupling/dehydrogenation

C. acid promoted cyclization

D. base promoted cyclization

Options :

1. A
2. B
3. C
4. D

Question Number : 71 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Buchwald-Hartwig amination can be used for synthesis of _____ annulated PDIs.

A. N-heterocyclic

B. O-heterocyclic

C. S-heterocyclic

D. all of the above

Options :

1. A
2. B
3. C

Question Number : 72 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

N,N'-dialkyl PDIs without core substitution shows _____ reduction waves.

A. two irreversible

B. one irreversible

C. two reversible

D. one reversible

Options :
1. A
2. B
3. C
4. D

Question Number : 73 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Visualization of minutiae points such as core, lake, delta, ridge dot etc. indicate _____ of information.

A. 4^{th} level

B. 3^{rd} level

C. 2^{nd} level

D. 1^{st} level

Options :
1. A
2. B
3. C
4. D

Question Number : 74 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

PDI that contains phenylboronic acid moieties at ammonium nitrogen is effective chirality sensor for

A. α-hydroxy carbonates

B. α-hydroxy sulphates

C. α-hydroxy phosphates

D. α-hydroxy carboxylates

2. B
3. C
4. D

Question Number : 75 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Acronym of ESIPT stands for

A. excited state induced proton transfer

B. excited state intermolecular proton transfer

C. energetic state intermolecular proton transfer

D. excited state intramolecular proton transfer

Options :
1. A
2. B
3. C
4. D

Question Number : 76 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

PDI-SDS can be used as an ensemble for detection of

A. spermine

B. ethylenediamine

C. bleomycin

D. trimethylamine

Options :
1. A
2. B
3. C
4. D

Question Number : 77 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Fluorescein labeled (FAM) ssDNA based ensemble can be used for fluorescence detection of

A. lysozyme

B. cysteine

C. bleomycin

D. avidin proteins

Options :

1. A
2. B
3. C
4. D

Question Number : 78 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following strategy is highly promising to reduce the metastasis of many types of cancer?

A. Direct eradication of cancer cells with PTT alone

B. Imaging-guided PTT

C. Efficient combination of PTT with current treatment modalities

D. All of the above

Options :

1. A
2. B
3. C
4. D

Question Number : 79 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Asialoglycoprotein receptor is overexpressed in _____ cells as an important element of some tumors.

A. HepG2

B. HT-29

C. Caco-2

D. all of the above

Options :

1. A
2. B

4. D

Question Number : 80 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

_____ is the best size for amphiphilic PDI derivative for differentiating popliteal and sciatic LNs.

A. 100 nm

B. 150 nm

C. 200 nm

D. 300 nm

Options :
1. A
2. B
3. C
4. D

Question Number : 81 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

When rylene diimide derivatives are used as sensitizers in DSSC, _____ group help to anchor them onto SnO_2.

A. carboxylic acid

B. anhydride

C. both (a) and (b)

D. none of the above

Options :
1. A
2. B
3. C
4. D

Question Number : 82 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

itate water oxidation reactions, co-catalysts are introduced onto the surface of the

photocatalysts which helps to

A. accommodate electrons

B. accommodate holes

C. both (a) and (b)

D. none of the above

Options :

1. A
2. B
3. C
4. D

Question Number : 83 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Shikimic acid ethyl ester is an intermediate in the production of

A. Tamilu

B. Protic-ionic liquids

C. Molten salts

D. none of the above

Options :

1. A
2. B
3. C
4. D

Question Number : 84 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

MIC means

A. Maximum Inhibitory Concentration

B. Minimum Inhibitory Concentration

C. Minimum Ionic Concentration

D. Maximum Ionic Concentration

Options :

1. A

3. C
4. D

Question Number : 85 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

The use of ionic liquids in DSSCs

A. improves the efficiency of DSSCs

B. reduces the efficiency of a DSSC

C. has no effect on the efficiency of DSSCs

D. none of the above

Options :
1. A
2. B
3. C
4. D

Question Number : 86 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

PEMFC in relation to fuel cells mean

A. potential energy map of fuel cells

B. proton exchange membrane fuel cells

C. proton exchange mapping of fuel cells

D. none of these

Options :
1. A
2. B
3. C
4. D

Question Number : 87 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

luced polarisation is directly proportional to the applied electric field in a

A. nonlinear medium

B. linear medium

C. both (a) and (b)

D. none of the above

Options :

1. A
2. B
3. C
4. D

Question Number : 88 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In non-centrosymmetric materials, the induced polarisations in + and – directions are

A. different

B. identical

C. not present

D. none of the above

Options :

1. A
2. B
3. C
4. D

Question Number : 89 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The magnitude of hyperpolarizability in the systems with borazine linkers in comparison to benzene linkers is

A. large

B. small

C. similar

D. small and negligible

Options :

1. A
2. B
3. C

Question Number : 90 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The total electrons to be filled in the energy levels of ferrocene are

A. 14

B. 16

C. 18

D. 20

Options :

1. A
2. B
3. C
4. D

Question Number : 91 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In the ferrocene based systems, which of the following acceptors will induce large NLO activity?

A. NO_2

B. CHO

C. pyridine

D. None of these

Options :

1. A
2. B
3. C
4. D

Question Number : 92 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

"EFISH" NLO technique, the molecule

A. should ionise in solution

B. should not ionise in solution

C. may or may not ionise in solution

D. should not possess a permanent dipole moment

Options :

1. A
2. B
3. C
4. D

Question Number : 93 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The material capable of second harmonic generation converts red light of Nd-YAG laser into

A. blue light

B. yellow light

C. green light

D. white light

Options :

1. A
2. B
3. C
4. D

Question Number : 94 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Upon the third harmonic generation, the laser light of 384 THz would be converted into

A. light of 1152 THz

B. light of 768 THz

C. light of 780 THz

D. none of these

Options :

1. A
2. B
3. C

Question Number : 95 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Reverse saturable absorption is shown by a nonlinear absorber in which

A. ground state absorption is larger than the excited state

B. ground state absorption is lower than the excited state

C. absorption takes place only in the excited state

D. absorption takes place only in the ground state

Options :

1. A
2. B
3. C
4. D

Question Number : 96 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Molecular hardness can be determined by using

A. Boltzmann equation

B. Doppler equations

C. Maxwell's equations

D. Koopman theorem

Options :

1. A
2. B
3. C
4. D

Question Number : 97 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

ochromism in ferrocene-based donor-acceptor dyads is larger in

A. low energy bands

B. high energy bands

C. bands due to the pi system

D. the acceptor moiety

Options :

1. A
2. B
3. C
4. D

Question Number : 98 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Redox switching of ferrocene-based chromophores influence

A. HOMO-LUMO bands

B. pi-pi* bands

C. metal to ligand charge transfer bands

D. internal charge transfer bands

Options :

1. A
2. B
3. C
4. D

Question Number : 99 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Quadratic hyperpolarizability

A. is directly proportional to the difference in transition dipole moments of the ground and excited state

B. is inversely proportional to the difference in transition dipole moments of the ground and excited state

C. does not depend on the transition dipole moment

D. none of these

Options :

2. B
3. C
4. D

Question Number : 100 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Centrosymmetric molecules can also show quadratic hyperpolarizability when

A. they have distorted planarity

B. they are embedded in a non-centrosymmetric medium

C. both (a) and (b) are correct

D. none of these

Options :
1. A
2. B
3. C
4. D