

परीक्षेचे नांव : सहायक प्राध्यापक, रसायनशास्त्र, अस्वायत्त शासकीय अभियांत्रिकी महाविद्यालय,
महाराष्ट्र अभियांत्रिकी महाविद्यालयीन शिक्षक सेवा, गट -अ, चाळणी परीक्षा-2014
परीक्षेचा दिनांक : 27 जुलै, 2014

महाराष्ट्र लोकसेवा आयोगामार्फत सहायक प्राध्यापक, रसायनशास्त्र, अस्वायत्त शासकीय अभियांत्रिकी महाविद्यालय, महाराष्ट्र अभियांत्रिकी महाविद्यालयीन शिक्षक सेवा, गट -अ, चाळणी परीक्षा-२०१४ या चाळणी परीक्षेच्या प्रश्नपत्रिकेची उत्तरतालिका उमेदवारांच्या माहितीसाठी संकेतस्थळावर प्रसिध्द करण्यात आली होती. उमेदवारांनी अधिप्रमाणित (Authentic) स्पष्टीकरण / संदर्भ देऊन पाठविलेली लेखी निवेदने, तसेच तज्ज्ञांचे अभिप्राय विचारात घेऊन आयोगाने उत्तरतालिका सुधारित केली आहे. या उत्तरतालिकेतील उत्तरे अंतिम समजण्यात येतील. यासंदर्भात आलेली निवेदने विचारात घेतली जाणार नाहीत व त्याबाबत कोणताही पत्रव्यवहार केला जाणार नाही, याची कृपया नोंद घ्यावी.

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उत्तरतालिका - KEY

Question Paper Preview

Notations:

- Options shown in green color and with ✓ icon are correct.
 - Options shown in red color and with ✗ icon are incorrect.
- Question Paper Name: Assistant Professor Chemistry ACTUAL final
 - Creation Date: 2014-07-23 14:07:02
 - Cut Off: 10
 - Duration: 60
 - Number of Questions: 100
 - Status: Sealed

Group 1

Number of optional sections to be attempted: 0, Group Maximum duration : 0, Group Minimum duration : 60,
Revisit allowed for view? : No, Revisit allowed for edit? : No, Break time: 0

Assistant Professor Chemistry

Section type : Online, Number of Questions to be attempted:100, Mandatory or Optional: Mandatory

Subsection : 1, Question Shuffling Allowed : No

Q.1 Question id : 8513 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

The correct range of wavelengths of visible region in the electromagnetic spectrum is :

Options :

- ✗ 100 – 200 nm
- ✗ 100 – 400 nm
- ✓ 380 – 780 nm
- ✗ 480 – 580 nm

Q.2 Question id : 8514 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

According to Hooke's law, the stretching vibrational frequency ($\bar{\nu}$) of a bond is represented by which of the following equation?

Options :

- ✓ $\bar{\nu} = \frac{1}{2\pi c} \sqrt{K/\mu}$

2. ✘ $\bar{\nu} = \frac{1}{4\pi c} \sqrt{K/\mu}$

3. ✘ $\bar{\nu} = 2\pi c / \sqrt{K\mu}$

4. ✘ $\bar{\nu} = 2\pi c / K\mu$

Q.3 Question id : 8515 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

NMR spectra of which of the following compound will give two proton signals?

Options :

1. ✔ 2 - Chloropropane

2. ✘ 1 - Chloropropane

3. ✘ 2 - Bromopropene

4. ✘ Vinyl chloride

Q.4 Question id : 8516 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following spectroscopy technique is used to elucidate structure especially of conjugated molecules?

Options :

1. ✘ Mass spectroscopy

2. ✘ Infrared spectroscopy

3. ✘ NMR spectroscopy

4. ✔ Ultraviolet spectroscopy

Q.5 Question id : 8517 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

A Polymer sample contains 30 percent molecules of molecular mass 20,000; 40 percent molecules of molecular mass 30,000 and the rest molecules of molecular mass 60,000. The value of PDI of this polymer is:

Options :

1. ✘ 2.106

2. ✔ 1.204

3. ✘ 1.240

4. ✘ 0.837

Q.6 Question id : 8518 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following is correct for Ziegler- Natter polymers ?

Options :

1. ✘ They are linear with 70 percent branching
2. ✔ They are linear and have practically no chain branching
3. ✘ They are linear with 30 percent branching
4. ✘ They are stereo-chemically uncontrollable

Q.7 Question id : 8519 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)
Cationic polymerization is fastest in which of the following?

Options :

1. ✔ 2 – methylpropene
2. ✘ 2 – Chloroprene
3. ✘ Butene – 1
4. ✘ Butene – 2

Q.8 Question id : 8520 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)
Which of the following ion is not aromatic in character?

Options :

1. ✘ Cyclopentadienyl anion
2. ✘ Cycloheptatrienyl cation
3. ✔ Cyclopentadienyl cation
4. ✘ Cyclopropenyl cation

Q.9 Question id : 8521 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)
Which of the following is correct for annulenes?

Options :

1. ✔ 1. They are monocyclic conjugated polyenes containing ten or more carbon atoms in the ring
2. ✘ 2. They are bicyclic conjugated polyenes containing ten or more carbon atoms in the ring

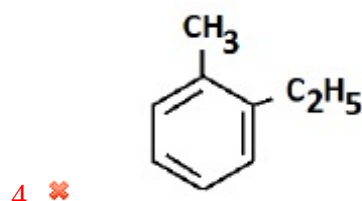
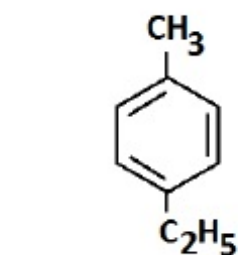
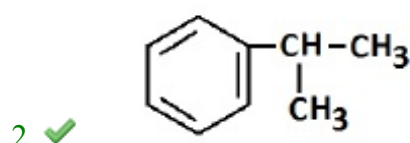
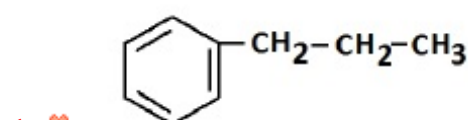
3. ✖ They are tricyclic conjugated polyenes containing more than ten carbon atoms in the ring

4. ✖ They are monocyclic conjugated polyenes containing eight carbon atoms in the ring

Q.10 Question id : 8522 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

The major product obtained by the reaction of benzene with 1 – Bromopropane in the presence of FeBr_3 is:

Options :



Q.11 Question id : 8523 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Out of lactic acid, 2–Bromobutane, 2–methylcyclohexanone and methylcyclohexane, achiral molecule is :

Options :

1. ✖ Lactic acid

2. ✔ Methylcyclohexane

3. ✖ 2–Bromobutane

4. ✖ 2–Methylcyclohexanone

Q.12 Question id : 8524 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

. Which of the following does not hold good for $[\alpha]_D$, the specific rotation of a compound?

Options :

1. ✘ Sample pathlength (l) is 1 decimeter
2. ✘ Sample concentration C is 1g/mL
3. ✔ Sample pathlength (l) is 1 meter
4. ✘ Light of 589 nanometer (nm) wavelengths is used

Q.13 Question id : 8525 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following is correct for mesotartaric acid?

Options :

1. ✘ It is monohydroxydicarboxylic acid
2. ✘ It is optically inactive due to external compensation
3. ✘ It is optically active due to internal compensation
4. ✔ It is optical inactive due to internal compensation

Q.14 Question id : 8526 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Correct decreasing order of stability of different conformations of cyclohexane is :

Options :

1. ✘ Twist form > Boat form > Chair form > Half chair form
2. ✔ Chair form > Twist form > Boat form > Half chair form
3. ✘ Half chair form > Boat form > Twist form > Chair form
4. ✘ Chair form > Half chair form > Boat form > Twist form

Q.15 Question id : 8527 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following is not correct for pericyclic reactions?

Options :

1. ✘ They are single stage concerted reactions
2. ✘ They are intramolecular electrocyclic reactions

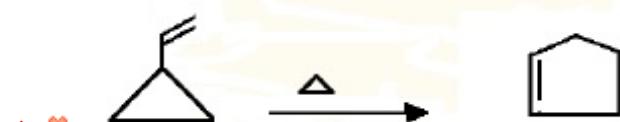
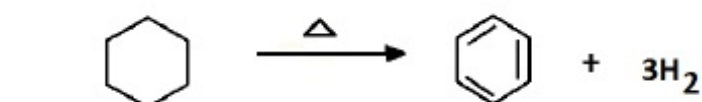
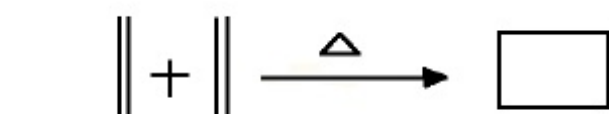
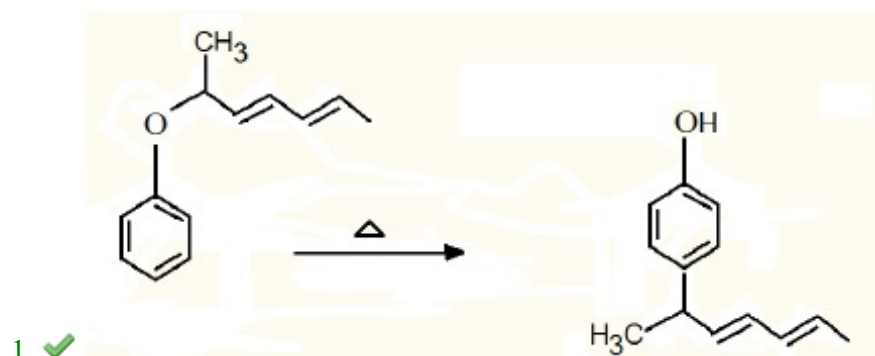
3. ✘ They are cycloaddition reactions

4. ✔ They are shown only by alicyclic compounds

Q.16 Question id : 8528 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following is the example of sigmatropic change?

Options :



Q.17 Question id : 8529 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Cope rearrangement is exhibited by:

Options :

1. ✘ Conjugated dienes

2. ✔ Biallylic hydrocarbons

3. ✘ Conjugated trienes

4. ✘ γ -alkylallylaryl ethers

Q.18 Question id : 8530 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Thiophene is synthesized industrially by cyclisation of:

Options :

1. ✘ Butene – 1
2. ✘ Butene – 2
3. ✔ 1,3 – Butadiene
4. ✘ 1,4 – Pentadiene

Q.19 Question id : 8531 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

The usual reactivity order of pyrrole, furan, and thiophene towards electrophilic substitution reactions is :

Options :

1. ✘ Thiophene > Pyrrole > Furan
2. ✔ Furan > Pyrrole > Thiophene
3. ✘ Pyrrole > Furan > Thiophene
4. ✘ Thiophene > Furan > Pyrrole

Q.20 Question id : 8532 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following reaction is not involved during kraup synthesis of quinoline?

Options :

1. ✘ Dehydration
2. ✘ 1:4 addition
3. ✔ Hydrogenation
4. ✘ Cyclisation

Q.21 Question id : 8533 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Benzopyrrole has:

Options :

1. ✔ 4 π and 17 σ bonds
2. ✘ 4 π and 16 σ bonds
3. ✘ 3 π and 17 σ bonds
4. ✘ 4 π and 18 σ bonds

Q.22 Question id : 8534 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following is correct for killiani- Fischer Synthesis?

Options :

1. ✓ Reaction of aldose with HCN followed by hydrolysis and reduction
2. ✗ Reaction of aldose with KCN followed by hydrolysis and oxidation
3. ✗ Reaction of aldose with HCN followed by hydrolysis and oxidation
4. ✗ Reaction of ketose with HCN followed by hydrolysis and reduction

Q.23 Question id : 8535 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following hormone contains a benzene like aromatic ring?

Options :

1. ✗ Testosterone
2. ✗ Androsterone
3. ✗ Androstenedione
4. ✓ Estrone

Q.24 Question id : 8536 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Main components of plant essential oils are:

Options :

1. ✗ Carbohydrates
2. ✓ Terpenes
3. ✗ Steroids
4. ✗ Proteins

Q.25 Question id : 8537 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following α - amino acid has the lowest value of isoelectric points ?

Options :

1. ✗ Glutamic acid
2. ✗ Glycine
3. ✓ Aspartic acid

4. ✘ Cysteine

Q.26 Question id : 8538 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following is not present in DNA?

QUESTION CANCELLED

Q.27 Question id : 8539 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following is not correct for enzymes?

Options :

1. ✘ Enzymes are colloidal in nature

2. ✔ They usually contain C, H, N and halogens

The optimum temperature for enzymatic action is

3. ✘ between 20 - 40°C

The optimum pH for most of the enzyme actions is about 7

4. ✘

Q.28 Question id : 8540 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following does not belong to the category of proteins ?

Options :

1. ✘ Hair

2. ✘ Skin

3. ✘ Pulses

4. ✔ Sodium palmitate

Q.29 Question id : 8541 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Efficiency of a photochemical reaction is generally measured in terms of:

Options :

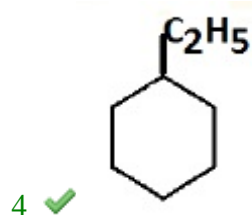
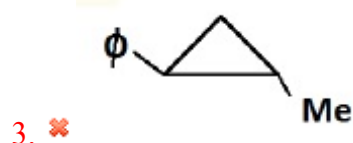
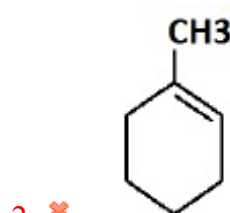
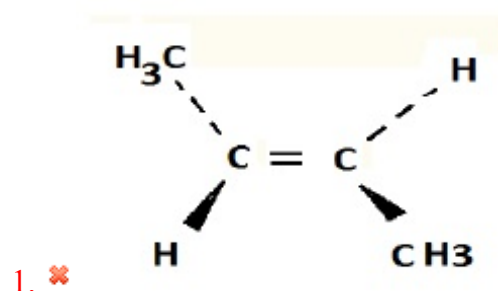
1. ✘ Primary quantum yield

2. ✘ Secondary quantum yield
3. ✘ Tertiary quantum yield
4. ✔ Overall quantum yield

Q.30 Question id : 8542 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Cis-trans isomerization is not shown by which of the following compound?

Options :



Q.31 Question id : 8543 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

The product obtained by reaction of benzene with excess of chlorine in the presence of sunlight is:

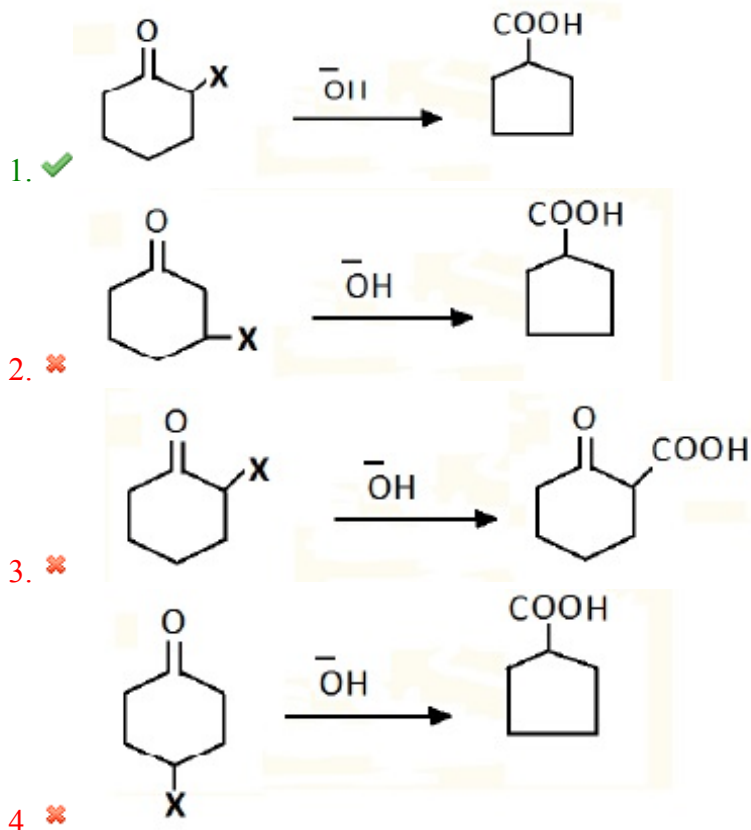
Options :

1. ✔ BHC
2. ✘ C_6H_5Cl
3. ✘ 1,4 - Dichlorobenzene
4. ✘ Hexachlorobenzene

Q.32 Question id : 8544 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following is correct for Favorski reaction?

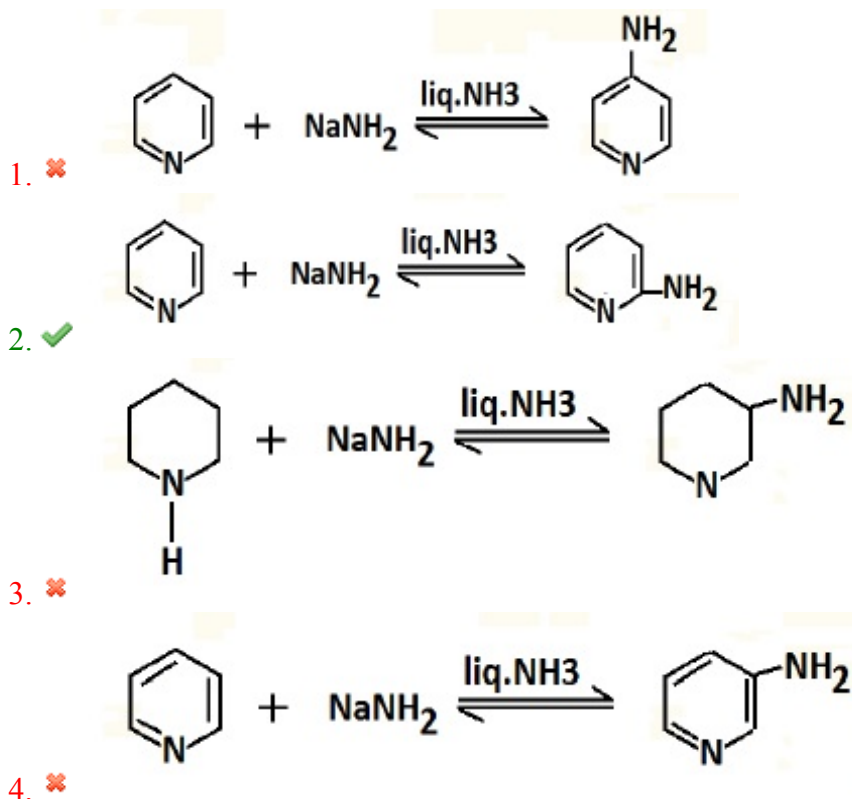
Options :



Q.33 Question id : 8545 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following is the correct representation of chichibabin reaction?

Options :



Q.34 Question id : 8546 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

. The intermediate ion formed during Mannich reaction is:

Options :

1. ✘ Carbanion
2. ✘ Aminoocarbanion
3. ✔ Aminocarocation
4. ✘ Anilinium ion

Q.35 Question id : 8547 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)
Which of the following is the correct decreasing order of stability of carbocations?

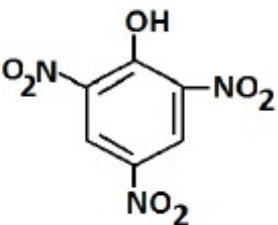
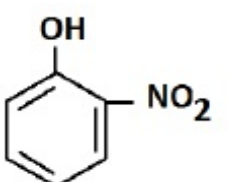
Options :

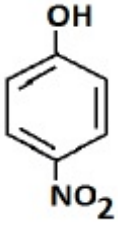
1. ✘ $(\text{CH}_3)_3\overset{+}{\text{C}} > \text{CH}_3\text{CH}_2\text{CH}_2\overset{+}{\text{C}}\text{H}_2 > (\text{CH}_3)_2\overset{+}{\text{C}}\text{H}$
2. ✘ $(\text{CH}_3)_2\overset{+}{\text{C}}\text{H} > \text{CH}_3\text{CH}_2\text{CH}_2\overset{+}{\text{C}}\text{H}_2 > (\text{CH}_3)_3\overset{+}{\text{C}}$
3. ✘ $(\text{CH}_3)_2\overset{+}{\text{C}}\text{H} > (\text{CH}_3)_3\overset{+}{\text{C}} > \text{CH}_3\text{CH}_2\text{CH}_2\overset{+}{\text{C}}\text{H}_2$
4. ✔ $(\text{CH}_3)_3\overset{+}{\text{C}} > (\text{CH}_3)_2\overset{+}{\text{C}}\text{H} > \text{CH}_3\text{CH}_2\text{CH}_2\overset{+}{\text{C}}\text{H}_2$

Q.36 Question id : 8548 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

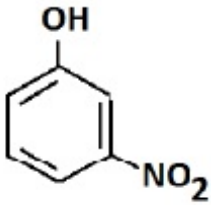
Which of the following is the strongest acid?

Options :

1. ✔ 
2. ✘ 



3. ✘



4. ✘

Q.37 Question id : 8549 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following is correct decreasing order of pK_b values for different acids?

QUESTION CANCELLED

Q.38 Question id : 8550 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

pH of 10^{-8} M HCl Solution is :

Options :

1. ✘ 8

2. ✘ 6

3. ✘ 7.6

4. ✔ between 6 and 7

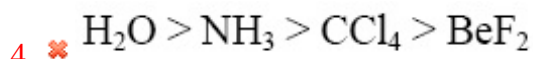
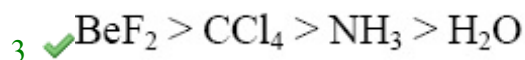
Q.39 Question id : 8551 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following is correct decreasing bond angle order?

Options :

1. ✘ $\text{NH}_3 > \text{H}_2\text{O} > \text{CCl}_4 > \text{BeF}_2$

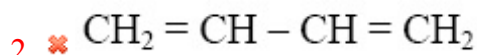
2. ✘ $\text{CCl}_4 > \text{H}_2\text{O} > \text{NH}_3 > \text{BeF}_2$



Q.40 Question id : 8552 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following has sp^3 hybridization?

Options :



Q.41 Question id : 8553 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following equation is used for calculation of frequency (ν) associated with the absorption and emission of the photon?

Options :

1. ✗ $\nu = R_H \times h \left[\frac{1}{n_1^2} - \frac{1}{n_f^2} \right]$

2. ✗ $\nu = \frac{R_H}{h} \left[\frac{1}{n_f^2} - \frac{1}{n_1^2} \right]$

3. ✓ $\nu = \frac{R_H}{h} \left[\frac{1}{n_1^2} - \frac{1}{n_f^2} \right]$

4. ✗ $\nu = R_H \times h \left[\frac{1}{n_f^2} - \frac{1}{n_1^2} \right]$

Q.42 Question id : 8554 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

The orbital with quantum number $n = 5$ and $l = 3$ is:

Options :



Q.43 Question id : 8555 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Correct order of orbitals with increasing energy is :

Options :

1. ✘ $3s < 3p < 4s < 3d$
2. ✘ $4s < 3d < 3p < 3s$
3. ✔ $3s < 3p < 3d < 4d$
4. ✘ $3d < 3p < 3s < 4s$

Q.44 Question id : 8556 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Heisenberg uncertainty principle is represented by:

Options :

1. ✘ $\Delta p \Delta x = \frac{1}{8} \left(\frac{\hbar}{2\pi} \right)$
2. ✘ $\Delta p \Delta x = \frac{1}{4} \left(\frac{2\pi}{\hbar} \right)$
3. ✘ $\Delta p \Delta x \geq \frac{1}{4} \left(\frac{\hbar}{2\pi} \right)$
4. ✔ $\Delta p \Delta x \geq \frac{1}{2} \left(\frac{\hbar}{2\pi} \right)$

Q.45 Question id : 8557 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the assumption is wrong for Born-oppenheimer approximation?

Options :

1. ✔ Molecular nuclei move fast
2. ✘ Molecular nuclei move slowly
3. ✘ Molecular nuclei may be treated as stationery
4. ✘ Electrons move in their field

Q.46 Question id : 8558 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following is wrong for time independent perturbation theory?

Options :

1. ✘ All the terms in the denominator are negative
2. ✘ All the terms in the numerator are positive
3. ✘ Stronger the perturbation, the greater the lowering of the ground state energy

Weaker the perturbation, the greater the lowering of the ground state energy

4. ✓

Q.47 Question id : 8559 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

The quantum numbers of four electrons named as A, B, C & D are given below

A. $n = 3, \ell = 1, m_\ell = -1, m_s = +1/2$

B. $n = 3, \ell = 2, m_\ell = 0, m_s = +1/2$

C. $n = 4, \ell = 1, m_\ell = 0, m_s = +1/2$

D. $n = 4, \ell = 2, m_\ell = -2, m_s = -1/2$

The correct order of their increasing energy is:

Options :

1. ✓ $A < B < C < D$

2. ✗ $B < A < C < D$

3. ✗ $D < C < B < A$

4. ✗ $C < D < B < A$

Q.48 Question id : 8560 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

The electronic configuration of $[\text{Ar}] 4s^1 3d^{10}$ belongs to which element ?

Options :

1. ✗ Chromium

2. ✗ Iron

3. ✓ Copper

4. ✗ Zinc

Q.49 Question id : 8561 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following is not correct for Raman scattering?

Options :

1. ✗ The molecule returns to a different energy level after interaction with the light

2. ✗ The scattered photon has a longer wavelength than the incident photon

3. ✗ The polarisability of the molecule changes with the vibrations

Raman scattering is not detected by shining light of one wavelength on the sample

4. ✓

Q.50 Question id : 8562 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

The spin quantum numbers m_z are related to the magnetic moment along z- axis, μ_z by which of the following?

Options :

1. ✓ $\mu_z = r \frac{h}{2\pi} m_z$

2. ✗ $\mu_z = h \frac{r}{2\pi} m_z$

3. ✗ $\mu_z = h \frac{r}{4\pi} m_z$

4. ✗ $\mu_z = r \frac{h}{4\pi} m_z$

Q.51 Question id : 8563 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following is not correct for thermodynamics?

Options :

1. ✗ Thermodynamics deals with energy transformation

2. ✗ Thermodynamics deals with energy changes of macroscopic systems

3. ✓ Thermodynamics deals with energy changes of microscopic systems

4. ✗ Thermodynamics is not concerned about rate of energy transformations

Q.52 Question id : 8564 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

The enthalpy of combustion of methane, graphite and dihydrogen at 298K are $-890.3 \text{ kJ mol}^{-1}$, $-393.5 \text{ kJ mol}^{-1}$, and $-285.8 \text{ kJ mol}^{-1}$ respectively. Enthalpy of formation of CH_4 (g) will be:

Options :

1. ✓ $-74.8 \text{ kJ mol}^{-1}$

2. ✗ $-52.27 \text{ kJ mol}^{-1}$

3. ✗ $+74.8 \text{ kJ mol}^{-1}$

4. ✗ $+52.48 \text{ kJ mol}^{-1}$

Q.53 Question id : 8565 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

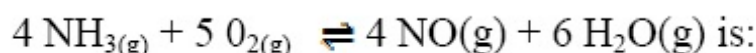
The correct form of Gibb's Helmholtz equation is :

Options :

1. ✓ $\frac{\partial}{\partial T} \cdot \frac{G}{T} = \frac{-H}{T^2}$
2. ✗ $\frac{\partial}{G} \cdot \frac{T}{\partial T} = + \frac{H}{T^2}$
3. ✗ $\frac{\partial}{\partial T} \cdot \frac{T}{G} = \frac{-H}{T^2}$
4. ✗ $\frac{\partial}{\partial T} \cdot \frac{G}{T} = \frac{-T^2}{H}$

Q.54 Question id : 8566 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

The equilibrium constant for a gas reaction



Options :

1. ✗ $\frac{[4 \text{NH}_3][5 \text{O}_2]}{[4 \text{NO}][6 \text{H}_2\text{O}]}$
2. ✗ $\frac{[\text{NH}_3]^4[\text{O}_2]^5}{[\text{NO}]^4[\text{H}_2\text{O}]^6}$
3. ✓ $\frac{[\text{NO}]^4[\text{H}_2\text{O}]^6}{[\text{NH}_3]^4[\text{O}_2]^5}$
4. ✗ $\frac{[\text{NH}_3]^4[\text{O}_2]^5}{[4 \text{NO}][6 \text{H}_2\text{O}]}$

Q.55 Question id : 8567 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

27.6 g of N_2O_4 was placed in a one litre reaction vessel at 400K and allowed to attain equilibrium $\text{N}_2\text{O}_{4(g)} \rightleftharpoons 2\text{NO}_2(g)$. Using the gas equation $Pv = nRT$, the value of P is:

Options :

1. ✗ 4.98 bar
2. ✓ 9.96 bar
3. ✗ 2.49 bar
4. ✗ 1.285 bar

Q.56 Question id : 8568 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

The correct form of Debye- Hückel limiting law for very dilute aqueous solution is :

Options :

1. ✓ $\log \gamma_{\pm} = -|z_+z_-| AI^{1/2}$

2. ✗ $\log \gamma_{\pm} = -|z_+z_-| AI^2$

3. ✗ $\log \gamma_{\pm} = -|z_+z_-| AI^{1/4}$

4. ✗ $\log \gamma_{\pm} = -|z_+z_-| AI^3$

Q.57 Question id : 8569 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

For a general electrochemical reaction of the type: $aA + bB \xrightarrow{ne^-} cC + dD$, the correct form of Nernst equation is :

Options :

1. ✗ -0.036

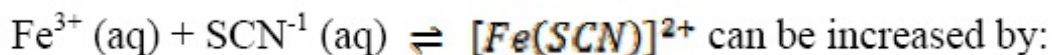
2. ✗ -0.092

3. ✓ 0.92

4. ✗ 1.92

Q.58 Question id : 8570 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

The colour intensity of the solution in the equilibrium



Options :

1. ✗ adding oxalic acid

2. ✗ adding aq. HgCl_2

3. ✓ adding potassium thiocyanate

4. ✗ adding $[\text{Fe}(\text{SCN})]^{2+}$

Q.59 Question id : 8571 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

59. For a general electrochemical reaction of the type: $aA + bB \xrightarrow{ne^-} cC + dD$, the correct form of Nernst equation is :

Options :

1. ✓ $E_{cell} = E^{\ominus}_{cell} - \frac{RT}{nF} \ln \frac{[C]^c [D]^d}{[A]^a [B]^b}$

2. ✗ $E_{cell} = E^{\ominus}_{cell} + \frac{RT}{nF} \ln \frac{[C]^c [D]^d}{[A]^a [B]^b}$

3. ✗ $E^{\ominus}_{cell} = E_{cell} - \frac{RT}{nF} \ln \frac{[C]^c [D]^d}{[A]^a [B]^b}$

4. ✗ $E_{cell} = E^{\ominus}_{cell} - \frac{RT}{nF} \ln \frac{[A]^a [B]^b}{[C]^c [D]^d}$

Q.60 Question id : 8572 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

The electricity required in terms of Faraday to produce 20 g of Ca from molten CaCl_2 is:

Options :

1. ✗ 4F

2. ✗ 2 F

3. ✗ $\frac{1}{2}$ F

4. ✓ 1 F

Q.61 Question id : 8573 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following processes does not contain interface?

Options :

1. ✗ Crystallization of potash alum

2. ✗ Rusting of iron

3. ✓ Dissolution of H_2 in O_2

4. ✗ Dissolution of sugar in water

Q.62 Question id : 8574 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following is the example of sorption?

Options :

1. ✓ Dipping of a chalk stick in blue ink

2. ✗ Exposure of anhydrous CaCl_2 to moisture

3. ✗ Exposure of silica gel bottle to moisture

4. ✗ Passing of aqueous solution of raw sugar over a bed of animal charcoal

Q.63 Question id : 8575 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

The substance used in photographic films is :

Options :

1. ✘ KBr
2. ✘ AlBr_3
3. ✘ AgCl
4. ✔ AgBr

Q.64 Question id : 8576 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

The technique used for studying the surface state of heterogeneous catalysts is:

Options :

1. ✔ ESCA
2. ✘ NMR
3. ✘ X-ray
4. ✘ u.v.

Q.65 Question id : 8577 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

The value of P in Fermi-Dirac distribution is :

Options :

1. ✔ 0.5
2. ✘ 2.0
3. ✘ 1.0
4. ✘ 0.25

Q.66 Question id : 8578 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

According to Maxwell- Boltzman distribution of velocities, the correct relationship between (u) , $(u^2)^{1/2}$ and $(u^3)^{1/3}$ is :

Options :

1. ✘ $u > (u^2)^{1/2} > (u^3)^{1/3}$
2. ✘ $u > (u^3)^{1/3} > (u^2)^{1/2}$
3. ✔ $(u^3)^{1/3} > (u^2)^{1/2} > u$
4. ✘ $(u^2)^{1/2} > u > (u^3)^{1/3}$

Q.67 Question id : 8579 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0) 01/11/14 Page 22 of 32

Which of the following is the correct form of Gibb's free energy equation?

Options :

1. ✘ $\Delta H = \Delta G - T\Delta S$
2. ✔ $\Delta G = \Delta H - T\Delta S$
3. ✘ $\Delta S = \Delta G - T\Delta H$
4. ✘ $\Delta G = \Delta H + T\Delta S$

Q.68 Question id : 8580 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

For the reaction $\text{Hg} (l) + \text{Cl}_2 (g) \rightarrow \text{Hg Cl}_2(s)$, the correct way of representation of rate of reaction is :

Options :

1. ✘ Rate of reaction = $\frac{\Delta[\text{Hg}]}{\Delta t}$
2. ✘ Rate of reaction = $\frac{[\Delta\text{Cl}_2]}{\Delta t}$
3. ✔ Rate of reaction = $\frac{\Delta[\text{HgCl}_2]}{\Delta t}$
4. ✘ Rate of reaction = $\frac{-\Delta[\text{HgCl}_2]}{\Delta t}$

Q.69 Question id : 8581 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

According Michaelis -Menton kinetics, which of the following relationship is correct, where $[E]$, $[E]_0$ and $[ES]$ carry their usual meanings ?

Options :

1. ✘ $[E] = [E]_0 + [ES]$
2. ✔ $[E]_0 = [E] + [ES]$
3. ✘ $[ES] = [E] + [E]_0$
4. ✘ $[ES] = [E] - [E]_0$

Q.70 Question id : 8582 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following statement is correct for flash photolysis?

Options :

1. ✘ It is used to study rusting of iron
2. ✘ It is used to study hydrolysis of ethyl acetate

3. ✓ It is used to study rate of neutralization reactions

4. ✗ It is used to study rate of burning of a candle

Q.71 Question id : 8583 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following is not the example of amorphous solid?

Options :

1. ✗ PTFE (Polytetrafluoroethylene)

2. ✗ PAN (Polyacrylonitrile)

3. ✗ Polyisoprene

4. ✓ Sodium chloride

Q.72 Question id : 8584 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following is wrong for Frankel defect?

Options :

1. ✗ Frankel defect is shown by ionic solids

2. ✗ Due to Frankel defect, a vacancy defect is created

3. ✗ Frankel defect is also known as dislocation defect

4. ✓ Density of the solid is changed due to Frankel defect

Q.73 Question id : 8585 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following is paramagnetic?

Options :

1. ✓ Cr^{3+}

2. ✗ MnO

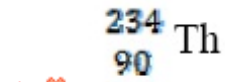
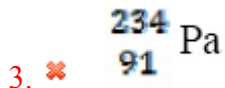
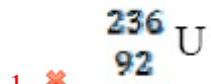
3. ✗ NaCl

4. ✗ C_6H_6

Q.74 Question id : 8586 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

The daughter element obtained by emission of one alpha and two beta particles from ${}_{92}^{238}\text{U}$ is:

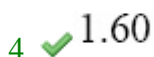
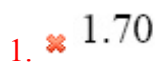
Options :



Q.75 Question id : 8587 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

The neutron proton ratio after emission of two alpha particles from ${}_{90}^{234}\text{Th}$ will be :

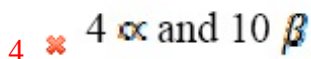
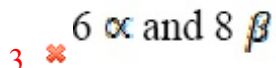
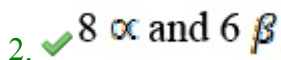
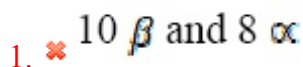
Options :



Q.76 Question id : 8588 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Number of alpha (α) and Beta (β) particles emitted during radioactive decay of ${}_{92}^{238}\text{U}$ to ${}_{82}^{206}\text{Pb}$ are:

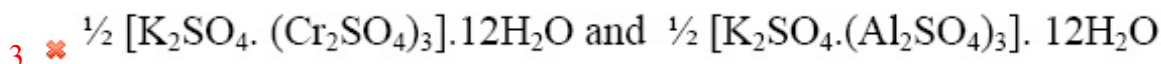
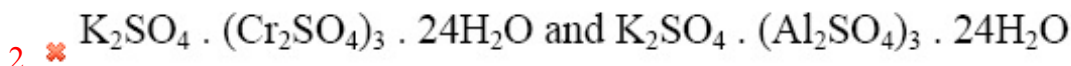
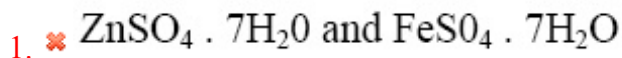
Options :



Q.77 Question id : 8589 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following is not correct pair of isomorphous substances?

Options :



4. ✓ $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ and $\text{Fe}(\text{SO}_4)_3 \cdot 7\text{H}_2\text{O}$

Q.78 Question id : 8590 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Sulphur molecules are best represented as:

Options :

1. ✗ S_2

2. ✗ S_4

3. ✓ S_8

4. ✗ S

Q.79 Question id : 8591 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Out of MgCl_2 , CaCl_2 , SrCl_2 , and BaCl_2 , which has got the highest tendency for hydrate formation?

Options :

1. ✓ MgCl_2

2. ✗ CaCl_2

3. ✗ SrCl_2

4. ✗ BaCl_2

Q.80 Question id : 8592 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following is dibasic acid?

Options :

1. ✗ H_3PO_4

2. ✓ H_3PO_3

3. ✗ H_3PO_5

4. ✗ $(\text{HPO}_3)_n$

Q.81 Question id : 8593 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Out of ClO^- , ClO_2^- , ClO_3^- and ClO_4^- which has tetrahedral shape?

Options :

1. ✗ ClO_2^-

2. ✓ ClO_4^-

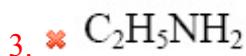
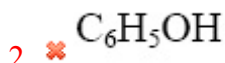
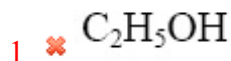
3. ✗ ClO^-



Q.82 Question id : 8594 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Hydrolysis product of borazole is:

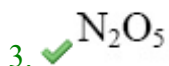
Options :



Q.83 Question id : 8595 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following is obtained by distilling concentrated Nitric acid over phosphorus Pentoxide?

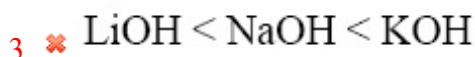
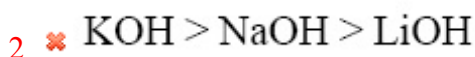
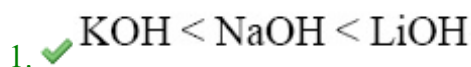
Options :



Q.84 Question id : 8596 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

The correct order of increasing pK_b value of KOH, NaOH & LiOH is :

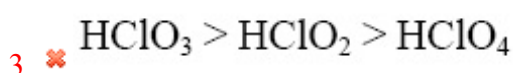
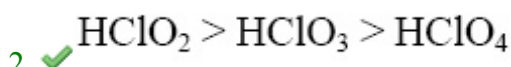
Options :



Q.85 Question id : 8597 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

The decreasing order of pK_a value of HClO_4 , HClO_3 and HClO_2 is:

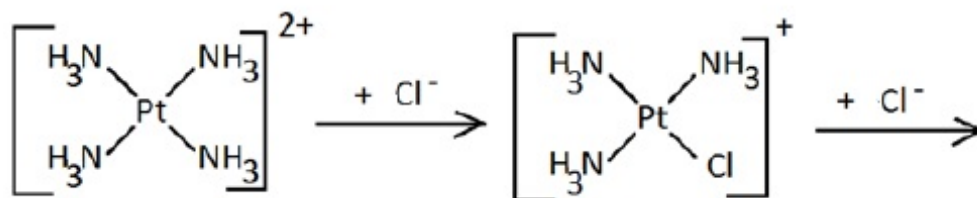
Options :



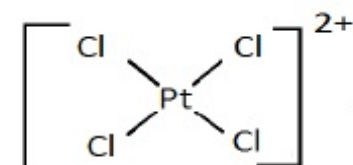
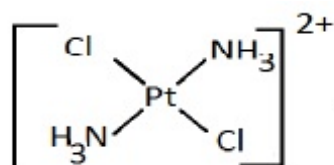
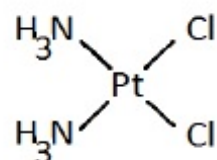
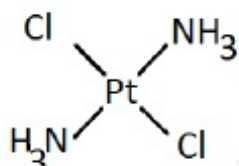


Q.86 Question id : 8598 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

The exclusive product formed in the reaction given below is :



Options :



Q.87 Question id : 8599 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

The highest magnetic moment (μ) is of:

Options :



Q.88 Question id : 8600 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

The maximum number of oxidation states are shown by:

Options :

1. ✘ Cu
2. ✔ Mn
3. ✘ Cr
4. ✘ Ni

Q.89 Question id : 8601 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following ions is coloured?

Options :

1. ✔ V^{4+}
2. ✘ Sc^{3+}
3. ✘ Ti^{4+}
4. ✘ Zn^{2+}

Q.90 Question id : 8602 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following has tetrahedral geometry?

Options :

1. ✘ $PtCl_4^{2-}$
2. ✘ CoF_6^{3-}
3. ✔ $NiCl_4^{2-}$
4. ✘ $Co(NH_3)_6^{3+}$

Q.91 Question id : 8603 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

The paramagnetic moment (μ) for lanthanide complexes can be calculated by which of the following, where symbols carry their usual meanings?

Options :

1. ✔ $\mu = g[J(J + 1)]^{\frac{1}{2}}$
2. ✘ $\mu = g[J(J - 1)]^{\frac{1}{2}}$
3. ✘ $\mu = g[J(J + 1)]^2$
4. ✘ $\mu = g[J(J - 1)]^2$

Q.92 Question id : 8604 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Atomic number of lanthanoid element with electronic configuration $[Xe]4f^{11}6s^2$ is :

Options :

1. ✘ 49
2. ✔ 67
3. ✘ 69
4. ✘ 99

Q.93 Question id : 8605 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

IUPAC name of the compound obtained by reaction of $C_2H_5 - MgBr$ and propanone in dry ether solvent followed by hydrolysis is :

Options :

1. ✘ 2 – Butanol
2. ✘ 2 – Ethyl – 2- Propanol
3. ✔ 2 – Methyl – 2 – butanol
4. ✘ 3 – Methyl – 2 – pentanol

Q.94 Question id : 8606 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following does not exist as a dimer?

Options :

1. ✔ SO_2
2. ✘ $AlCl_3$
3. ✘ P_2O_5
4. ✘ $Mn(CO)_5$

Q.95 Question id : 8607 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following is not associated with nitrogen fixation?

Options :

1. ✘ Vivo nitrogen fixation
2. ✘ Vitro nitrogen fixation
3. ✔ Carbo nitrogen fixation
4. ✘ Nitrogenase enzyme

Q.96 Question id : 8608 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

The order of stability of complexes of porphyrins with +2 metal ions is:

Options :

1. ✓ $\text{Ni}^{2+} > \text{Cu}^{2+} > \text{Fe}^{2+} > \text{Zn}^{2+}$
2. ✗ $\text{Zn}^{2+} > \text{Fe}^{2+} > \text{Cu}^{2+} > \text{Ni}^{2+}$
3. ✗ $\text{Cu}^{2+} > \text{Fe}^{2+} > \text{Zn}^{2+} > \text{Ni}^{2+}$
4. ✗ $\text{Fe}^{2+} > \text{Zn}^{2+} > \text{Cu}^{2+} > \text{Ni}^{2+}$

Q.97 Question id : 8609 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following is not correct for cytochromes?

Options :

1. ✗ They are heme proteins
2. ✗ They act as electron carriers
3. ✗ They are enzymes
4. ✓ They can convert n - hexane into benzene

Q.98 Question id : 8610 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following is not associated with solvent extraction?

Options :

1. ✗ Continuous boiling with solvent
2. ✗ Used for extraction of essential oils from plants
3. ✓ Used for petroleum refining
4. ✗ Slow but continuous process

Q.99 Question id : 8611 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

Which of the following is not used as a dehydrating reagent?

Options :

1. ✗ KHSO_4
2. ✗ Anhyd ZnCl_2
3. ✗ Conc. H_2SO_4
4. ✓ Liquid bromine

Q.100 Question id : 8612 Question Type : MCQ (Correct + 2.0 , Wrong - 0.0)

The reagent used in Clemmenson reduction is :

Options :

1. ✘ LiAlH_4
2. ✘ $\text{Na/Hg} + \text{C}_2\text{H}_5\text{OH}$
3. ✔ $\text{Zn/Hg} + \text{Conc. HCl}$
4. ✘ $(\text{Me}_2\text{CHO})_3\text{Al}$