10.5/15

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Department of Chemistry

Date: 25 August 2016; 8:00-8.45 a.m.

CH-101 **QUIZ 1** **Maximum Marks = 15**

Name: IBRAR ALI Division: III Signature of Invigilator:

Roll No.: 170121020 Tutorial Group: T9

Answer only in this sheet. Only fully correct answers will be accepted. All questions are compulsory. Rough work is mandatory

1. Given the Planck's radiation law, $\rho(\upsilon)d\upsilon = = \frac{8\pi h\upsilon^3}{c^3}\frac{1}{e^{\frac{h\upsilon}{kT}}-1}d\upsilon$, the expression for $\rho(\upsilon)$ at high temperature would be, **2.5 Marks**

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Answer:

(G) $\frac{8\pi\nu^3}{c^3kT}$; (H) $kT\frac{8\pi\nu^3}{c^3}$; (I) $\frac{8\pi\nu^2}{c^3kT}$; or (J) $\frac{8\pi\nu^2}{c^3}kT$

2. For a particle-in-a-box of length L = 3.315 Å, the wavefunction is written as $\Psi(x) = \sqrt{\frac{2}{L}}\sin\frac{n\pi x}{L}$.

The value of linear momentum in the ground state (in the unit of kg m s^{-1}) would be,
(Use h = 6.63× 10^{-34} Js) **2.5 Marks**

Answer:

(K) 1.0 × 10^{-24}; (L) 0.1 × 10^{-24}; (M) 1.0 × 10^{-34}; (N) 0.1 × 10^{-34}

3. Which of the following statements are correct? **1 Mark**

(a) Environmental science creates safer technology. (b) Environmental science quantifies the problem.
(c) Green chemistry solves environmental problems. (d) Green prevents pollution at source.
(e) Green chemistry & environmental science are complimentary to each other.
(f) Green chemistry is same as environmental science.

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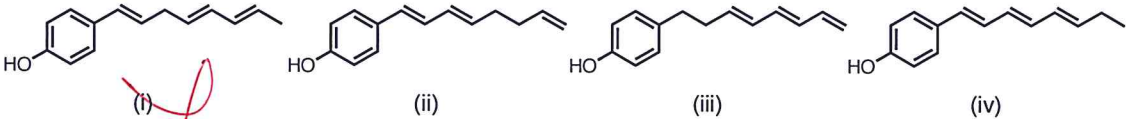
Answer:

(A) b, c, d, e, f ; (B) a, b, d, e, f; (C) b, c, d, e; (D) a, b, c, e, f

4. The increase order of λ_{max} for the compound shown below follows the order **1 Mark**



(i) (ii) (iii) (iv)

Answer:

(A) III > IV > I > II; (B) IV > II > I > III; (C) IV > II > III > I; (D) IV > I > II > III;

5. The increasing order of solvent toxicity for the following set of solvents follows the order. **1 Mark**

(A) Chloroform > Benzene > Acetonitrile > Ethylacetate > Toluene > Ethanol
(B) Benzene > Chloroform > Acetonitrile > Toluene > Ethylacetate > Ethanol
(C) Benzene > Acetonitrile > Chloroform > Toluene > Ethylacetate > Ethanol
(D) Chloroform > Acetonitrile > Benzene > Toluene > Ethylacetate > Ethanol

6. During enzymatic conversion of Glucose to catechol which of the following principle of green chemistry is followed? **1 Mark**

(a) High atom economy (b) Renewable feed-stock (c) Excellent E-factor
(d) Omit derivatization (e) Catalytic (f) Temperature and pressure optimization

Answer:
(A) b, d, e, f; (B) a, c, e, f (C) c, d, e, f; (D) a, b, c, f

7. The increasing order Atom economy in the following reactions follows the order. **1 Mark**

(a) $C_6H_{12}O_6 \xrightarrow{\text{Enzyme}} 2\,C_2H_5OH + 2CO_2$

(b) $CH_4 + H_2O \longrightarrow CO + 3H_2$

(c) $2Na + H_2SO_4 \longrightarrow Na_2SO_4 + H_2$

(d) $CH_4 + 2O_2 \longrightarrow 2H_2O + CO_2$

Answer:
(A) a > b > d > c; (B) b > a > d > c; (C) d > b > a > c; (D) b > a > c > d;

8. Using Slater's rules, calculate the effective nuclear charge for 3*d* electron in zinc. **2 Marks**

Answer:

$Z_{eff} = 8.85$

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9. N_2 has a very high electron affinity **1 Mark**

Answer: False.
True False

10. Arrange the elements (Li, Be, B, C, N, O, F) in increasing order of first ionization energy. **1 Mark**

Answer:

Li < B < Be < C < O < N < F

11. The Cl^- ion has a very high effective nuclear charge in comparison to an P^{3-} ion **1 Mark**

Answer: True.
True False