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Previous Year Paper

Chemistry - 2015



Multiple Choice Questions

1. The threshold frequency of a metal corresponds to the wavelength of x nm. In two separate experiments A and B, incident radiations of wavelengths $1/2x$ nm and $1/4x$ nm respectively are used. The ratio of kinetic energy of the released electrons in experiment 'B' to that in experiment 'A' is
- A. $1/3$
 - B. 2
 - C. 4
 - D. 3

Answer

2. The minimum values of uncertainties involved in the determination of both the position and velocity of a particle respectively are 1×10^{-10} m and 1×10^{-10} ms⁻¹. Then, the mass (in kg) of the particle is
- A. 5.270×10^{-15}
 - B. 5.270×10^{-20}
 - C. 5.270×10^{-16}
 - D. 5.270×10^{-10}

Answer

3. The number of electrons with azimuthal quantum number $l = 1$ and $l = 2$ for Cr in ground state respectively are
- A. 12, 5
 - B. 12, 4
 - C. 16, 5
 - D. 16, 4

Answer

4. Which of the following changes in the respective bond order values are caused by removal of an electron from N_2 and F_2 molecules?
- A. Decrease by 0.5 in both
 - B. Increase by 0.5 in both
 - C. Increase by 0.5 in the former and decrease by 0.5 in the latter
 - D. Decrease by 0.5 in the former and increase by 0.5 in the latter

Answer

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5. The correct order of first ionisation enthalpies of the following elements is

A. $\text{Be} > \text{Mg} > \text{Ca} > \text{Sr} > \text{Ra} > \text{Ba}$

B. $\text{Ra} > \text{Ba} > \text{Sr} > \text{Ca} > \text{Mg} > \text{Be}$

C. $\text{Be} > \text{Mg} > \text{Ca} > \text{Sr} > \text{Ba} > \text{Ra}$

D. $\text{Ra} > \text{Sr} > \text{Ba} > \text{Mg} > \text{Ca} > \text{Be}$

Answer

6. The relative strength of trichlorides of boron group to accept a pair of electron is given by

A. $\text{GaCl}_3 > \text{AlCl}_3 > \text{BCl}_3$

B. $\text{AlCl}_3 > \text{BCl}_3 > \text{GaCl}_3$

C. $\text{AlCl}_3 > \text{GaCl}_3 > \text{BCl}_3$

D. $\text{BCl}_3 > \text{AlCl}_3 > \text{GaCl}_3$

Answer

7. The hybridised state of bromine in bromine pentafluoride is

A. sp^3d

B. dsp^3

C. d^2sp^3

D. sp^3d^2

Answer

8. In which one of the following, d-d transition involves absorption in the ultraviolet region?

A. $[\text{Cu}(\text{H}_2\text{O})_4]^{2+}$

B. $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$

C. $[\text{Co}(\text{NH}_3)_6]^{3+}$

D. $[\text{Co}(\text{CN})_6]^{3-}$

Answer

9. The enthalpy change for a reaction at equilibrium is $-20.5 \text{ kJ mol}^{-1}$. Then the entropy change for this equilibrium at 410 K is

A. $+50 \text{ JK}^{-1}\text{mol}^{-1}$

B. $+55 \text{ JK}^{-1}\text{mol}^{-1}$

C. $+75 \text{ JK}^{-1}\text{mol}^{-1}$

D. $-50 \text{ JK}^{-1}\text{mol}^{-1}$

Answer

10. The enthalpy of combustion of glucose (mol.wt.: 180 g mol^{-1}) is $-2840 \text{ kJ mol}^{-1}$. Then the amount of heat evolved when 0.9 g of glucose is burnt, will be

A. 14.2 kJ

B. 142 kJ

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D. 1420 kJ

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Answer

11. If the ionic product of $M(OH)_2$ is 5×10^{-10} , then the molar solubility of $M(OH)_2$ in 0.1 M NaOH is
- A. 5×10^{-12} M
B. 5×10^{-8} M
C. 5×10^{-10} M
D. 5×10^{-9} M

Answer

12. Equilibrium constants are given for the following two equilibria.



Calculate the equilibrium constant for the following equilibrium.



- A. $500 \text{ mol}^{1/2} \text{ L}^{-1/2}$
B. $500 \text{ mol}^{1/2} \text{ L}^{1/2}$
C. $4 \times 10^{-6} \text{ mol}^{1/2} \text{ L}^{1/2}$
D. $200 \text{ mol}^{1/2} \text{ L}^{-1/2}$

Answer

13. The equilibrium constant for the equilibrium $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$ at a particular temperature is $2 \times 10^{-2} \text{ mol L}^{-1}$. The number of moles of PCl_5 that must be taken in a one litre flask at the same temperature to obtain a concentration of 0.20 mole of chlorine at equilibrium is
- A. 2.2
B. 2.0
C. 1.8
D. 0.2

Answer

14. 18 g of glucose is dissolved in 178.2 g of water. The vapour pressure of the solution at 100°C is (vapour pressure of pure water at 100°C is 760 mm Hg)
- A. 767.6 mm Hg
B. 760 mm Hg
C. 752.4 mm Hg
D. 725.4 mm Hg

Answer

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A. $F^- < I^- < CN^- < H_2O < CO$

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~~B. $I^- < F^- < H_2O < CO < CN^-$~~

C. $I^- < F^- < H_2O < CN^- < CO$

D. $F^- < H_2O < I^- < CN^- < CO$

Answer

16. An organic compound contains 90% carbon and 10% hydrogen by mass. Its empirical formula is

A. C_2H_4

B. C_3H_6

C. C_3H_8

D. C_3H_4

Answer

17. The IUPAC name of $(CH_3)_3C-CH=CH_2$ is

A. 2,2-dimethylbut-3-ene

B. 2, 2-dimethyl pent-3-ene

C. 3,3-dimethylbut-1-ene

D. hex-1-ene

Answer

18. When methane is heated with dioxygen in the presence of Mo_2O_3 catalyst, the organic product obtained is

A. methanal

B. ethanoic acid

C. methanol

D. ethanol

Answer

19. Isomers which can be interconverted through rotation about C- C single bond are

A. diastereomers

B. enantiomers

C. conformers

D. chain isomers

Answer

20. Which one of the following compounds shows *cis-trans* isomerism?

A. Pent-1-ene

B. But-2-ene

C. But-1-ene

D. Propene

Answer

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21. Among the following, the ambident nucleophile is

A. iodide

B. alkoxy

C. hydroxyl

D. cyanide

Answer

22. Out of the following isomeric alcohols containing five carbon atoms, the alcohol that exhibits optical isomerism is

A. 1-pentanol

B. 2-pentanol

C. 3-pentanol

D. 2-methyl-2-butanol

Answer

23. An odd electron molecule among the following is

A. CO

B. SO_2

C. CO_2

D. NO

Answer

24. Which one of the following is reduced by H_2O_2 in alkaline medium?

A. Fe^{2+}

B. HOCl

C. KMnO_4

D. PbS

Answer

25. Aluminium (atomic mass = 27) crystallises in a cubic system with edge length of 4 Å. Its density is 2.7 g cm^{-3} . The number of aluminium atoms present per unit cell is

A. 5

B. 6

C. 4

D. 2

Answer

26. For two isomorphous crystals A and B, the ratio of density of A to that of B is 1.6 while the ratio of the edge length of B to that of A is 2. If the molar mass of crystal B is 200 g mol^{-1} , then that of crystal A is

A. 240 g mol^{-1}

B. 40 g mol^{-1}

Answer

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27. A binary solid has a primitive cubical structure with B⁻ ions constituting the lattice points and A⁺ ions occupying 25% of its tetrahedral holes. The molecular formula of the crystal is
- A. A₂B
 - B. AB₃
 - C. AB₂
 - D. A₂B₃

Answer

28. Match the following-

Column I	Column II
A. Sphalerite	p. FeCO ₃
B. Malachite	q. ZnCO ₃
C. Calamite	r. Na ₃ AlF ₆
D. Cryolite	s. CuCO ₃ .Cu(OH) ₂
E. Siderite	t. ZnS

- A. A - r; B - p; C - t; D - q; E - s
- B. A - t; B - s; C - q; D - p; E - r
- C. A - t; B - r; C - q; D - p; E - s
- D. A - t; B - s; C - q; D - r; E - p

Answer

29. In the metallurgy of zinc; the reducing agent employed in reducing the zinc oxide to crude zinc metal in the last stage is
- A. Al
 - B. Li
 - C. Coke
 - D. Water gas

Answer

30. Which one of the following has the maximum number of P-OH bonds?
- A. H₃PO₂
 - B. H₃PO₄
 - C. H₄P₂O₆
 - D. H₄P₂O₅

A. Ag

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C. Cu

D. Pt

Answer

32. The hardest lanthanide element is

A. Sm

B. La

C. Gd

D. Dy

Answer

33. Which one of the following binary liquid mixture exhibit positive deviation from Raoult's law?

A. Carbon disulphide-acetone

B. Chloroform-acetone

C. Bromobenzene-chlorobenzene

D. Benzene-toluene

Answer

34. The standard electrode potentials of Zn and Ni respectively are - 0.76 V and - 0.25 V. Then the standard emf of the spontaneous cell by coupling these under standard conditions is

A. +1.01 V

B. -0.51 V

C. +0.51 V

D. +0.25 V

Answer

35. How many moles of platinum will be deposited on the cathode when 0.60 F of electricity is passed through a 1.0 M solution of Pt^{4+} ?

A. 0.60 mol

B. 0.15 mol

C. 0.30 mol

D. 0.45 mol

Answer

36. The half-life period of a first order reaction having rate constant $k = 0.231 \times 10^{-10} \text{ s}^{-1}$ will beA. $32 \times 10^{10} \text{ s}$ B. $2 \times 10^{10} \text{ s}$ C. $3 \times 10^{10} \text{ s}$ D. $2 \times 10^{-10} \text{ s}$

Answer

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37. For the reaction $X \rightarrow Y$, the concentrations of X are 1.2 M, 0.6 M, 0.3 M and 0.15 M at 0, 1, 2 and 3 hours respectively. The order of the reaction is

- A. zero
B. half
C. one
D. two

Answer

38. List I contains the type of colloid while List II contains the examples.

List I	List II
A. Sol	p. Dust
B. Aerosol	q. Cheese
C. Gel	r. Soap lather
D. Foam	s. Plant cell fluid

Choose the correct match.

- A. A - s; B - r; C - p; D - q
B. A - s; B - p; C - q; D - r
C. A - r; B - s; C - q; D - p
D. A - r; B - p; C - s; D - q

Answer

39. Glycerol can be separated from spent-lye in soap industry by

- A. crystallisation
B. sublimation
C. differential extraction
D. chromatography

Answer

40. Which one of the following is an allylic halide?

- A. 2-chlorobutane
B. Chloroethene
C. 3-bromopropene
D. 2-chlorotoluene

Answer

41. Which one of the following undergoes iodoform test?

- A. Propanal
B. Ethanal
C. Benzophenone

42. Which one of the following is used as a test for aliphatic primary amines?

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- A. Tollen's test
B. Fehling's test
C. Isocyanide test
D. Azo dye test

Answer

43. When methanamine is treated with benzoyl chloride, the major product is

- A. N-phenylethanamide
B. N-methylbenzamide
C. benzanilide
D. acetophenone

Answer

44. In DNA, the consecutive deoxynucleotides are connected by

- A. phosphodiester linkage
B. phosphomonoester linkage
C. phosphotriester linkage
D. amide linkage

Answer

45. Which one of the following monomers form biodegradable polymer?

- A. Urea and formaldehyde
B. Ethylene glycol and terephthalic acid
C. 3-hydroxybutanoic and 3-hydroxypentanoic acid
D. Phenol and caproic acid

Answer

46. Match the following:

Drug	Class
A. Dimetapp	p. Antidepressant
B. Furacine	q. Analgesic
C. Pheneizine	r. Antiseptic
D. Aspirin	s. Antifertility
E. Norethindrone	t. Antihistamine

- A. A - q; B - s; C - t; D - r; E - p
B. A - r; B - t; C - q; D - p; E - s
C. A - t; B - s; C - q; D - p; E - r

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Answer

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47. The enzyme that converts glucose into ethyl alcohol and carbon dioxide is

- A. zymase
- B. invertase
- C. maltase
- D. urease

Answer

48. The chelating ligand used to remove excess of copper and iron in chelate therapy is

- A. D-penicillamine
- B. oxalate ion
- C. EDTA
- D. ethylenediamine

Answer