CHEMISTRY

BOOKS - MTG CHEMISTRY (ENGLISH)

PRACTICE PAPER 3

Mcqs

1. Compressibility factor for H_2 behaving as real gas is

A. 1

B. $\left(1-\frac{a}{RTV}\right)$

C. $\left(1+\frac{Pb}{RT}\right)$

D. $\frac{RTV}{(1-a)}$

Answer: C

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2. Which of the following statements is correct with respect to the property of elements wiith

increase in atomic number of ini the carbon family (group 14)?

A. Their metallic character decreases.

B. The stability of +2 oxidation state increases.

C. Their ionization energy increases

D. Their atomic size decreases.

Answer: B

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3. A sample of calcium carbonate $(CaCO_3)$ has the following percentage composition:

$Ca = 40\,\%\,, C = 12\,\%\,, O = 48\,\%$

If the law of constant proportions is true, then the weight off calcium in 4g of a sample of calcium carbonate from another source will be

A. 0.016 g

B. 0.16 g

C. 1.6 g

D. 16 g

Answer: C

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4. For the reaction, $CO_{(g)} + Cl_{2(g)} \Leftrightarrow CoCl_{2(g)}$, the value of K_p / K_c is equal to

A. 1

B. RT

C. $\sqrt{RT}$

D. $\frac{1}{RT}$

Answer: D

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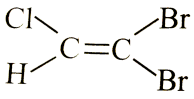
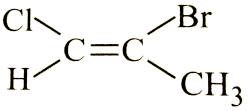
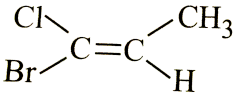
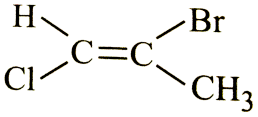
5. Which is a pair of geometrical isomers?

I. 

II. 

III. 

IV. 

A. I and II

B. I and III

C. II and IV

D. III and IV

Answer: C

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6. Which of the following is not a basic physical quantity?

A. Length

B. Time

C. Density

D. Amount of substance

Answer: C

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7. In any subshell, the maximum number of electrons having same value of spin quantum number is

A. $\sqrt{l(l+1)}$

B. $l+2$

C. $2l + 1$

D. $4l + 2$

Answer: C

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8. Clean water would have BOD value of less than

A. 17 ppm

B. 5 ppm

C. 200,000 ppm

D. 10 ppm

Answer: B

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9. Which of the followin will show least dipole character?

A. Water

B. Ethanol

C. Ethane

D. Ether

Answer: C

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10. Indicate the wrongly named compound.

A. $CH_3 - \underset{\underset{CH_3}{|}}{C}H - CH_2 - CH_2 - CHO$

(4-Methyl-1-pentanal)

B. $CH_3 - \underset{\underset{CH_3}{|}}{C}H - C \equiv C - COOH$

(4-Methylpent-2-yn-1-oic acid)

C. $CH_3CH_2CH_2 - \underset{\underset{CH_3}{|}}{C}H - COOH$

(2-Methyl-1-pentanoic acid)

D. $CH_3CH_2 - CH = CH - \overset{\overset{O}{||}}{C} - CH_3$

(Hex-3-en-5-one)

Answer: D

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11. Heavy water is used as a

A. fuel in engines

B. semiconductor

C. moderator in nuclear reactors

D. insulator in steam engines.

Answer: C

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12. The pH of 0.05 M $Ba(OH)_2$ solution is

A. 12

B. 13

C. 1

D. 10

Answer: B

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13. Which of the following solutions will have pH close to 1.0?

A. 100 mL of M/10 HCl+100 mL of M/10 NaOH

B. 55 mL of M/10 HCl+45mL of M/10 NaOH

C. 10 mL of M/10 HCl+90mL of M/10 NaOH

D. 75 mL of M/10 HCl+25mL of M/10 NaOH

Answer: D

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14. The signs of $\Delta H, \Delta S$ and ΔG for a non-spontaneous reaction at all temperature would e

A. $+, +, -$

B. $+, -, +$

C. $-, -, -$

D. $+, +, +$

Answer: B

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15. Which oxide is formed when potassium is heated in e3xcess of oxygen?

A. K_2O

B. KO

C. K_2O_2

D. KO_2

Answer: D

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16. What is the decreasing order of strength of the bases $OH^-, NH_2^-, HC \equiv C^-$ and $CH_3CH_2^-$?

A.

$$CH_3CH_2^- > NH_2^- > HC \equiv C^- > OH^-$$

B.

$$HC \equiv C^- > CH_3CH_2^- > NH_2^- > OH^-$$

C.

$$OH^- > NH_2^- > HC \equiv C^- > CH_3CH_2^-$$

D.

$$NH_2^- > HC \equiv C^- > OH^- > CH_3CH_2^-$$

Answer: A

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17. The electrons, identified by quantum numbers n and l(i) n=4,l=1 (ii) n=4, l=0 (iii) n=3,l=2 (iv) n=3, l=1 can be placed in order of increasing energy from the lowest to highest as

A. $(iv) < (ii) < (iii) < (i)$

B. $(ii) < (iv) < (i) < (iii)$

C. $(i) < (iii) < (ii) < (iv)$

D. $(iii) < (i) < (iv) < (ii)$

Answer: A

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18. Conjugate base of a strong acid is

A. a weak base

B. a strong base

C. neutral

D. a weak acid.

Answer: A

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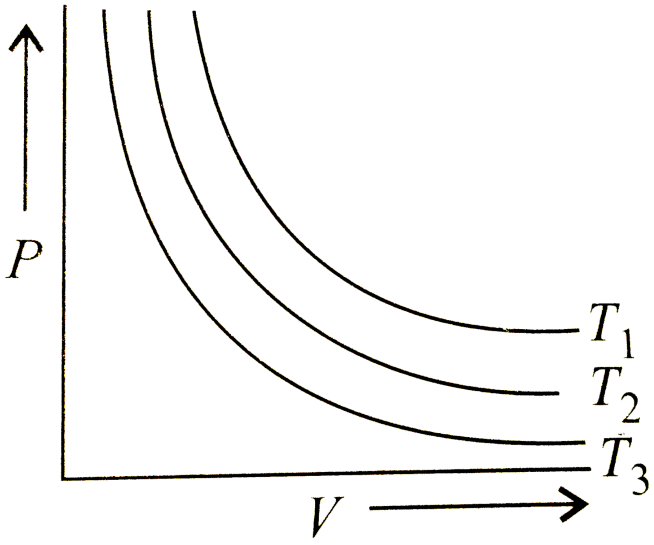
19. The graph of P vs V is given at different temperature



The correct relationship is

A. $T_1 > T_2 > T_3$

B. $T_1 < T_2 < T_3$

C. $T_1 = T_2 = T_3$

D. $T_2 > T_1 > T_3$

Answer: A

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20. A sample of gas has a volume of V_1 litre at temperature $t_1.^\circ C$. When the temperature of the gas is changed to $t_2.^\circ C$ at constant pressure, then the volume of the gas was found to increase by 10%. The percentage increase in temperature is

A. 0.1

B. $\left(10+\frac{2730}{t_1}\right)\%$

C. 20%

D. $\left(0.1+t_1^{-1}\right)\%$

Answer: B

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21. For three different gases, value of van der waals' constant 'a' and 'b' are given. What is the

correct orde of liquefaction of gases?

Gas	'a'	'b'
X_2	1.3	0.090
Y_2	4.1	0.023
Z_2	2.2	0.075

A. $X_2 > Y_2 > Z_2$

B. $Y_2 > Z_2 > X_2$

C. $Z_2 > Y_2 > X_2$

D. $X_2 > Z_2 > Y_2$

Answer: B

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22. The liquefaction behaviour of temporary gases approacches that of perrmanent gases as we go

A. below critical temperature

B. above critical temperature

C. above absolute zero

D. below absolute zero

Answer: B

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23. When the temperature is raised, viscosity o the liquid decreases. This is because

A. volume of the solution decreases

B. increase in temperature increases the average kinetiic energy of the molecules which overcomes the attractive forces between them

C. covalent and hydrogen bond forces decreases

D. attraction between the molecule increases.

Answer: B

24. the pH of a solution prepared by mixing 2M, 100 mL HCl and M, 200 mL NaOH at $25^{\circ}C$ is

A. 8

B. 7

C. 4

D. 5

Answer: B

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25. In which of the following ionisation processes, the bond order has increased and the magnetic behaviour has changed?

A. $N_2 \rightarrow N_2^+$

B. $C_2 \rightarrow C_2^+$

C. $NO \rightarrow NO^+$

D. $O_2 \rightarrow O_2^+$

Answer: C

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26. In which of the following pairs, the hybridisation of central atoms is same, but geometry is not the same?

A. SO_3, CO_3^{2-}

B. SO_3^{2-}, NH_3

C. $PCl_5, POCl_3$

D. XeF_2, Icl_3

Answer: D

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27. Select correct statement for BrF_5.

A. All fluorine atoms are in same plane

B. Four fluorine atoms and Br atom is in same plane.

C. Four fluorine atoms are in same plane

D. It has all F-Br-F bond angles at 90°.

Answer: C

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28. Consider a P_y orbital of an atom and identify correct statement

A. s-orbital of another atom produces π-bond when y is the bond formation axis

B. p_y-orbital of another atom produces σ-bond when x is the bond formation axis.

C. p_z-orbital of another atom produces π-bond when x is the bond formation axis.

D. d_{xy}-orbital of another atom produces π-bond when x is the bond formation axis

Answer: D

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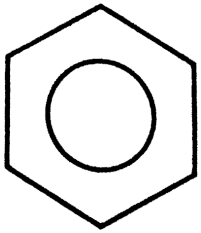
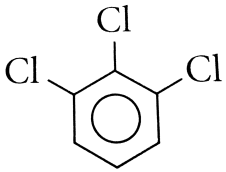
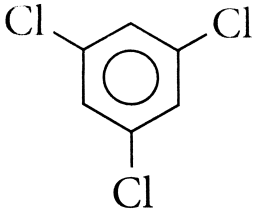
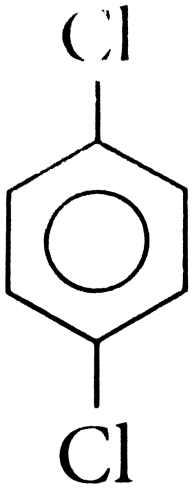
29. Which of the following will have maximum dipole moment?

A. 

B. 

C. 

D. 

Answer: B

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30. Which of the following is not the consequence of H-bonding?

A. Glycerol is more soluble in water than ethanol.

B. Boiling point of C_2H_5OH is higher than $CH_3 - O - CH_3$.

C. p-nitrophenol has higher boiling point than o-nitrophenol

D. HCl is water soluble due to H-bonding

Answer: D

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31. The two equilibrium $AB \Leftrightarrow A^+ + B^-$ and $AB + B^- \Leftrightarrow AB_2^-$ are simultaneously maintained in a solutio with equilibrium constant K_1 and K_2 respectively. The ratio of $\left[A^+\right]$ to $\left[AB_2^-\right]$ in the solution is

A. directly proportional to the concentration of B^-

B. inversely proportional to the concentration of B^-

C. directly proporitonal to the squar eof the concentration of B^-

D. Inversely proportional to the square of the concentration of B^-.

Answer: D

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32. Consider the following equilibrium in a closed container,

$N_2O_{4(g)} \Leftrightarrow 2NO_{2(g)}$

At a fixed temperature, the volume of the reaction container is halved. For this change

which of the following statements holds true regarding the equilibrium constant (K_p) and degree of dissociation (α)?

A. Neither K_p nor α changes

B. Both K_p and α change

C. K_p changes, but α does not change

D. K_p does not change, but α changes

Answer: D

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33. The degree of dissociation α of the reaction"

$$N_2O_{4(g)} \Leftrightarrow 2NO_{2(g)}$$

can be related to K_p as:

A. $\alpha = \dfrac{\frac{K_p}{P}}{4 + \frac{K_p}{P}}$

B. $\alpha = \dfrac{K_p}{4 + K_p}$

C. $\alpha = \left[\dfrac{K_p / P}{4 + K_p / P}\right]^{1/2}$

D. $\alpha = \left[\dfrac{K_p}{4 + K_p}\right]^{1/2}$

Answer: C

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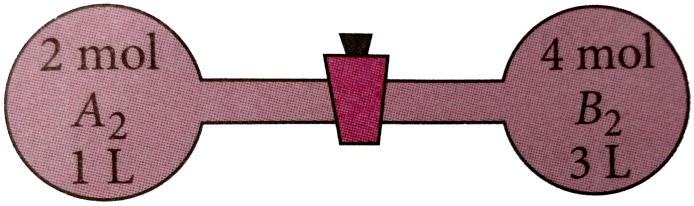
34.



When A_2 and B_2 are allowed to react, the equilibrium constant of the reaction at $27^\circ C$ is found $(K_c = 4)$.

$A_{2(g)} + B_{2(g)} \Leftrightarrow 2AB_{(g)}$

what will be the equilibrium concentration of AB?

A. 1.33 M

B. 2.66 M

C. 0.66 M

D. 0.33 M

Answer: C

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35. (I) $H_2O_2 + O_3 \rightarrow H_2O + 2O_2$

(II) $H_2O_2 + Ag_2O \rightarrow 2Ag + H_2O + O_2$

Role of hydrogen peroxide in the above reactions is respectively

A. oxidising in (I) and reducing in (II)

B. reducing in (I) and oxidising in (II)

C. Reducing in (I) and (II)

D. oxidisng in (I) and (II)

Answer: C

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36. Which set of quantum numbers is possible for the last electron of Mg^+ ion

A. n=3,l=2,m=0,s=+1/2

B. $n=2, l=3, m=0, s=+1/2$

C. $n=1, l=0, m=0, s=+1/2$

D. $n=3, l=0, m=0, s=+1/2$

Answer: D

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37. Which of the following reactions is said to be entropy driven?

A. Endothermic reaction with positive entropy change and high temperature

B. Endothermic reaction will negative entropy change and low temperature

C. Exothermic reaction with positive entropy change and high temperature

D. Exothermic reactionn with negative entropy change and low temperature

Answer: A

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38. If 10^{21} molecules are removed from 200 mg of CO_2, the number of moles of CO_2 left is

A. 2.88×10^{-3}

B. 28.8×10^{-3}

C. 0.288×10^{-3}

D. 1.66×10^{-2}

Answer: A

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39. The ions O^{-2}, F^{-}, Mg^{2+} and Al^{3+} are isoelectronic. Their ionic radii show

A. a decrease from O^{2-} to F^{-} and then increase from Na^{+} to Al^{3+}

B. a significant increase from O^{2-} to Al^{3+}

C. a significant decrease from O^{2-} to Al^{3+}

D. an increase from O^{2-} to F^{-} and then decrease from Na^{+} to Al^{3+}

Answer: C

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40. The pH of 0.004 M hydrazine solution is 9.7. its ionisation constant (K_b) is

A. 7.79×10^{-8}

B. 4.49×10^{-9}

C. 1.67×10^{-10}

D. 6.25×10^{-7}

Answer: D

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41. The vapoour density of a mixture containing NO_2 and N_2O_4 is 38.3 at 300 K. the number of moles of NO_2 in 100 g of the mixture is approximately

A. 0.44

B. 4.4

C. 33.4

D. 3.34

Answer: A

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42. An alkane C_7H_{16} is produced by the reaction of lithium di(3-pentyl)cuprate with ethyl bromide. The name of the product is

A. 3-methylhexane

B. 2-ethylpentane

C. 3-ethylpentane

D. n-heptane.

Answer: C

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43. The enthalpy of neutralisation of NH_4OH and CH_3COOH is -10.5 kcal mol^{-1} and enthalpy of neutralisation of CH_3COOH with strong base is -12.5 kcal mol^{-1}. The enthalpy of ionisation of NH_4OH will be

A. 4.0 kcal mol^{-1}

B. 3.0 kcal mol^{-1}

C. 2.0 kcal mol^{-1}

D. 3.2 kcal mol^{-1}

Answer: C

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44. When $LiNO_3$ is heated, it gives oxide, Li_2O whereas other alkali metals nitrates decompose to give corresponding

A. nitrite

B. peroxide

C. both nitrite and oxide

D. none of these

Answer: A

45. Which one of the following statements is not true?

A. pH of drinkingg water should be between 5.5-9.5

B. Concentration of DO below 6 ppm is good from the growth of fish

C. Clean water would have a BOD value of less than 5 ppm

D. Oxides of sulphur, nitrogen and carbon are the most widespread air pollutant

Answer: B

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46. The solubility product of MgF_2 is 7.4×10^{-11}. Calculate the solubility of MgF_2 in 0.1M NaF solution

A. 7.4×10^{-9}

B. 3.7×10^{-9}

C. 3.7×10^{-11}

D. 7.4×10^{-11}

Answer: A

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47. The aqueous solution of potash alum $\left[K_2SO_4 \cdot Al_2(SO_4)_3 \cdot 24H_2O\right]$ is acidic due to

A. hydrolysis of K^+

B. hydrolysis of Al^{3+}

C. hydrolysis of SO_4^{2-}

D. Presence of acid in its crystal as impurity.

Answer: B

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48. For reaction, $2NOCl_{(g)} \Leftrightarrow 2NO_{(g)} + Cl_{2(g)}$, K_c at

$427^\circ C$ is $3 \times 10^{-6} L \quad mol^{-1}$. The value of K_p is nearly,

A. 7.50×10^{-5}

B. 2.50×10^{-5}

C. 2.50×10^{-4}

D. 1.75×10^{-4}

Answer: D

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49. At a certain temperature, the equilibrium constant K_c is 16 for the reaction,

$$SO_{(g)} + NO_{2(g)} \Leftrightarrow SO_{3(g)} + NO_{(g)}$$

If 1.0 mol each of the four gases is taken in a one litre container the concentration of NO_2 at equilibrium would is

A. 1.6 mol L^{-1}

B. 0.8 mol L^{-1}

C. 0.4 mol L^{-1}

D. 0.6 mol L^{-1}

Answer: C

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50. For which of the following reactions, the degree of dissociation cannot be calculated from the vapour density data.

I. $2HI_{(g)} \Leftrightarrow H_{2(g)} + I_{2(g)}$

II. $2NH_{3(g)} \Leftrightarrow N_{2(g)} + 3H_{2(g)}$

III. $2NO_{(g)} \Leftrightarrow N_{2(g)} + O_{2(g)}$

IV. $PCl_{5(g)} \Leftrightarrow PCl_{3(g)} + Cl_{2(g)}$

A. I and III

B. III and IV

C. I and II

D. II and III

Answer: A

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Practice Paper 3

1. Compressibility factor for H_2 behaving as real gas is

A. 1

B. $\left(1-\frac{a}{RTV}\right)$

C. $\left(1+\frac{Pb}{RT}\right)$

D. $\frac{RTV}{(1-a)}$

Answer: C

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2. Which of the following statements is correct with respect to the property of elements wiith

increase in atomic number of ini the carbon family (group 14)?

A. Their metallic character decreases.

B. The stability of +2 oxidation state increases.

C. Their ionization energy increases

D. Their atomic size decreases.

Answer: B

Watch Video Solution

3. A sample of calcium carbonate $(CaCO_3)$ has the following percentage composition:

$Ca = 40\,\%\,, C = 12\,\%\,, O = 48\,\%$

If the law of constant proportions is true, then the weight off calcium in 4g of a sample of calcium carbonate from another source will be

A. 0.016 g

B. 0.16 g

C. 1.6 g

D. 16 g

Answer: C

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4. For the reaction, $CO_{(g)} + Cl_{2(g)} \Leftrightarrow CoCl_{2(g)}$, the value of K_p / K_c is equal to

A. 1

B. RT

C. $\sqrt{RT}$

D. $\frac{1}{RT}$

Answer: D

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5. Which of the following is not a basic physical quantity?

A. Length

B. Time

C. Density

D. Amount of substance

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6. In any subshell, the maximum number of electrons having same value of spin quantum number is

A. $\sqrt{l(l+1)}$

B. $l+2$

C. $2l+1$

D. $4l+2$

Answer: C

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7. Clean water would have BOD value of less than

A. 17 ppm

B. 5 ppm

C. 200,000 ppm

D. 10 ppm

Answer: B

8. Which of the followin will show least dipole character?

A. Water

B. Ethanol

C. Ethane

D. Ether

Answer: C

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9. Indicate the wrongly named compound.

A. $CH_3 - \underset{\underset{CH_3}{|}}{C}\ H - CH_2 - CH_2 - CHO$

(4-Methyl-1-pentanal)

B. $CH_3 - \underset{\underset{CH_3}{|}}{C}\ H - C \equiv C - COOH$

(4-Methylpent-2-yn-1-oic acid)

C. $CH_3CH_2CH_2 - \underset{\underset{CH_3}{|}}{C}\ H - COOH$

(2-Methyl-1-pentanoic acid)

D. $\underset{(\text{Hex-3-en-5-one})}{CH_3CH_2 - CH = CH - \overset{\overset{O}{||}}{C} - CH_3}$

Answer: D

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10. Heavy water is used as a

A. fuel in engines

B. semiconductor

C. moderator in nuclear reactors

D. insulator in steam engines.

Answer: C

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11. The pH of 0.05 M $Ba(OH)_2$ solution is

A. 12

B. 13

C. 1

D. 10

Answer: B

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12. Which of the following solutions will have pH close to 1.0?

A. 100 mL of M/10 HCl+100 mL of M/10 NaOH

B. 55 mL of M/10 HCl+45mL of M/10 NaOH

C. 10 mL of M/10 HCl+90mL of M/10 NaOH

D. 75 mL of M/10 HCl+25mL of M/10 NaOH

Answer: D

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13. The signs of $\Delta H, \Delta S$ and ΔG for a non-spontaneous reaction at all temperature would e

A. $+, +, -$

B. $+, -, +$

C. $-, -, -$

D. $+, +, +$

Answer: B

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14. Which oxide is formed when potassium is heated in e3xcess of oxygen?

A. K_2O

B. KO

C. K_2O_2

D. KO_2

Answer: D

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15. What is the decreasing order of strength of the bases $OH^-, NH_2^-, HC \equiv C^-$ and $CH_3CH_2^-$?

A.

$$CH_3CH_2^- > NH_2^- > HC \equiv C^- > OH^-$$

B.

$$HC \equiv C^- > CH_3CH_2^- > NH_2^- > OH^-$$

C.

$$OH^- > NH_2^- > HC \equiv C^- > CH_3CH_2^-$$

D.

$$NH_2^- > HC \equiv C^- > OH^- > CH_3CH_2^-$$

Answer: A

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B. $(ii) < (iv) < (i) < (iii)$

C. $(i) < (iii) < (ii) < (iv)$

D. $(iii) < (i) < (iv) < (ii)$

Answer: A

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17. Conjugate base of a strong acid is

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B. a strong base

C. neutral

D. a weak acid.

Answer: A

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18. A sample of gas has a volume of V_1 litre at temperature $t_1.^\circ C$. When the temperature of the gas is changed to $t_2.^\circ C$ at constant pressure, then the volume of the gas was found

to increase by 10%. The percentage increase in temperature is

A. 0.1

B. $\left(10+\frac{2730}{t_1}\right)\%$

C. 20%

D. $\left(0.1+t_1^{-1}\right)\%$

Answer: B

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19. The liquefaction behaviour of temporary gases approacches that of perrmanent gases as we go

A. below critical temperature

B. above critical temperature

C. above absolute zero

D. below absolute zero

Answer: B

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20. When the temperature is raised, viscosity o the liquid decreases. This is because

A. volume of the solution decreases

B. increase in temperature increases the average kinetiic energy of the molecules which overcomes the attractive forces between them

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Answer: B

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21. the pH of a solution prepared by mixing 2M, 100 mL HCl and M, 200 mL NaOH at $25^{\circ}C$ is

A. 8

B. 7

C. 4

D. 5

Answer: B

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22. In which of the following ionisation processes, the bond order has increased and the magnetic behaviour has changed?

A. $N_2 \rightarrow N_2^+$

B. $C_2 \rightarrow C_2^+$

C. $NO \rightarrow NO^+$

D. $O_2 \rightarrow O_2^+$

Answer: C

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23. In which of the following pairs, the hybridisation of central atoms is same, but geometry is not the same?

A. SO_3, CO_3^{2-}

B. SO_3^{2-}, NH_3

C. $PCl_5, POCl_3$

D. XeF_2, Icl_3

Answer: D

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24. Select correct statement for BrF_5.

A. All fluorine atoms are in same plane

B. Four fluorine atoms and Br atom is in same plane.

C. Four fluorine atoms are in same plane

D. It has all F-Br-F bond angles at 90°.

Answer: C

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25. Consider a P_y orbital of an atom and identify correct statement

A. s-orbital of another atom produces π-bond when y is the bond formation axis

B. p_y-orbital of another atom produces σ-bond when x is the bond formation axis.

C. p_z-orbital of another atom produces π-bond when x is the bond formation axis.

D. d_{xy}-orbital of another atom produces π-bond when x is the bond formation axis

Answer: D

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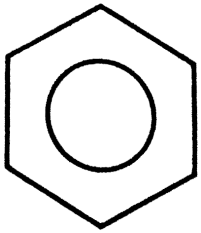
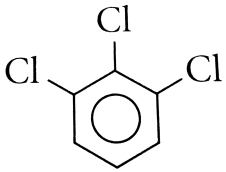
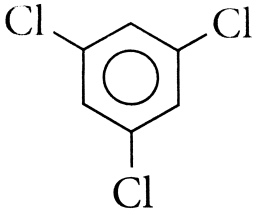
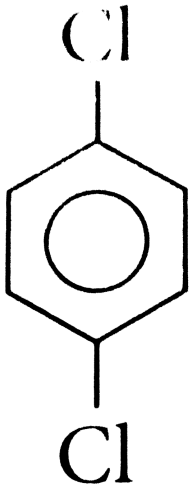
26. Which of the following will have maximum dipole moment?

A. 

B. 

C. 

D. 

Answer: B

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27. Which of the following is not the consequence of H-bonding?

A. Glycerol is more soluble in water than ethanol.

B. Boiling point of C_2H_5OH is higher than $CH_3 - O - CH_3$.

C. p-nitrophenol has higher boiling point than o-nitrophenol

D. HCl is water soluble due to H-bonding

Answer: D

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28. The two equilibrium $AB \Leftrightarrow A^+ + B^-$ and $AB + B^- \Leftrightarrow AB_2^-$ are simultaneously maintained in a solutio with equilibrium constant K_1 and K_2 respectively. The ratio of $\left[A^+\right]$ to $\left[AB_2^-\right]$ in the solution is

A. directly proportional to the concentration of B^-

B. inversely proportional to the concentration of B^-

C. directly proporitonal to the squar eof the concentration of B^-

D. Inversely proportional to the square of the concentration of B^-.

Answer: D

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29. Consider the following equilibrium in a closed container,

$N_2O_{4(g)} \Leftrightarrow 2NO_{2(g)}$

At a fixed temperature, the volume of the reaction container is halved. For this change

which of the following statements holds true regarding the equilibrium constant (K_p) and degree of dissociation (α)?

A. Neither K_p nor α changes

B. Both K_p and α change

C. K_p changes, but α does not change

D. K_p does not change, but α changes

Answer: D

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30. The degree of dissociation α of the reaction"

$$N_2O_{4(g)} \Leftrightarrow 2NO_{2(g)}$$

can be related to K_p as:

A. $\alpha = \dfrac{\frac{K_p}{P}}{4 + \frac{K_p}{P}}$

B. $\alpha = \dfrac{K_p}{4 + K_p}$

C. $\alpha = \left[\dfrac{K_p / P}{4 + K_p / P}\right]^{1/2}$

D. $\alpha = \left[\dfrac{K_p}{4 + K_p}\right]^{1/2}$

Answer: C

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31. (I) $H_2O_2 + O_3 \rightarrow H_2O + 2O_2$

(II) $H_2O_2 + Ag_2O \rightarrow 2Ag + H_2O + O_2$

Role of hydrogen peroxide in the above reactions is respectively

A. oxidising in (I) and reducing in (II)

B. reducing in (I) and oxidising in (II)

C. Reducing in (I) and (II)

D. oxidisng in (I) and (II)

Answer: C

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32. Which set of quantum numbers is possible for the last electron of Mg^+ ion

A. n=3,l=2,m=0,s=+1/2

B. n=2,l=3,m=0,s=+1/2

C. n=1,l=0,m=0,s=+1/2

D. n=3,l=0,m=0,s=+1/2

Answer: D

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33. Which of the following reactions is said to be entropy driven?

A. Endothermic reaction with positive entropy change and high temperature

B. Endothermic reaction will negative entropy change and low temperature

C. Exothermic reaction with positive entropy change and high temperature

D. Exothermic reactionn with negative entropy change and low temperature

Answer: A

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34. If 10^{21} molecules are removed from 200 mg of CO_2, the number of moles of CO_2 left is

A. 2.88×10^{-3}

B. 28.8×10^{-3}

C. 0.288×10^{-3}

D. 1.66×10^{-2}

Answer: A

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35. The ions O^{-2}, F^{-}, Mg^{2+} and Al^{3+} are isoelectronic. Their ionic radii show

A. a decrease from O^{2-} to F^{-} and then increase from Na^{+} to Al^{3+}

B. a significant increase from O^{2-} to Al^{3+}

C. a significant decrease from O^{2-} to Al^{3+}

D. an increase from O^{2-} to F^{-} and then decrease from Na^{+} to Al^{3+}

Answer: C

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36. The pH of 0.004 M hydrazine solution is 9.7. its ionisation constant (K_b) is

A. 7.79×10^{-8}

B. 4.49×10^{-9}

C. 1.67×10^{-10}

D. 6.25×10^{-7}

Answer: D

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37. The vapoour density of a mixture containing NO_2 and N_2O_4 is 38.3 at 300 K. the number of

moles of NO_2 in 100 g of the mixture is approximately

A. 0.44

B. 4.4

C. 33.4

D. 3.34

Answer: A

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38. An alkane C_7H_{16} is produced by the reaction of lithium di(3-pentyl)cuprate with ethyl bromide. The name of the product is

A. 3-methylhexane

B. 2-ethylpentane

C. 3-ethylpentane

D. n-heptane.

Answer: C

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39. The enthalpy of neutralisation of NH_4OH and CH_3COOH is -10.5 kcal mol^{-1} and enthalpy of neutralisation of CH_3COOH with strong base is -12.5 kcal mol^{-1}. The enthalpy of ionisation of NH_4OH will be

A. 4.0 kcal mol^{-1}

B. 3.0 kcal mol^{-1}

C. 2.0 kcal mol^{-1}

D. 3.2 kcal mol^{-1}

Answer: C

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40. When $LiNO_3$ is heated, it gives oxide, Li_2O whereas other alkali metals nitrates decompose to give corresponding

A. nitrite

B. peroxide

C. both nitrite and oxide

D. none of these

Answer: A

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41. Which one of the following statements is not true?

A. pH of drinkingg water should be between 5.5-9.5

B. Concentration of DO below 6 ppm is good from the growth of fish

C. Clean water would have a BOD value of less than 5 ppm

D. Oxides of sulphur, nitrogen and carbon are the most widespread air pollutant

Answer: B

42. The solubility product of MgF_2 is 7.4×10^{-11}. Calculate the solubility of MgF_2 in 0.1M NaF solution

A. 7.4×10^{-9}

B. 3.7×10^{-9}

C. 3.7×10^{-11}

D. 7.4×10^{-11}

Answer: A

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43. The aqueous solution of potash alum $\left[K_2SO_4 \cdot Al_2(SO_4)_3 \cdot 24H_2O\right]$ is acidic due to

A. hydrolysis of K^+

B. hydrolysis of Al^{3+}

C. hydrolysis of SO_4^{2-}

D. Presence of acid in its crystal as impurity.

Answer: B

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44. For reaction, $2NOCl_{(g)} \Leftrightarrow 2NO_{(g)} + Cl_{2(g)}$, K_c at $427^\circ C$ is $3 \times 10^{-6} L \quad mol^{-1}$. The value of K_p is nearly,

A. 7.50×10^{-5}

B. 2.50×10^{-5}

C. 2.50×10^{-4}

D. 1.75×10^{-4}

Answer: D

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45. At a certain temperature, the equilibrium constant K_c is 16 for the reaction,

$SO_{(g)} + NO_{2(g)} \Leftrightarrow SO_{3(g)} + NO_{(g)}$

If 1.0 mol each of the four gases is taken in a one litre container the concentration of NO_2 at equilibrium would is

A. 1.6 mol L^{-1}

B. 0.8 mol L^{-1}

C. 0.4 mol L^{-1}

D. 0.6 mol L^{-1}

Answer: C

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46. For which of the following reactions, the degree of dissociation cannot be calculated from the vapour density data.

I. $2HI_{(g)} \Leftrightarrow H_{2(g)} + I_{2(g)}$

II. $2NH_{3(g)} \Leftrightarrow N_{2(g)} + 3H_{2(g)}$

III. $2NO_{(g)} \Leftrightarrow N_{2(g)} + O_{2(g)}$

IV. $PCl_{5(g)} \Leftrightarrow PCl_{3(g)} + Cl_{2(g)}$

A. I and III

B. III and IV

C. I and II

D. II and III

Answer: A