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[முழுப் பதிப்புரிமையுடையது]
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இலங்கைப் பரீட்சைத் திணைக்களம்
Department of Examinations, Sri Lanka

02 E I

අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය, 2006 අප්‍රේල්
கல்விப் பொதுத் தராதரப் பத்திர(உயர் தர)ப் பரீட்சை, 2006 ஏப்பிரல்
General Certificate of Education (Adv. Level) Examination, April 2006

රසායන විද්‍යාව I
இரசாயனவியல் I
Chemistry I

පැය දෙකයි
இரண்டு மணித்தியாலம்
Two hours

Important :

- *This paper consists of* **10** *pages (Periodic Table is also provided).*
- *Answer* ***all*** *the questions.*
- ***Use of calculators is not allowed.***
- *Write your* ***Index Number*** *in the space provided in the answer sheet.*
- *Instructions are given on the back of the answer sheet. Follow those carefully.*
- *In each of the questions* **1** *to* **60**, *pick one of the alternatives from* (1), (2), (3), (4), (5) *which is* ***correct or most appropriate*** *and* ***mark your response on the answer sheet with a cross*** (×) *on the number of the correct option in accordance with the instructions given on the back of the answer sheet.*

Universal gas constant, $R = 8{\cdot}314\ J\,K^{-1}\,mol^{-1}$
Avogadro constant, $N_A = 6{\cdot}022 \times 10^{23}\ mol^{-1}$

1. The oxidation number and valency of the carbon atom in CH_2Cl_2 are respectively,
   (1) −2 and 4. (2) +2 and 4 (3) 0 and 4. (4) +4 and 0 (5) 0 and +2.

2. Which of the following statements is **incorrect** regarding isotopes of an element?
   They have
   (1) the same number of electrons.
   (2) the same density.
   (3) similar chemical properties.
   (4) different numbers of neutrons.
   (5) the same number of protons.

3. Which arrangement of compounds given below, gives the correct increasing order of **boiling points**?
   (1) $CH_3CH_2CH_2CH_2CH_3 < CH_3CH_2COCH_3 < CH_3CH_2COOH < CH_3CH_2CH_2CH_2OH$
   (2) $CH_3CH_2CH_2CH_2CH_3 < CH_3CH_2COOH < CH_3CH_2COCH_3 < CH_3CH_2CH_2CH_2OH$
   (3) $CH_3CH_2COCH_3 < CH_3CH_2CH_2CH_2CH_3 < CH_3CH_2CH_2CH_2OH < CH_3CH_2COOH$
   (4) $CH_3CH_2COCH_3 < CH_3CH_2COOH < CH_3CH_2CH_2CH_2OH < CH_3CH_2CH_2CH_2CH_3$
   (5) $CH_3CH_2CH_2CH_2CH_3 < CH_3CH_2COCH_3 < CH_3CH_2CH_2CH_2OH < CH_3CH_2COOH$

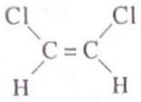
4. The valence shell electronic configuration of an element showing the valencies 2 and 4 **only** in its compounds is,
   (1) $3d^4 4s^2$ (2) $2s^2 2p^4$ (3) $2s^2 2p^2$ (4) $3s^2 3p^4$ (5) $3s^2 3p^1$

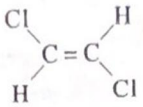
5. Which of the following **will not** colour the CCl_4 layer violet when shaken with CCl_4 and an acidified solution of KI?
   (1) CrO_4^{2-} (2) MnO_2 (3) HBr (4) KO_2 (5) $Ca(OCl)_2$

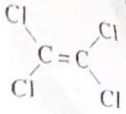
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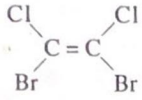
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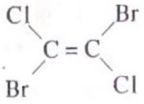
6. Which one of the following molecules has the **largest** dipole moment?

(1) 

(2) 

(3) 

(4) 

(5) 

7. The mass of $K_2SO_4 \cdot Cr_2(SO_4)_3 \cdot 24H_2O$ (relative molar mass = 894) required to prepare 1.00 dm^3 of 10.4 ppm Cr^{3+} solution (1 ppm = 1 mg dm^{-3} ; Cr = 52.0) is,

(1) 8.940 mg (2) 8.940 g (3) 17.88 mg (4) 178.8 mg (5) 89.40 mg

8. Which of the following cations

(i) gives a precipitate with NH_4OH, insoluble in excess

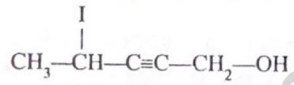
and (ii) gives a precipitate with dilute NaOH, insoluble in excess?

(1) Fe^{3+} (2) Zn^{2+} (3) Al^{3+} (4) Cu^{2+} (5) Ni^{2+}

9. Which one of the following pairs contains species with different shapes?

(1) CO_2, $BeCl_2$ (2) PO_4^{3-}, $S_2O_3^{2-}$ (3) NO_3^-, SO_3 (4) HOBr, H_2S (5) NCl_3, BCl_3

10. What is the IUPAC name of the following compound?



(1) 2-Iodo-3-pentyn-5-ol
(2) 4-Iodopent-2-yne-1-ol
(3) 1-Hydroxy-4-iodo-2-pentyne
(4) 2-Iodo-5-hydroxy-3-pentyne
(5) 4-Iodo-2-pentyn-1-ol

11. The pair of elements forming dioxides, which are solids at room temperature is,

(1) Mn, Cu (2) Mn, S (3) Cu, Ni (4) Ti, Si (5) S, N

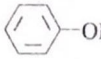
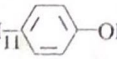
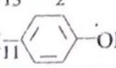
12. The cation that forms a hydroxide which readily reacts with oxygen under basic conditions is,

(1) Cr^{3+} (2) Cu^{2+} (3) Co^{2+} (4) Mn^{2+} (5) Fe^{3+}

13. Solubilities of four organic compounds **A**, **B**, **C** and **D** in water and in an aqueous solution of 5% HCl are given below.

	A	**B**	**C**	**D**
Water	Insoluble	Insoluble	Insoluble	Insoluble
5% HCl	Insoluble	Soluble	Insoluble	Insoluble

Which one of the following rows of compounds (1) to (5) is consistent with the above observations?

A	**B**	**C**	**D**
(1) CH_3CH_2OH	$CH_3CH_2NH_2$	CH_3COOH	
(2) CH_3CH_2OH	$CH_3CH_2NH_2$		CH_3COOH
(3) C_5H_{11}	$CH_3CH_2NH_2$	$C_6H_{13}OH$	CH_3COOH
(4) $C_6H_{13}OH$	$C_6H_{13}NH_2$	C_5H_{11}	$C_5H_{11}COOH$
(5) $C_6H_{13}NH_2$	C_5H_{11}	$C_5H_{11}COOH$	$C_6H_{13}OH$

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14. A 30.0 mg sample of a volatile liquid is vaporised at 127 °C. The volume of the vapour phase measured at 1.00×10^5 Pa is 16.65 cm^3. If the vapour phase behaves ideally, the liquid is most likely to be (H = 1.0, C = 12.0, O = 16.0, Cl = 35.5)
(1) methanol. (2) ethanol. (3) acetone.
(4) chloroform. (5) carbon tetrachloride.

15. The energy released in the process

$X(g) + e \longrightarrow X^-(g)$ is lowest when X is

(1) Li (2) Be (3) B (4) C (5) F

16. Which one of the following statements is **not true** regarding the ions N^{3-}, O^{2-} and F^- ?
(1) They have the same electronic configuration.
(2) Nuclear charge follows the order $N^{3-} < O^{2-} < F^-$.
(3) They have the same number of electrons as Ne.
(4) Their radii follow the order $N^{3-} < O^{2-} < F^-$.
(5) Compounds containing these ions are formed when Li reacts with the respective gases, N_2, O_2 and F_2

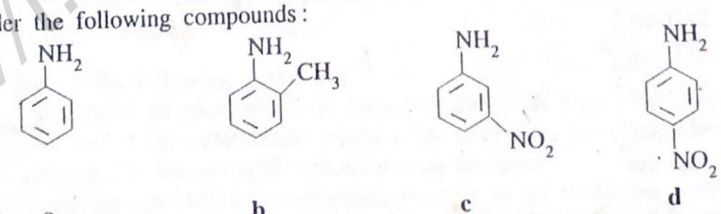
17. Which arrangement of compounds given below, gives the correct increasing order of **acid strength**?
(1) $C_6H_5OH < CH_3COOH < CH_3CH{=}CH_2 < CH_3C{\equiv}CH$
(2) $CH_3CH{=}CH_2 < C_6H_5OH < CH_3COOH < CH_3C{\equiv}CH$
(3) $CH_3CH{=}CH_2 < CH_3C{\equiv}CH < CH_3COOH < C_6H_5OH$
(4) $CH_3C{\equiv}CH < CH_3CH{=}CH_2 < C_6H_5OH < CH_3COOH$
(5) $CH_3CH{=}CH_2 < CH_3C{\equiv}CH < C_6H_5OH < CH_3COOH$

18. A 10.0 cm^3 sample of coconut vinegar (density = 1.07 g cm^{-3}) was titrated with a 0.428 mol dm^{-3} NaOH solution, using a suitable indicator. If the end point was 25.00 cm^3, the mass percentage (w/w%) of acetic acid (relative molar mass of CH_3COOH = 60.0) in the vinegar, is
(1) 0.060 (2) 0.60 (3) 3.0 (4) 6.0 (5) 12.0

19. Which one of the following statements is **not true** about hybridisation?
(1) Hybrid orbitals formed from a given hybridisation have the same shape.
(2) Hybrid orbitals may form π bonds.
(3) The angle between sp^2 hybrid orbitals is 120°.
(4) All carbon atoms in hydrocarbons are hybridised.
(5) Hybrid orbitals formed from a given hybridisation have the same energy.

20. The polymer which reacts most readily with Br_2 is
(1) natural rubber. (2) PVC.
(3) phenol-formaldehyde polymer. (4) poly(styrene).
(5) poly(ethylene).

21. Consider the following compounds :



a **b** **c** **d**

Which arrangement of the compounds **a**, **b**, **c** and **d** given below, gives the correct increasing order of **base strength**?
(1) **a < b < c < d** (2) **d < c < b < a** (3) **d < c < a < b**
(4) **c < d < a < b** (5) **b < a < c < d**

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22. The standard electrode potential of the metal/metal-ion electrodes $A^{2+}(aq)/A$ and $B^{2+}(aq)/B$ are -0.75 V and -1.0 V respectively. Which of the following statements is **incorrect** regarding a cell constructed by combining the above two standard electrodes, when a current is drawn from the cell?
(1) In the external circuit current flows from **B** to **A**.
(2) Anions move towards the $B^{2+}(aq)/B$ electrode.
(3) The $A^{2+}(aq)/A$ electrode is the cathode.
(4) The mass of the metal **B** decreases with time.
(5) Oxidation occurs at the $B^{2+}(aq)/B$ electrode.

23. Which two aqueous solutions of the following **will not form** a precipitate when mixed together?

(A) $BaCl_2$ (B) $MgSO_4$ (C) $Pb(NO_3)_2$ (D) NH_4OH

(1) A and B (2) A and C (3) B and C (4) C and D (5) A and D

24. Average bond energies of C ≡ N and C – N bonds are 837 and 347 kJ mol^{-1} respectively. The most reasonable value for the average bond energy (kJ mol^{-1}) of C = N bond is,

(1) 837 – 347 (2) $(837+347)\times\frac{1}{2}$ (3) $837\times\frac{2}{3}$

(4) $347+\frac{(837-347)}{2}$ (5) 347 × 2

25. At 25°C the pressure inside a vessel containing gas **X** is 10 atm. **X** dissociates when exposed to UV light resulting in the following equilibrium.

$$3\ \mathbf{X}\ (g) \rightleftharpoons 3\ \mathbf{Q}(g) + 2\ \mathbf{R}(g)$$

It is found that when equilibrium is reached at 25 °C the pressure in the vessel is 13 atm. The percentage of **X** decomposed at equilibrium is

(1) 75 (2) 15 (3) 30 (4) 10 (5) 45

26. Organic compound **A** contains C, H and N only. The complete combustion of 0.88 g of **A** gave 1.76 g of CO_2 and 1.08 g of H_2O. In a separate experiment, 0.88 g of **A** gave 0.34 g of NH_3.
(C = 12.0, H = 1.0, N = 14.0, O = 16.0)

Which of the following statements is the most appropriate deduction?
(1) **A** is a saturated compound with molecular formula $C_4H_{12}N_2$.
(2) **A** is an aliphatic diamine with molecular formula $C_4H_{12}N_2$.
(3) **A** is an unsaturated compound with molecular formula $C_5H_{12}N_2$.
(4) **A** is an aliphatic diamine with molecular formula $C_5H_{12}N_2$.
(5) The data provided above is insufficient to determine the molecular formula of **A**.

27. Solution **S** is prepared by mixing equal volumes of 0.2 mol dm^{-3} aqueous H_2SO_4 and 0.2 mol dm^{-3} aqueous CH_3COOH. 25.0 cm^3 portions of **S** are titrated separately with 0.1 mol dm^{-3} NaOH solution (in burette) using (A) phenolphthalein and (B) methyl orange as indicators. The end-points of the two titrations are respectively
(1) (A) 75.0 cm^3 (B) 25.0 cm^3.
(2) (A) 25.0 cm^3 (B) 25.0 cm^3.
(3) (A) 75.0 cm^3 (B) 50.0 cm^3.
(4) (A) 50.0 cm^3 (B) 75.0 cm^3.
(5) (A) 25.0 cm^3 (B) 50.0 cm^3.

28. Which one of the following observations **cannot** be explained by using the electrochemical series?
(1) Reducing ability of K is more than that of Na.
(2) F_2 is more easily reduced than Cl_2.
(3) $Cu^{2+}(aq)$ forms a complex with $Cl^-(aq)$ while $Mg^{2+}(aq)$ does not.
(4) Fe can be oxidized by $H^+(aq)$.
(5) Mg can displace Cu from an aqueous solution of $CuSO_4$.

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29. Solutions **A** to **D** are prepared as follows ;

A - 10.0 cm^3 of 0.1 mol dm^{-3} aqueous NH_4OH + 10.0 cm^3 of H_2O

B - 10.0 cm^3 of 0.1 mol dm^{-3} aqueous NH_4OH + 10.0 cm^3 of 0.15 mol dm^{-3} aqueous NH_4Cl

C - 10.0 cm^3 of 0.1 mol dm^{-3} aqueous NH_4OH + 10.0 cm^3 of 0.10 mol dm^{-3} aqueous $(NH_4)_2SO_4$

D - 10.0 cm^3 of 0.1 mol dm^{-3} aqueous NH_4OH + 10.0 cm^3 of 0.05 mol dm^{-3} aqueous NH_4OH

The correct order of the pH of the solutions **A** to **D** is

(1) **B < C < A < D**
(2) **D < A < C < B**
(3) **C < B < A < D**
(4) **B < A < C < D**
(5) **A < D < C < B**

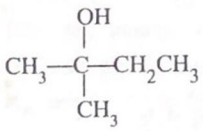
30. The colour imparted on the Bunsen flame by metal atoms results from the light energy released when the electrons return to the ground state (energy = $\in_0$) from the 1st excited state (energy = $\in_1$). The flame colours of some atoms are given below.

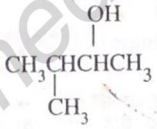
Li – red, Cu – green, Na – yellow, K – violet

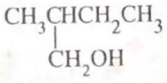
The correct order of $\in_1 - \in_0$, for the atoms is,

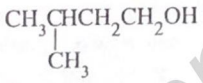
(1) Li > Cu > Na > K
(2) Na > Li > K > Cu
(3) Cu > Li > Na > K
(4) K > Cu > Na > Li
(5) Na > K > Li > Cu

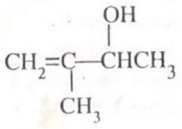
31. Which of the alcohols is the **most difficult** to oxidise with an acidic solution of potassium dichromate?

(1) 

(2) 

(3) 

(4) 

(5) 

32. The most convenient method to prepare a reasonably pure solution of NaOH at home is

(1) heating a solution of common salt with slaked lime.
(2) heating a solution of baking soda with slaked lime.
(3) heating a solution of washing soda with limestone.
(4) electrolysing a solution of common salt using Fe electrodes.
(5) heating a solution of washing soda with slaked lime.

33. Which one of the following statements is true?

(1) The rate of an exothermic reaction decreases with increasing temperature.
(2) The rate of an endothermic reaction increases with increasing temperature.
(3) Temperature has no effect on solid-state reactions.
(4) A catalyst converts an endothermic reaction to an exothermic one.
(5) A catalyst decreases the enthalpy change of a reaction.

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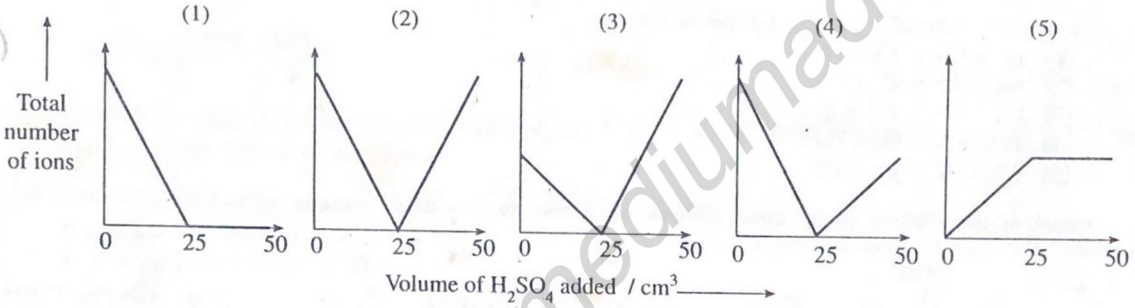
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34. The product that results when 2-butanone is first treated with $LiAlH_4$ followed by hydrolysis with deuterium oxide (D_2O) is

(1) $CH_3\overset{\overset{OD}{|}}{C}DCH_2CH_3$ (2) $CH_3\overset{\overset{OH}{|}}{C}DCH_2CH_3$ (3) $CH_3\overset{\overset{OD}{|}}{C}HCH_2CH_3$

(4) $CH_3\overset{\overset{OH}{|}}{C}HCH_2CH_3$ (5) $CH_3CD_2CH_2CH_3$

35. When 50.0 cm^3 of 0.1 mol dm^{-3} H_2SO_4 solution is added gradually to 25.0 cm^3 of 0.1 mol dm^{-3} $Ba(OH)_2$ solution, the variation of the total number of ions in the mixture is shown by



36. The function of the $FeBr_3$ catalyst in the reaction of bromine and benzene is to

(1) serve as a radical initiator to generate $Br^{\bullet}$.
(2) stabilize the carbocation intermediate.
(3) destabilize the carbocation intermediate.
(4) act as a Lewis acid to activate bromine.
(5) act as a Lewis acid to activate benzene.

37. Which one of the following statements is **not true**? (K_w = 1.0×10^{-14} $mol^2\,dm^{-6}$ at 25 °C; K_w = 1.0×10^{-12} $mol^2\,dm^{-6}$ at 80 °C; Ignore the effect of dissolved CO_2).

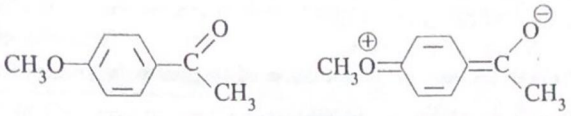
(1) Pure water at 25 °C has a pH of 7.
(2) Chlorinated water has a pH less than 7.
(3) When a 0.1 mol dm^{-3} solution of H_2SO_4 is titrated with a 0.2 mol dm^{-3} solution of NaOH at 25 °C, the pH rises to 7 at the end point.
(4) When a 0.1 mol dm^{-3} solution of H_2SO_4 is titrated with a 0.2 mol dm^{-3} solution of NaOH at 80 °C, the pH rises to 6 at the end point.
(5) The volume of 0.2 mol dm^{-3} NaOH required for the titration of 10.0 cm^3 of 0.1 mol dm^{-3} H_2SO_4 is less at 80 °C than that required at 25 °C.

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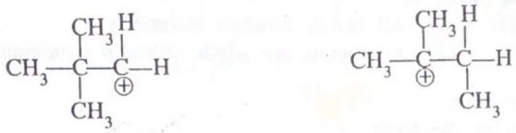
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38. Which of the following is **not** a pair of resonance structures?

(1) 

(2) 

(3) 

(4) 

(5) 

Use the following passage to answer questions **39** and **40**.

A and **B** are two liquids that give ideal solutions. A solution of **A** and **B** is in equilibrium with its vapour. X_A and X_B are the mole fractions of **A** and **B** respectively in the liquid phase while Y_A and Y_B are the corresponding values for the vapour phase. p_A^0, the vapour pressure of pure **A**, is larger than p_B^0, the vapour pressure of pure **B**.

39. $3a$ mol of **A** and $2a$ mol of **B** are placed in an evacuated vessel and an equilibrium between liquid and vapour phases results. Which one of the following is true for the above system?

(1) $X_A = 0.6$ and $X_B = 0.4$
(2) $Y_A < X_A$ and $Y_B < X_B$
(3) $X_A < Y_A$ and $X_B < Y_B$
(4) $Y_A < X_A$ and $X_B < Y_B$
(5) $X_A < Y_A$ and $Y_B < X_B$

40. Which one of the following statements is **not true** for any binary solution of **A** and **B**?

(1) The partial vapour pressure of **A** decreases as X_B increases.
(2) The partial vapour pressure of **B** decreases as X_A increases.
(3) For a given X_B, the total vapour pressure is higher than either p_A^0 or p_B^0.
(4) The total vapour pressure increases as X_A increases.
(5) The total vapour pressure decreases as X_B increases.

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● **Instructions for questions No. 41 to 50**

For each of the questions **41** to **50**, four responses (*a*), (*b*), (*c*) and (*d*) are given. One or more of these is/are correct. Select the correct response/responses. In accordance with the instructions given on your answer sheet, mark

(1) if only (*a*) and (*b*) are correct.
(2) if only (*b*) and (*c*) are correct.
(3) if only (*c*) and (*d*) are correct.
(4) if only (*d*) and (*a*) are correct.
(5) if **any other** number or combination of responses is/are correct.

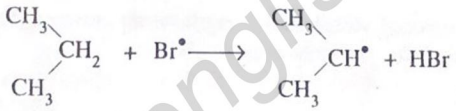
Summary of above Instructions				
(1)	(2)	(3)	(4)	(5)
Only (*a*) and (*b*) correct	Only (*b*) and (*c*) correct	Only (*c*) and (*d*) correct	Only (*d*) and (*a*) correct	**Any other** number or combination of responses correct

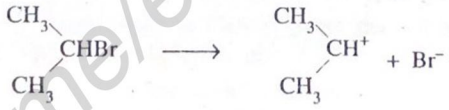
41. Which of the following statements is/are **incorrect**?
(*a*) All transition elements are metals. (*b*) All metals conduct electricity.
(*c*) No nonmetal conducts electricity. (*d*) All metals are solids at room temperature.

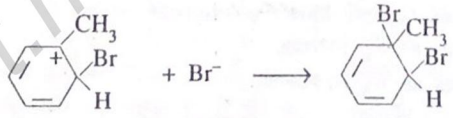
42. Which of the following statements is/are true?
(*a*) Bohr Theory is a nuclear model of the atom.
(*b*) Rutherford proposed the first nuclear model of the atom.
(*c*) Electrons do not behave as waves and particles at one and the same time.
(*d*) *e*/*m* ratio of cathode rays varies with the gas inside a cathode ray tube.

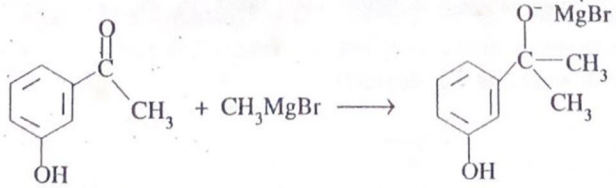
43. Which of the following statements is/are applicable to all three elements Zn, Cu, and Ni?
(*a*) They are d-block elements.
(*b*) Solutions containing their ions form precipitates with $(NH_4)_2S$.
(*c*) They liberate H_2 from dilute acids.
(*d*) Their oxides dissolve in NH_4OH.

44. Which of the following mechanistic steps is/are feasible?

(*a*) 

(*b*) 

(*c*) 

(*d*) 

45. Which of the following statements is/are true?
(*a*) The compressibility of all real gases approaches unity at low pressure.
(*b*) If the pressure is high enough any real gas can be liquefied at room temperature.
(*c*) Under identical conditions of temperature and volume, the pressure of an ideal gas is lower than that of a real gas.
(*d*) At sufficiently low temperatures, any real gas can show a compressibility less than unity.

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46. Consider the following equilibrium at 150 °C

$$A(g) + B(g) \rightleftharpoons P(g) + Q(g) \; ; \quad \Delta H^{\theta} = -50.0 \text{ kJ mol}^{-1}$$

Which of the following statements is/are true for the above system when the temperature is raised to 250 °C?

(*a*) Initially the rate of the forward reaction rises faster than that of the reverse reaction.

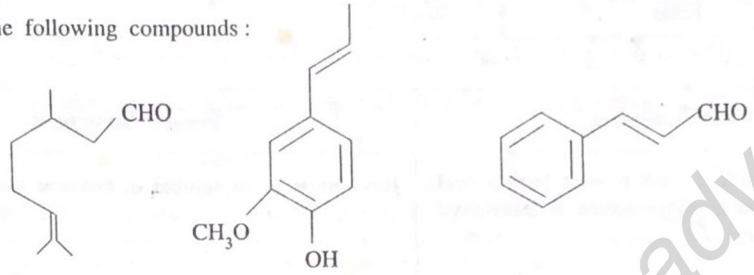
(*b*) Initially the rate of the reverse reaction rises faster than that of the forward reaction.

(*c*) Initially both forward and reverse reaction rates increase by the same factor.

(*d*) At equilibrium,

$$\frac{\text{Rate of the forward reaction at 250 °C}}{\text{Rate of the forward reaction at 150 °C}} = \frac{\text{Rate of the reverse reaction at 250 °C}}{\text{Rate of the reverse reaction at 150 °C}}$$

47. Consider the following compounds :



Citronellal Eugenol Cinnamaldehyde

Which the following statements is/are correct?

(*a*) Citronellal, which is present in citronella oil, affects the plane of polarized light.

(*b*) Eugenol, which is the major compound of clove oil, is used in dentistry.

(*c*) Eugenol, which is also the major compound of cinnamon bark oil, shows both geometric and optical isomerism.

(*d*) Cinnamaldehyde, which is used as a flavouring agent in food industry, is the major compound of cinnamon leaf oil.

48. Which of the following statements is/are correct?

(*a*) There is a rapid change of pH near the end-point of an acid-base titration.

(*b*) There is a rapid change of pH at the beginning of an acid-base titration.

(*c*) In MnO_4^-–oxalic acid titration, the colour change at the end-point is due to a rapid change of pH.

(*d*) Diphenylamine is used as the indicator in the titration between Fe^{2+} and $Cr_2O_7^{2-}$.

49. Which of the following statements is/are **not true** regarding the preparation of ethanol (boiling point 78.1°C) from sugar (sucrose, $C_{12}H_{22}O_{11}$) by fermentation using yeast?

(*a*) One mole of sugar is expected to provide 4 moles of ethanol and 4 moles of carbon dioxide.

(*b*) High concentrations of ethanol inhibit the fermentation and the concentration of ethanol in the fermentation product will be less than 15%.

(*c*) More concentrated ethanol can be isolated by distillation of the filtrate of the fermentation broth, and the fraction distilled at 78–80 °C would contain 100% ethanol.

(*d*) The fractions distilled at temperatures over 88 °C contain fusel oil which consists of higher alcohols.

50. The kinetic molecular theory equation for an ideal gas is $pV = \frac{1}{3}mN\overline{C^2}$. Which of the following statements is/are true for a sample of an ideal gas?

(*a*) $\overline{C^2}$ increases with p at constant temperature.

(*b*) $\overline{C^2}$ increases with V at constant temperature.

(*c*) $\overline{C^2}$ increases with temperature.

(*d*) $\overline{C^2}$ increases if more molecules of the gas are introduced into the sample at constant temperature.

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Instructions for questions No. 51 to 60

In questions No. **51** to **60**, two statements are given in respect of each question.
From the Table given below, select the response out of the responses (1), (2), (3), (4) and (5) that **best** fits the two statements given for each of the questions and mark appropriately on your answer sheet.

Response	First Statement	Second Statement
(1)	True	True, and correctly explains the first statement.
(2)	True	True, but does **not** explain the first statement correctly.
(3)	True	False
(4)	False	True
(5)	False	False

	First Statement	Second Statement
51.	When bromine-water is shaken with hexene and benzene, the colour of the bromine is transferred to the organic layer.	Bromine is more soluble in benzene than in water.
52.	At constant temperature, the rate of hydrogenation of ethylene on Ni catalyst should be the same as that on Pd catalyst.	At constant temperature, rate of hydrogenation depends only on the initial concentration of the reactants.
53.	Fe_3O_4 can, not only be reduced to FeO, but can also be oxidised to Fe_2O_3.	Fe_3O_4 contains both Fe^{2+} and Fe^{3+}.
54.	When a molecule of an ideal gas bounces off the wall of the container, the momentum of the molecule changes.	When a molecule bounces off the wall, its speed as well as the direction of motion changes.
55.	No chloride is more soluble in conc. HCl than in water.	Due to the common ion effect exerted by the large Cl^- concentration in conc. HCl, the solubilities of all chlorides decrease in this acid.
56.	The standard enthalpy of formation of all elements is taken as zero.	As elements are not in a chemically combined state, their enthalpies of formation equal zero.
57.	The rate of the gaseous reaction $A(g) \rightarrow B(g)$, remains constant as long as the temperature remains constant.	At constant temperature, the number of collisions between reactant molecules as well as the fraction of molecules with sufficient energy for reaction remains constant.
58.	The atomic spectrum of hydrogen is a line spectrum.	The energy associated with each line of the spectrum is equal to the energy of the electronic level corresponding to the line.
59.	When the pH of an aqueous solution changes, the pOH also changes by the same number of units.	When the H^+ concentration of a solution changes, the OH^- concentration also changes by the same amount.
60.	Galvanising is a convenient process for making iron corrosion resistant.	Galvanising can be done by immersing a piece of iron in an aqueous solution of $ZnCl_2$.

* * *

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