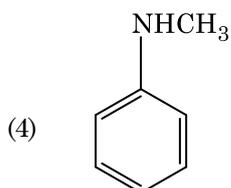
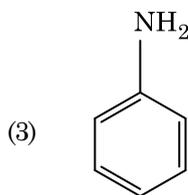
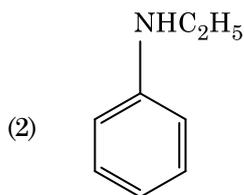
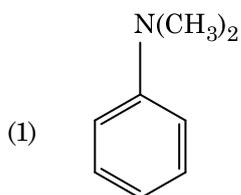


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- Which of the following is a natural polymer ?
 - polybutadiene
 - poly (Butadiene-acrylonitrile)
 - cis*-1,4-polyisoprene
 - poly (Butadiene-styrene)
- The following metal ion activates many enzymes, participates in the oxidation of glucose to produce ATP and with Na, is responsible for the transmission of nerve signals.
 - Calcium
 - Potassium
 - Iron
 - Copper
- HCl was passed through a solution of CaCl_2 , MgCl_2 and NaCl. Which of the following compound(s) crystallise(s) ?
 - Only MgCl_2
 - NaCl, MgCl_2 and CaCl_2
 - Both MgCl_2 and CaCl_2
 - Only NaCl
- Which of the following amine will give the carbylamine test ?



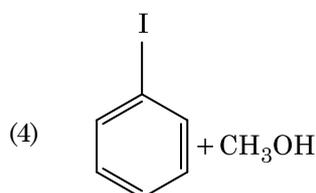
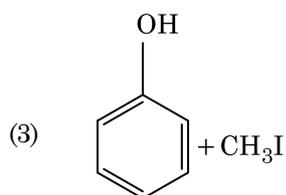
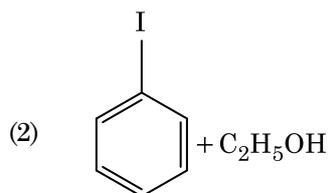
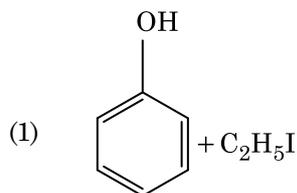
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- The mixture which shows positive deviation from Raoult's law is :
 - Acetone + Chloroform
 - Chloroethane + Bromoethane
 - Ethanol + Acetone
 - Benzene + Toluene
- Which of the following is **not** correct about carbon monoxide ?
 - The carboxyhaemoglobin (haemoglobin bound to CO) is less stable than oxyhaemoglobin.
 - It is produced due to incomplete combustion.
 - It forms carboxyhaemoglobin.
 - It reduces oxygen carrying ability of blood.
- The freezing point depression constant (K_f) of benzene is $5.12 \text{ K kg mol}^{-1}$. The freezing point depression for the solution of molality 0.078 m containing a non-electrolyte solute in benzene is (rounded off upto two decimal places) :
 - 0.40 K
 - 0.60 K
 - 0.20 K
 - 0.80 K
- Sucrose on hydrolysis gives :
 - α -D-Glucose + β -D-Fructose
 - α -D-Fructose + β -D-Fructose
 - β -D-Glucose + α -D-Fructose
 - α -D-Glucose + β -D-Glucose

9. Identify the **correct** statements from the following :
- $\text{CO}_2(\text{g})$ is used as refrigerant for ice-cream and frozen food.
 - The structure of C_{60} contains twelve six carbon rings and twenty five carbon rings.
 - ZSM-5, a type of zeolite, is used to convert alcohols into gasoline.
 - CO is colorless and odourless gas.
- (b) and (c) only
 - (c) and (d) only
 - (a), (b) and (c) only
 - (a) and (c) only
10. Elimination reaction of 2-Bromo-pentane to form pent-2-ene is :
- β -Elimination reaction
 - Follows Zaitsev rule
 - Dehydrohalogenation reaction
 - Dehydration reaction
- (b), (c), (d)
 - (a), (b), (d)
 - (a), (b), (c)
 - (a), (c), (d)
11. Paper chromatography is an example of :
- Thin layer chromatography
 - Column chromatography
 - Adsorption chromatography
 - Partition chromatography
12. Identify the **incorrect** match.
- | | Name | | IUPAC Official Name |
|-----|-------------|-------|---------------------|
| (a) | Unnilunium | (i) | Mendelevium |
| (b) | Unniltrium | (ii) | Lawrencium |
| (c) | Unnilhexium | (iii) | Seaborgium |
| (d) | Unununnium | (iv) | Darmstadtium |
- (c), (iii)
 - (d), (iv)
 - (a), (i)
 - (b), (ii)
13. Identify the **correct** statement from the following :
- Vapour phase refining is carried out for Nickel by Van Arkel method.
 - Pig iron can be moulded into a variety of shapes.
 - Wrought iron is impure iron with 4% carbon.
 - Blister copper has blistered appearance due to evolution of CO_2 .
14. Hydrolysis of sucrose is given by the following reaction.
- $$\text{Sucrose} + \text{H}_2\text{O} \rightleftharpoons \text{Glucose} + \text{Fructose}$$
- If the equilibrium constant (K_c) is 2×10^{13} at 300 K, the value of $\Delta_r G^\ominus$ at the same temperature will be :
- $8.314 \text{ J mol}^{-1} \text{ K}^{-1} \times 300 \text{ K} \times \ln(3 \times 10^{13})$
 - $-8.314 \text{ J mol}^{-1} \text{ K}^{-1} \times 300 \text{ K} \times \ln(4 \times 10^{13})$
 - $-8.314 \text{ J mol}^{-1} \text{ K}^{-1} \times 300 \text{ K} \times \ln(2 \times 10^{13})$
 - $8.314 \text{ J mol}^{-1} \text{ K}^{-1} \times 300 \text{ K} \times \ln(2 \times 10^{13})$
15. The number of Faradays(F) required to produce 20 g of calcium from molten CaCl_2 (Atomic mass of $\text{Ca} = 40 \text{ g mol}^{-1}$) is :
- 3
 - 4
 - 1
 - 2
16. Match the following and identify the **correct** option.
- | | | | |
|-----|--|-------|---|
| (a) | $\text{CO}(\text{g}) + \text{H}_2(\text{g})$ | (i) | $\text{Mg}(\text{HCO}_3)_2 + \text{Ca}(\text{HCO}_3)_2$ |
| (b) | Temporary hardness of water | (ii) | An electron deficient hydride |
| (c) | B_2H_6 | (iii) | Synthesis gas |
| (d) | H_2O_2 | (iv) | Non-planar structure |
- | | (a) | (b) | (c) | (d) |
|-----|-------|-------|------|------|
| (1) | (iii) | (iv) | (ii) | (i) |
| (2) | (i) | (iii) | (ii) | (iv) |
| (3) | (iii) | (i) | (ii) | (iv) |
| (4) | (iii) | (ii) | (i) | (iv) |

17. Find out the solubility of Ni(OH)_2 in 0.1 M NaOH. Given that the ionic product of Ni(OH)_2 is 2×10^{-15} .
- (1) 1×10^{-13} M
 - (2) 1×10^8 M
 - (3) 2×10^{-13} M
 - (4) 2×10^{-8} M
18. Measuring Zeta potential is useful in determining which property of colloidal solution ?
- (1) Stability of the colloidal particles
 - (2) Size of the colloidal particles
 - (3) Viscosity
 - (4) Solubility
19. Which of the following oxoacid of sulphur has -O-O- linkage ?
- (1) $\text{H}_2\text{S}_2\text{O}_8$, peroxodisulphuric acid
 - (2) $\text{H}_2\text{S}_2\text{O}_7$, pyrosulphuric acid
 - (3) H_2SO_3 , sulphurous acid
 - (4) H_2SO_4 , sulphuric acid
20. Identify the **incorrect** statement.
- (1) Interstitial compounds are those that are formed when small atoms like H, C or N are trapped inside the crystal lattices of metals.
 - (2) The oxidation states of chromium in CrO_4^{2-} and $\text{Cr}_2\text{O}_7^{2-}$ are not the same.
 - (3) $\text{Cr}^{2+}(\text{d}^4)$ is a stronger reducing agent than $\text{Fe}^{2+}(\text{d}^6)$ in water.
 - (4) The transition metals and their compounds are known for their catalytic activity due to their ability to adopt multiple oxidation states and to form complexes.
21. Reaction between benzaldehyde and acetophenone in presence of dilute NaOH is known as :
- (1) Cross Cannizzaro's reaction
 - (2) Cross Aldol condensation
 - (3) Aldol condensation
 - (4) Cannizzaro's reaction
22. The rate constant for a first order reaction is $4.606 \times 10^{-3} \text{ s}^{-1}$. The time required to reduce 2.0 g of the reactant to 0.2 g is :
- (1) 500 s
 - (2) 1000 s
 - (3) 100 s
 - (4) 200 s
23. Which of the following is the **correct** order of increasing field strength of ligands to form coordination compounds ?
- (1) $\text{F}^- < \text{SCN}^- < \text{C}_2\text{O}_4^{2-} < \text{CN}^-$
 - (2) $\text{CN}^- < \text{C}_2\text{O}_4^{2-} < \text{SCN}^- < \text{F}^-$
 - (3) $\text{SCN}^- < \text{F}^- < \text{C}_2\text{O}_4^{2-} < \text{CN}^-$
 - (4) $\text{SCN}^- < \text{F}^- < \text{CN}^- < \text{C}_2\text{O}_4^{2-}$
24. A mixture of N_2 and Ar gases in a cylinder contains 7 g of N_2 and 8 g of Ar. If the total pressure of the mixture of the gases in the cylinder is 27 bar, the partial pressure of N_2 is :
- [Use atomic masses (in g mol^{-1}) : N = 14, Ar = 40]
- (1) 15 bar
 - (2) 18 bar
 - (3) 9 bar
 - (4) 12 bar
25. The number of protons, neutrons and electrons in ${}^{175}_{71}\text{Lu}$, respectively, are :
- (1) 71, 71 and 104
 - (2) 175, 104 and 71
 - (3) 71, 104 and 71
 - (4) 104, 71 and 71
26. Urea reacts with water to form **A** which will decompose to form **B**. **B** when passed through $\text{Cu}^{2+}(\text{aq})$, deep blue colour solution **C** is formed. What is the formula of **C** from the following ?
- (1) Cu(OH)_2
 - (2) $\text{CuCO}_3 \cdot \text{Cu(OH)}_2$
 - (3) CuSO_4
 - (4) $[\text{Cu}(\text{NH}_3)_4]^{2+}$

27. Anisole on cleavage with HI gives :



28. Which of the following alkane cannot be made in good yield by Wurtz reaction ?

- (1) n-Heptane
- (2) n-Butane
- (3) n-Hexane
- (4) 2,3-Dimethylbutane

29. An increase in the concentration of the reactants of a reaction leads to change in :

- (1) threshold energy
- (2) collision frequency
- (3) activation energy
- (4) heat of reaction

30. On electrolysis of dil. sulphuric acid using Platinum (Pt) electrode, the product obtained at anode will be :

- (1) H₂S gas
- (2) SO₂ gas
- (3) Hydrogen gas
- (4) Oxygen gas

31. Which of the following is a basic amino acid ?

- (1) Tyrosine
- (2) Lysine
- (3) Serine
- (4) Alanine

32. Reaction between acetone and methylmagnesium chloride followed by hydrolysis will give :

- (1) Tert. butyl alcohol
- (2) Isobutyl alcohol
- (3) Isopropyl alcohol
- (4) Sec. butyl alcohol

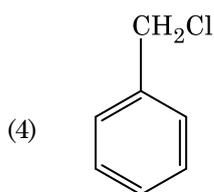
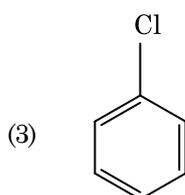
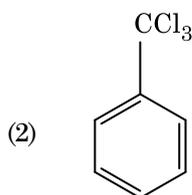
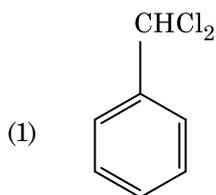
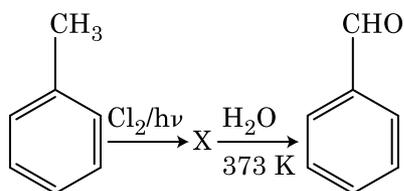
33. For the reaction, 2Cl(g) → Cl₂(g), the **correct** option is :

- (1) Δ_rH < 0 and Δ_rS > 0
- (2) Δ_rH < 0 and Δ_rS < 0
- (3) Δ_rH > 0 and Δ_rS > 0
- (4) Δ_rH > 0 and Δ_rS < 0

34. Which one of the followings has maximum number of atoms ?

- (1) 1 g of O₂(g) [Atomic mass of O = 16]
- (2) 1 g of Li(s) [Atomic mass of Li = 7]
- (3) 1 g of Ag(s) [Atomic mass of Ag = 108]
- (4) 1 g of Mg(s) [Atomic mass of Mg = 24]

35. Identify compound X in the following sequence of reactions :



36. Match the following :

	Oxide		Nature
(a)	CO	(i)	Basic
(b)	BaO	(ii)	Neutral
(c)	Al ₂ O ₃	(iii)	Acidic
(d)	Cl ₂ O ₇	(iv)	Amphoteric

Which of the following is **correct** option ?

	(a)	(b)	(c)	(d)
(1)	(iii)	(iv)	(i)	(ii)
(2)	(iv)	(iii)	(ii)	(i)
(3)	(i)	(ii)	(iii)	(iv)
(4)	(ii)	(i)	(iv)	(iii)

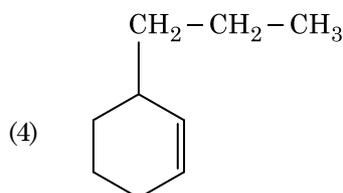
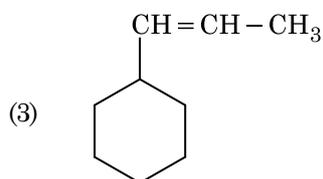
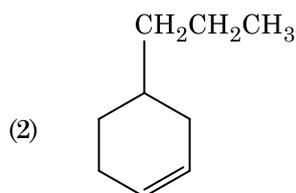
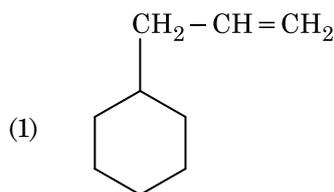
37. A tertiary butyl carbocation is more stable than a secondary butyl carbocation because of which of the following ?

- (1) - R effect of - CH₃ groups
- (2) Hyperconjugation
- (3) - I effect of - CH₃ groups
- (4) + R effect of - CH₃ groups

38. Which of the following set of molecules will have zero dipole moment ?

- (1) Nitrogen trifluoride, beryllium difluoride, water, 1,3-dichlorobenzene
- (2) Boron trifluoride, beryllium difluoride, carbon dioxide, 1,4-dichlorobenzene
- (3) Ammonia, beryllium difluoride, water, 1,4-dichlorobenzene
- (4) Boron trifluoride, hydrogen fluoride, carbon dioxide, 1,3-dichlorobenzene

39. An alkene on ozonolysis gives methanal as one of the product. Its structure is :



40. Identify a molecule which does **not** exist.
- (1) C_2
 - (2) O_2
 - (3) He_2
 - (4) Li_2
41. The correct option for free expansion of an ideal gas under adiabatic condition is :
- (1) $q < 0, \Delta T = 0$ and $w = 0$
 - (2) $q > 0, \Delta T > 0$ and $w > 0$
 - (3) $q = 0, \Delta T = 0$ and $w = 0$
 - (4) $q = 0, \Delta T < 0$ and $w > 0$
42. An element has a body centered cubic (bcc) structure with a cell edge of 288 pm. The atomic radius is :
- (1) $\frac{4}{\sqrt{3}} \times 288$ pm
 - (2) $\frac{4}{\sqrt{2}} \times 288$ pm
 - (3) $\frac{\sqrt{3}}{4} \times 288$ pm
 - (4) $\frac{\sqrt{2}}{4} \times 288$ pm
43. The calculated spin only magnetic moment of Cr^{2+} ion is :
- (1) 5.92 BM
 - (2) 2.84 BM
 - (3) 3.87 BM
 - (4) 4.90 BM
44. Which of the following is a cationic detergent ?
- (1) Cetyltrimethyl ammonium bromide
 - (2) Sodium dodecylbenzene sulphonate
 - (3) Sodium lauryl sulphate
 - (4) Sodium stearate
45. What is the change in oxidation number of carbon in the following reaction ?
- $$CH_4(g) + 4Cl_2(g) \rightarrow CCl_4(l) + 4HCl(g)$$
- (1) -4 to +4
 - (2) 0 to -4
 - (3) +4 to +4
 - (4) 0 to +4
46. A body weighs 72 N on the surface of the earth. What is the gravitational force on it, at a height equal to half the radius of the earth ?
- (1) 30 N
 - (2) 24 N
 - (3) 48 N
 - (4) 32 N
47. An iron rod of susceptibility 599 is subjected to a magnetising field of 1200 A m^{-1} . The permeability of the material of the rod is :
- $$(\mu_0 = 4\pi \times 10^{-7} \text{ T m A}^{-1})$$
- (1) $2.4\pi \times 10^{-5} \text{ T m A}^{-1}$
 - (2) $2.4\pi \times 10^{-7} \text{ T m A}^{-1}$
 - (3) $2.4\pi \times 10^{-4} \text{ T m A}^{-1}$
 - (4) $8.0 \times 10^{-5} \text{ T m A}^{-1}$
48. A long solenoid of 50 cm length having 100 turns carries a current of 2.5 A. The magnetic field at the centre of the solenoid is :
- $$(\mu_0 = 4\pi \times 10^{-7} \text{ T m A}^{-1})$$
- (1) $6.28 \times 10^{-5} \text{ T}$
 - (2) $3.14 \times 10^{-5} \text{ T}$
 - (3) $6.28 \times 10^{-4} \text{ T}$
 - (4) $3.14 \times 10^{-4} \text{ T}$
49. When a uranium isotope ${}_{92}^{235}\text{U}$ is bombarded with a neutron, it generates ${}_{36}^{89}\text{Kr}$, three neutrons and :
- (1) ${}_{36}^{101}\text{Kr}$
 - (2) ${}_{36}^{103}\text{Kr}$
 - (3) ${}_{56}^{144}\text{Ba}$
 - (4) ${}_{40}^{91}\text{Zr}$