



Kulkarni Science Academy

Exam Name :-12CET CHEM

Date
:-31/08/2025

Time :-90
Minutes

Mark :- 50

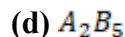
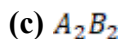
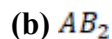
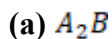
CHEMISTRY

- Total number of lone pairs of electron on oxygen atoms in carbondioxide are[MHT-CET 2020]
(a) 4 (b) 1
(c) 3 (d) 2
- Calculate the molar mass of solute when 50 gram solute is dissolved in 150 gram solvent that boils at 84°C .
[K_b for solvent is $2.7 \text{ K kg mol}^{-1}$ and boiling point of solvent is 75°C] [MHT-CET 2023 : PCB]
(a) 190 g mol^{-1} (b) 236 g mol^{-1}
(c) 134 g mol^{-1} (d) 100 g mol^{-1}
- What is the molar mass of a solute if a solution is prepared by dissolving 0.8 gram solute in 0.4dm^3 water having osmotic pressure 0.18 atm at 300 K ? ($R = 0.082 \text{ atm dm}^3 \text{ K}^{-1} \text{ mol}^{-1}$)
(a) 273.3 g mol^{-1} (b) 290.2 g mol^{-1}
(c) 260.1 g mol^{-1} (d) 300.0 g mol^{-1}
- Which one of the following groupings represents a collection of isoelectronic species? (At. no. Cs=55, Br=35)
(a) Na^+ , Ca^{+2} , Mg^{+2} (b) N^{3-} , F^- , Na^+
(c) Be^{+2} , Ca^{+3} , Cl^- (d) Ca^{+2} , Cs^+ , Br^-
- An element crystallizes in bec type of crystal lattice having edge length of unit cell $4.4 \times 10^{-8} \text{ cm}$. What is the radius of atom of an element? [MHT-CET 2020]
(a) 2.22×10^{-8} (b) 3.72×10^{-8}
(c) 4.72×10^{-8} (d) 1.905×10^{-8}
- For the reaction, $2\text{N}_2\text{O}_5(\text{g}) \rightarrow 4\text{NO}_2(\text{g}) + \text{O}_2(\text{g})$ If the concentration of NO_2 increase by $5.2 \times 10^{-3} \text{ M}$ in 100 s then the rate of the reactions
(a) $1.3 \times 10^{-5} \text{ Ms}^{-1}$ (b) $0.5 \times 10^{-4} \text{ Ms}^{-1}$
(c) $7.6 \times 10^{-4} \text{ Ms}^{-1}$ (d) $2 \times 10^{-3} \text{ Ms}^{-1}$
- For the reaction $2\text{A} + 2\text{B} \rightarrow 2\text{C} + \text{D}$,
if $r = k[\text{A}]^2[\text{B}]^0$, then rate of reaction is [MHT-CET 2021]
(a) independent of concentration of A. (b) independent of concentration of B
(c) inversely poportional to square of concentration of A. (d) directly proportional to concentration of B.
- Calculate the volume of unit cell when metal having density 1 g cm^{-3} and molar mass 23 g mol^{-1} crystallises to form bcc structure. [MHT-CET 2024]
(a) $7.6 \times 10^{-23} \text{ cm}^3$ (b) $6.0 \times 10^{-23} \text{ cm}^3$
(c) $9.5 \times 10^{-23} \text{ cm}^3$ (d) $8.6 \times 10^{-23} \text{ cm}^3$
- The decreasing order of bond angle is
(a) $\text{NO}_2 > \text{NO}_2^+ > \text{NO}_2^-$ (b) $\text{NO}_2^- > \text{NO}_2 > \text{NO}_2^+$
(c) $\text{NO}_2^+ > \text{NO}_2 > \text{NO}_2^-$ (d) $\text{NO}_2^+ > \text{NO}_2^- > \text{NO}_2$

10. Find the void volume of bcc unit cell in cm^3 if volume of unit cell is $1.5 \times 10^{-22} \text{ cm}^3$. [MHT-CET 2024]
- (a) 4.8×10^{-23} (b) 2.4×10^{-23}
(c) 1.2×10^{-23} (d) 3.6×10^{-23}
11. 0.015 M aqueous solution of acetic acid is 9.5% dissociated. What is its $[\text{H}^+]$? [MHT-CET 2024]
- (a) $1.43 \times 10^{-3} \text{ mol dm}^{-3}$ (b) $3.62 \times 10^{-5} \text{ mol dm}^{-3}$
(c) $2.21 \times 10^{-5} \text{ mol dm}^{-3}$ (d) $5.34 \times 10^{-3} \text{ mol dm}^{-3}$
12. Which of the following molecule in its valence shell has three bond pairs of electrons and one lone pair of electrons?
- (a) NH_3 (b) H_2O
(c) BF_3 (d) CO_2
13. Find freezing point depression constant for 0.3 molal solution that lowers the freezing point by 1.5 K. [MHT-CET 2024 : PCB]
- (a) $2.8 \text{ K kg mol}^{-1}$ (b) $4.2 \text{ K kg mol}^{-1}$
(c) $3.5 \text{ K kg mol}^{-1}$ (d) $5.0 \text{ K kg mol}^{-1}$
14. What is the SI unit of conductivity?[MHT-CET 2017]
- (a) Sm (b) Sm^{-1}
(c) S m^2 (d) Sm^{-2}
15. Which activity from following is exhibited by Lewis base according to definition? [MHT-CET 2023]
- (a) accept a pair of electron (b) donate OH^- ions
(c) accept H^+ ions (d) donate a pair of electron
16. A solid metal has ccp or fcc structure. The relation of side of cube (a) and radius of atom (r) will be
- (a) $a = 2r$ (b) $a = 2\sqrt{2}r$
(c) $a = \frac{4}{\sqrt{3}}r$ (d) $a = \sqrt{\frac{3}{2}}r$
17. The decreasing order of bond angle in the following molecules is [MHT-CET 2022]
- (a) $\text{CH}_4 > \text{NH}_3 > \text{H}_2\text{O}$ (b) $\text{H}_2\text{O} > \text{NH}_3 > \text{CH}_4$
(c) $\text{NH}_3 > \text{CH}_4 > \text{H}_2\text{O}$ (d) $\text{CH}_4 > \text{H}_2\text{O} > \text{NH}_3$
18. The study of the rate of the chemical reaction and factors affecting its rate is known as ____
- (a) Thermodynamics (b) Electrochemistry
(c) Chemical kinetics (d) Ionic equilibrium
19. What quantity of electricity is required for reduction of 3 mole Al^{+3} to Al? [MHT-CET 2022]
- (a) 12 F (b) 6 F
(c) 3 F (d) 9 F
20. If a metal crystallizes in bcc structure with edge length of unit cell $4.29 \times 10^{-8} \text{ cm}$, the radius of metal atom is.....
- (a) $1.86 \times 10^{-8} \text{ cm}$ (b) $1.07 \times 10^{-7} \text{ cm}$
(c) $3.2 \times 10^{-7} \text{ cm}$ (d) $1.07 \times 10^{-8} \text{ cm}$
21. Which of the following solutions will have highest boiling point [MHT CET 2008]
- (a) 0.1 M FeCl_3 (b) 0.1 M BaCl_2
(c) 0.1 M NaCl (d) 0.1 M urea (NH_2CONH_2)
22. What is vapour pressure of a solution containing 1 mol of a non-volatile solute in 36 g of water? [$P_1^0 = 400 \text{ mmHg}$] [MHT-CET 2021]
- (a) 267 mm Hg (b) 240 mm Hg

- (c) 334 mm Hg (d) 284 mm Hg
23. How many faraday of electricity is required to deposit 0.6 g of magnesium at cathode when an aqueous solution of MgCl_2 is electrolysed?
[Molar mass of $\text{Mg} = 24 \text{ g mol}^{-1}$] [MHT-CET 2021]
- (a) 2 F (b) 0.05 F
(c) 1 F (d) 5 F
24. The rate of reaction $\text{A} + \text{B} \rightarrow 2\text{C} + \text{D}$ is $6 \times 10^{-4} \text{ mol dm}^{-3} \text{ sec}^{-1}$ when $[\text{A}] = 0.3$ and $[\text{B}] = 0.1 \text{ mol dm}^{-3}$. Calculate rate constant if the reaction is first order in both A and B. [MHT-CET 2022]
- (a) $6 \times 10^{-2} \text{ sec}^{-1}$ (b) $2 \times 10^{-2} \text{ sec}^{-1}$
(c) $3 \times 10^{-2} \text{ sec}^{-1}$ (d) $5 \times 10^{-2} \text{ sec}^{-1}$
25. Copper crystallises with fcc unit cell. If the radius of copper atom is 127.8 pm, calculate the density of copper? (At. mass: $\text{Cu} = 63.55 \text{ g mol}^{-1}$) [MHT-CET 2020]
- (a) 9.5 g cm^{-3} (b) 1.89 g cm^{-3}
(c) 4.4 g cm^{-3} (d) 8.9 g cm^{-3}
26. Edge length of unit cell of a crystal is 288 pm. If its density is 7.2 g cm^{-3} , determine the type of unit cell. (Atomic mass = 52)
- (a) Face centred cubic (b) Body centred cubic
(c) Simple cubic (d) Hexagonal cubic
27. What is the density of iron crystal which crystallizes in body centred cubic structure with edge length 287 pm? (At. mass of $\text{Fe} = 56 \text{ amu}$) [MHT-CET 2020]
- (a) 7.87 g/cm^3 (b) 6.07 g/cm^3
(c) 7.07 g/cm^3 (d) 6.87 g/cm^3
28. Calculate electrode potential for $\text{Zn}^{++}(0.02\text{M}) \mid \text{Zn}_{(s)}$ at 25°C . ($E_{\text{Zn}}^0 = -0.76 \text{ V}$) [MHT-CET 2023]
- (a) 0.81 V (b) -0.71 V
(c) 0.71 V (d) -0.81 V
29. The molar conductivity of 0.02 M KCl solution is $410 \Omega^{-1} \text{ cm}^2 \text{ mol}^{-1}$ at 25°C . Calculate its conductivity? [MHT-CET 2024]
- (a) $4.1 \times 10^{-3} \Omega^{-1} \text{ cm}^{-1}$ (b) $8.2 \times 10^{-3} \Omega^{-1} \text{ cm}^{-1}$
(c) $2.8 \times 10^{-3} \Omega^{-1} \text{ cm}^{-1}$ (d) $5.4 \times 10^{-3} \Omega^{-1} \text{ cm}^{-1}$
30. Acidic buffer solution is prepared by mixing proportionate quantity of [MHT-CET 2024]
- (a) strong base and its salt with weak acid. (b) weak acid and its salt with strong base.
(c) strong acid and its salt with weak base. (d) weak base and its salt with strong acid.
31. A first order reaction takes 40 minutes for 30% decomposition. What is the half-life of reaction? [MHT-CET 2020]
- (a) 59.5 min (b) 77.8 min
(c) 67.8 min (d) 82.2 min
32. If the molar conductance value of Ca^{2+} and Cl^- at infinite dilution are respectively $118.88 \times 10^{-4} \text{ m}^2 \text{ mho mol}^{-1}$ and $77.33 \times 10^{-4} \text{ m}^2 \text{ mho mol}^{-1}$ then that of CaCl_2 is (in $\text{m}^2 \text{ mho mol}^{-1}$)
- (a) 118.88×10^{-4} (b) 154.66×10^{-4}
(c) 273.54×10^{-4} (d) 196.21×10^{-4}
33. Which among the following species can act as an acid as well as base according to BronstedLowry theory? [MHT-CET 2022]
- (a) HSO_4^- (b) SO_4^{2-}
(c) H_3O^+ (d) Cl^-

34. What is vapour pressure of solution containing 1.8 g glucose in 16.2 g water? [$P_1^\circ = 24 \text{ mm Hg}$ and Molar mass of glucose = 180 g mol^{-1}] [MHT-CET 2021]
- (a) 18.1 mm Hg (b) 12.4 mm Hg
(c) 23.8 mm Hg (d) 15.7 mm Hg
35. For the reaction, $\text{N}_{2(g)} + 3\text{H}_{2(g)} \rightarrow 2\text{NH}_{3(g)}$, What is relation between $\frac{d[\text{N}_2]}{dt}$ and $\frac{d[\text{NH}_3]}{dt}$? [MHT-CET 2021]
- (a) $\frac{d[\text{NH}_3]}{dt} = 2 \frac{d[\text{N}_2]}{dt}$ (b) $\frac{d[\text{NH}_3]}{dt} = \frac{1}{2} \frac{d[\text{N}_2]}{dt}$
(c) $\frac{d[\text{NH}_3]}{dt} = \frac{d[\text{N}_2]}{dt}$ (d) $3 \frac{d[\text{NH}_3]}{dt} = \frac{d[\text{N}_2]}{dt}$
36. Initial concentration of reactant in a first order reaction is 0.08 moldm^{-3} . What concentration would remain after 40 minute?
(Given: $\frac{[A]_0}{[A]_t} = 5.00$) [MHT-CET 2024]
- (a) 0.032 moldm^{-3} (b) 0.08 moldm^{-3}
(c) 0.008 moldm^{-3} (d) 0.016 moldm^{-3}
37. If vapour pressure of pure solvent and solution are 240 and 216 mm Hg respectively, then mole fraction of solvent in solution is [MHT-CET 2021]
- (a) 0.4 (b) 0.6
(c) 0.9 (d) 0.1
38. If the distance between Na^+ and Cl^- ions in NaCl crystal is a pm what is the length of the cell edge?
- (a) 4a pm (b) $\frac{a}{4}$ pm
(c) 2 a pm (d) $\frac{a}{2}$ pm
39. The uncertainty in the momentum of an electron is $1.0 \times 10^{-5} \text{ kg ms}^{-1}$. The uncertainty in its position will be
- (a) $1.50 \times 10^{-28} \text{ m}$ (b) $1.05 \times 10^{-26} \text{ m}$
(c) $5.27 \times 10^{-30} \text{ m}$ (d) $5.25 \times 10^{-28} \text{ m}$
40. Which is NOT a colligative property ?
- (a) Refractive index (b) lowering of vapour pressure
(c) Depression of freezing point (d) Elevation of boiling point
41. Unit cell of a crystal has edge length 300 pm and density 7.86 g cm^{-3} , determine the type of crystal lattice if atomic mass of an element is 56. [MHT-CET 2021]
- (a) Face centred cubic (b) Simple cubic
(c) Body centred cubic (d) Hexagonal close pack
42. Which from following liquid mixtures exhibits negative deviation from Raoult's law? [MHT-CET 2024 : PCB]
- (a) Benzene + toluene (b) Phenol + aniline
(c) Ethanol + acetone (d) Carbon disulfide + acetone
43. In face centred cubic unit cell, what is the volume occupied? [MHT-CET 2016]
- (a) $\frac{4}{3} \pi r^3$ (b) $\frac{8}{3} \pi r^3$
(c) $\frac{16}{3} \pi r^3$ (d) $\frac{64r^3}{3\sqrt{3}}$
44. In the face centred cubic lattice, atom A occupies the corner positions and atom B occupies the face centre positions. If one atom of B is missing from one of the face centred points, the formula of the compound is



45. The rate law for the reaction, $A + B \rightarrow \text{product}$ is $\text{rate} = k[A][B]$. When will the rate of reaction increase by factor two? [MHT-CET 2023]
- (a) $[A]$ is doubled and $[B]$ is kept constant
(b) $[B]$ is doubled and $[A]$ is halved
(c) $[A]$ and $[B]$ both are doubled
(d) $[A]$ is kept constant and $[B]$ is halved
46. What is molar mass of solute if 50 gram of it in 150 gram solvent has boiling point elevation of 5.54 K ? [$K_b = 2.77 \text{ K kg mol}^{-1}$] [MHT-CET 2021 : PCB]
- (a) 60.5 g mol^{-1}
(b) 180.0 g mol^{-1}
(c) 90.3 g mol^{-1}
(d) 166.6 g mol^{-1}
47. Calculate the volume of solution when 1 g non-volatile solute (molar mass 300 g mol^{-1}) is dissolved in solvent has osmotic pressure 0.2 atm at 300 K. [$R = 0.082 \text{ dm}^3 \text{ atm K}^{-1} \text{ mol}^{-1}$] [MHT-CET 2024 : PCB]
- (a) 0.41 dm^3
(b) 0.23 dm^3
(c) 0.12 dm^3
(d) 0.31 dm^3
48. Which of the following is NOT an example of secondary voltaic cell? [MHT-CET 2022]
- (a) Nickel-cadmium cell
(b) Lead storage battery
(c) Dry cell
(d) Mercury cell
49. What is the geometry of SbF_5 molecule? [MHT-CET 2021]
- (a) Trigonal pyramidal
(b) Trigonal planar
(c) Trigonal bipyramidal
(d) Square pyramidal
50. What is the structure of NaCl ?
- (a) BCC
(b) FCC
(c) Interpenetrating fcc
(d) None of these