

PRACTICE PAPER

CHEMISTRY

Q1.

1-Butyne reacts with hot alkaline KMnO_4 to produce

- (a) $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$
- (b) $\text{CH}_3\text{CH}_2\text{COOH}$
- (c) $\text{CH}_3\text{CH}_2\text{COOH} + \text{CO}_2$
- (d) $\text{CH}_3\text{CH}_2\text{COOH} + \text{HCOOH}$

Q2.

Reduction of benzoyl chloride with $\text{H}_2/\text{Pd}/\text{BaSO}_4$ produces

- (a) Benzoyl cyanide
- (b) Benzaldehyde
- (c) Benzoic acid
- (d) None of the above

Q3.

In a reaction $\text{A} \rightarrow \text{B}$, the rate of reaction increases two times on increasing the concentration of reactant four times. Then order of reaction is

- (a) Zero
- (b) Two
- (c) Half
- (d) Four

Q4.

A current of 2 amperes is passed through a solution of H_2SO_4 for 20 minutes. The volume of oxygen liberated at STP is:

- (a) 1.392 ml
- (b) 0.1392 L
- (c) 1.392 L
- (d) 139.2 L

Q5.

Which of the following is not an aromatic compound?

- (a) Benzene
- (b) Cyclobutadiene
- (c) Orthoxylene
- (d) Picric Acid

Q6.

Which of the following is not colored?

- (a) $\text{Na}_2 [\text{CuCl}_4]$
- (b) $\text{Na}_2 [\text{CdCl}_4]$
- (c) $\text{K}_4 [\text{Fe}(\text{CN})_6]$
- (d) $\text{K}_3 [\text{Fe}(\text{CN})_6]$

Q7.

The enthalpy change of reaction does not depend upon

- (a) State of reactants and products
- (b) Nature of reactants and products
- (c) Different intermediates of a reaction
- (d) Initial and final enthalpy change

Q8.

The compressibility factor for an ideal gas is

- (a) Zero
- (b) One
- (c) Two
- (d) Six

Q9.

Calcium is obtained by:

- (a) electrolysis of molten CaCl_2
- (b) electrolysis of aqueous CaCl_2
- (c) reduction of CaCl_2 with C
- (d) Roasting of its ore with lime stone.

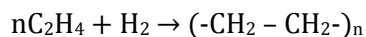
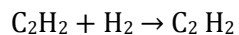
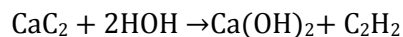
Q10.

Hexyne-3 reacts with Na/NH_2 to produce

- (a) Hexane
- (b) Hexylamine
- (c) Transhexene
- (d) Cis-hexene

Q11.

The formation of polyethene from calcium carbide takes place as follows :



Then the amount of polythene obtained from 64 kg of calcium carbide is

- (a) 7 kg
- (b) 14 kg
- (c) 21 kg
- (d) 28 kg

Q12.

$\text{K}_2[\text{HgI}_4]$ detects the ion/group.

- (a) NH_2
- (b) NO
- (c) NH_4^+
- (d) Cl

Q13.

Which one of the following can give iodometric titration ?

- (a) Fe^{3+}
- (b) Pb^{2+}
- (c) Cu^{2+}
- (d) Ag^{2+}

Q14.

O_2 is

- (a) Paramagnetic
- (b) Diamagnetic
- (c) Ferromagnetic
- (d) Cation

Q15.

Two solutions having pH 1 and 2, are mixed. Then the resulting pH will be

- (a) 1.76
- (b) 0.96
- (c) 1.26
- (d) 1.5

Q 16.

If 1, 3-dibromopropane reacts with Zn, the product obtained is

- (a) Propene
- (b) Propane
- (c) Cyclopropane
- (d) Hexane

Q 17.

Hydrolysis of methyl cyanide yields:

- (a) Formic Acid
- (b) Formaldehyde
- (c) Acetaldehyde
- (d) Acetic Acid

Q 18.

The number of stereoisomers of the compounds $\text{CH}_3\text{CHBrCHBrCOOH}$ and $\text{CH}_3\text{CHBrCHBrCH}_3$ respectively are :

- (a) 0,0
- (b) 4,4
- (c) 3,4
- (d) 4,3

Q 19.

In the compound lithium aluminium hydride, the hydrogen is present as

- (a) H^+
- (b) H
- (c) H^-
- (d) None of these

Q 20.

IUPAC name of $(\text{CH}_3)_3\text{C}-\text{CH}=\text{CH}_2$ is

- (a) 2,2, Dimethyl but-3-ene
- (b) 2, 2 Dimethyl pent-4-ene
- (c) 3, 3 Dimethyl but-1-ene
- (d) None of the above

Q 21.

In the reaction of $1_2 + 1 \rightarrow 1_3$; the Lewis base is

- (a) 1_2
- (b) $1\cdot$
- (c) 1_3^-
- (d) None of these

Q 22.

A green mass is formed in the charcoal cavity test when a colorless salt (X) is fused with cobalt nitrate, X contains.

- (a) A^{3+}
- (b) Cu^{2+}
- (c) Ba^{2+}
- (d) Zn^{2+}

Q 23.

$R-CH_2CH_2OH$ can be converted into $R-CH_2CH_2COOH$ with the help of

- (a) PHr_3, KCN, H^+
- (b) PBr_3, KCN, H_2E
- (c) KCN, H^+
- (d) $KMnO_4, H_2SO_4$

Q 24.

A metal hydroxide is soluble in excess of sodium hydroxide solution. the metal ion in hydroxide is :

- (a) Fe^{3+}
- (b) Cr^{3+}
- (c) Al^{3+}
- (d) Any of these

Q 25.

The wrong statement about diborane is

- (a) There is a bridge bonding in a diborane
- (b) All the six B-H bonds are similar
- (c) Four H-atoms are terminal while two are bridged H-atom
- (d) in B_2H_6 boron shows sp^3 hybridization

Q 26.

SiO₂ is

- (a) sp hybridized
- (b) sp² hybridized
- (c) sp³ hybridized
- (d) sp³ hybridized

Q 27.

The halide of phosphorous that undergoes rapid hydrolysis is

- (a) PCl₃
- (b) PF₃
- (c) PBr₃
- (d) PI₃

Q 28.

The oxidation state of nickel in Ni(CO)₄ is

- (a) 4
- (b) 2
- (c) 0
- (d) 1

Q 29.

Identify Z in the following series

(Image)

- (a) C₂H₅I
- (b) C₂H₅OH
- (c) CHI₃
- (d) CH₃CHO

Q 30.

The role of acetic anhydride which is used as a solvent in CrO₃ oxidation of toluene to benzaldehyde is to:

- (a) Protect CrO₃ against atmospheric moisture.
- (b) Act as a catalyst.
- (c) Protect further oxidation of benzaldehyde.
- (d) all the above

Q1.

If E is energy, M is mass, J is angular momentum and G is universal gravitational constant, then dimensions of $x = \frac{EJ^2}{G^2Ms}$ are that of

- (a) Angle
- (b) Angular velocity
- (c) Area
- (d) Acceleration

Q2.

V and a represent velocity and acceleration of a particle in one dimensional motion

- (a) For v and a both being negative or v being negative and a positive, the speed of particle may be increasing.
- (b) Speed of particle remains same with change in magnitude of v and a
- (c) Speed of particle increases when a is negative
- (d) Speed of particle always decreases when v is negative.

Q3

By A principle a dynamic system can be converted to a static system by introducing B force. Then A and B stand for

- (a) Lami's, vector
- (b) D'Alembert's inertia
- (c) Vector, polar
- (d) Conservation of momentum, axial

Q4.

Two glass balls, two ivory balls, two cork balls, two cast iron balls and two lead balls collide, then

- (a) Coefficient of restitution is maximum for glass balls
- (b) Coefficient of restitution is maximum for ivory balls
- (c) Coefficient of restitution is maximum for lead balls
- (d) Coefficient of restitution is least for cork balls

Q5.

A ball on at rest on a horizontal surface enjoys

- (a) Absence of inertia
- (b) Absence of gravity
- (c) Absence of accelerating force
- (d) Free fall of spaceship

Q7.

Cold fluid flows sluggishly because of

- (a) Cohesion
- (b) Adhesion
- (c) Surface tension
- (d) Viscosity

Q8.

The neutral temperature of a thermocouple depends upon

- (a) Temperature of hot junction
- (b) Temperature of cold junction
- (c) Temperature of inversion
- (d) None of these

Q9.

In mixture of ideal gases, the molecules have the same

- (a) Speed
- (b) Mean speed
- (c) Mean translational kinetic energy
- (d) Root mean square momentum

Q10.

The period of oscillations of a simple pendulum is T in a stationary lift. If the lift moves upwards with an acceleration $5g$, the period will

- (a) Remain the same
- (b) Increase by $\frac{3}{5}$
- (c) Decrease by $\frac{3}{2}$
- (d) None of these

Q11.

A tunnel is dug along the diameter of the earth. The time period of the dropped body in the tunnel is T_1 . If T_2 is the time period of similar body dropped in a straight tunnel dug along any chord except through the centre of the earth, then

- (a) $T_2 < T_1$
- (b) $T_2 = T_1$
- (c) $T_2 > T_1$
- (d) Any above three

Q 12.

A parallel plate capacitor is charged by connecting its plates to a battery. Without disconnecting the battery, a dielectric is introduced between its plate, then

- (a) Potential difference between the plates increases
- (b) Charge on the plate decreases.
- (c) Capacitance of the capacitor decreases
- (d) Energy of the capacitor decreases

Q 13.

An electric bulb is designed to draw power P_0 at a voltage V_0 . If the bulb draws a power at a voltage V then

- (a) $P = \left[\frac{v}{v_0}\right]^2 P_0$
- (b) $P = \left[\frac{v_0}{v}\right]^2 P_0$
- (c) $P = \left[\frac{v_0}{v}\right] P_0$
- (d) $P = \frac{v_0}{v} P_0$

Q 14.

An electron of mass m_e and a proton of mass m_p are injected into a uniform magnetic field at right angles to the direction of the field, with equal velocity, The ratio of the radii of their orbits r_e/r_p is equal to

- (a) 2
- (b) M_e/m_p
- (c) 1
- (d) M_p/m_e

Q 15.

Susceptibility of a magnetic substance is found to depend upon temperature and the intensity of the magnetizing field. The material is a

- (a) Paramagnetic
- (b) Superconductor
- (c) Diamagnetic
- (d) Ferromagnetic

Following question consists of two statements printed as Statement 1 and Statement 2. While answering these questions you are required to select any one of the responses indicated as

- (a) If both Statement 1 and Statement 2 are true and Statement 2 is not a correct explanation of Statement 1.
- (b) If both Statement 1 and Statement 2 are true but the statement 2 is not a correct explanation of Statement 1.
- (c) If Statement 1 is true but the Statement 2 is false.
- (d) If statement 1 is false but Statement 2 is true.

Q 16.

Statement 1: For very high frequency of a.c, inductor behaves as an open circuit and capacitor behaves as a conductor

Statement 2: Inductive reactance for d.c. is zero and capacitive reactance is infinity

- (a) 1
- (b) 2
- (c) 3
- (d) 4

Q 17.

A small magnet M is allowed to fall through a fixed horizontal conducting ring. Let g be the acceleration due to gravity. Then the acceleration of M will be

- (a) Greater than g, when it is below R and moving away from R
- (b) Equal to g when it is below or above R and moving towards or away from R
- (c) Less than g when it is above R and moving towards R
- (d) Greater than g when it is above R and moving towards R

Q 18.

The phase and orientation of magnetic vector associated with electromagnetic oscillations differ respectively from those of electric vector by

- (a) Zero and zero
- (b) Zero and $\pi/2$
- (c) $\pi/2$ and $\pi/2$
- (d) $\pi/2$ and zero

Q 19.

In a Fraunhofer diffraction experiment at a single slit using light of wavelength 400 nm, the first minimum is formed at an angle of 30° , the direction θ of the first secondary maximum is given by

- (a) $\tan^{-1} (3/4)$
- (b) $\sin^{-1} (3/4)$
- (c) 60°
- (d) $\tan^{-1} (4/3)$

Read the following paragraph:

A point object is placed at a distance of 12 cm on the axis of a convex lens of focal length 10 cm. On the other side of the lens, a convex mirror is placed at a distance of 10 cm from the lens such that the image formed by the combination coincided with the object itself.

Q 20.

Distance of the image in the absence of mirror is

- (a) 30 cm
- (b) 45 cm
- (c) 60 cm
- (d) 75 cm

Q 21.

Focal length of convex mirror is

- (a) 52 cm
- (b) 25 cm
- (c) 32 cm
- (d) 15 cm

Q 22.

An electron and a proton have the same the Broglie wavelength. Then the kinetic energy of the electron is

- (a) Greater than the kinetic energy of the proton
- (b) Zero
- (c) Equal to the kinetic energy of the proton
- (d) Infinity

Q 23.

The transition from state $n = 4$ to $n = 3$ in a hydrogen like atom results in ultraviolet radiation. The following transition will give the infra red radiations

- (a) $2 \rightarrow 1$
- (b) $3 \rightarrow 2$
- (c) $4 \rightarrow 2$
- (d) $5 \rightarrow 4$

Q 24.

The number of atoms in a radioactive sample reduces from 1000 to 100 in two days. The number of atoms remaining at the end of four days will be

- (a) 25
- (b) 20
- (c) 10
- (d) 50

Q 25.

An intrinsic semiconductor has 10^8 m^{-3} free electrons and is doped with pentavalent impurity atoms of density 10^{24} m^{-3} . The free electron density will increase by orders of magnitude

- (a) 10^{24} m^{-3}
- (b) 10^{22} m^{-3}
- (c) 10^{20} m^{-3}
- (d) 10^{26} m^{-3}

Q1.

If $\operatorname{Re} \left(\frac{az+b}{cz+d} \right) = 1$ (where z is a complex number and a, b, c, d are real numbers,) then z lies on

- (a) a circle
- (b) straight line
- (c) an ellipse
- (d) a hyperbola

Q2.

Number of real roots of the equation $\sqrt{x} \sqrt{x - \sqrt{1-x}} = 1$ is

- (a) 0
- (b) 1
- (c) 2
- (d) 3

Q3.

Number of identical terms in the sequence 2, 4, 6, 8, upto 100 terms and 1, 4, 7, 10, upto 100 terms are

- (a) 20
- (b) 33
- (c) 35
- (d) 40

Q4.

The total number of integral solution for x, y, z such that $xyz = 36$ is

- (a) 12
- (b) 18
- (c) 24
- (d) 30

Q5.

The number $7^{20} - 5^{20}$ is divisible by

- (a) 2
- (b) 3
- (c) 4
- (d) 6

Q6.

$$\text{If } \Delta_1 = \begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^2 & b^2 & c^2 \end{vmatrix} \text{ and}$$

$$\Delta_2 = \begin{vmatrix} 1 & 1 & 1 \\ bc & ca & ab \\ 2a & 2b & 2c \end{vmatrix} \text{ then}$$

- (a) $2\Delta_1 + \Delta_2 = 0$
- (b) $\Delta_1 + 2\Delta_2 = 0$
- (c) $\Delta_1 + \Delta_2 = 0$
- (d) $\Delta_1 = \Delta_2$

Q7.

If A is an orthogonal matrix, then

- (a) $AA^{-1} = I$
- (b) $AA^T = I$
- (c) $A^T A^{-1} = I$
- (d) $A^T = A$

Q8.

The number $\log_{20} 3$ lies in

- (a) $\left(\frac{1}{2}, \frac{5}{4}\right)$
- (b) $\left(\frac{1}{3}, \frac{1}{2}\right)$
- (c) $\left(\frac{1}{5}, \frac{1}{4}\right)$
- (d) $\left(\frac{1}{4}, \frac{1}{3}\right)$

Q9.

There of the six vertices of a regular hexagon are selected at random. The probability that the triangle formed by these vertices is equilateral is

- (a) $\frac{1}{10}$
- (b) $\frac{1}{6}$
- (c) $\frac{1}{20}$
- (d) $\frac{1}{2}$

Q 10.

A man is known to speak truth in 75% cases. If he throws unbiased die simultaneously and tells that sum on die is eight, then the probability that it is actually eight is

- (a) $\frac{3}{4}$
- (b) $\frac{5}{36}$
- (c) $\frac{31}{36}$
- (d) $\frac{15}{46}$

Q 11.

Range of the function

$$f(x) = 1 + \cos^2 X + \cos^4 + \dots;$$

$$x \in \left(-\frac{\pi}{2}, 0\right) \text{ is}$$

- (a) $(0, \infty)$
- (b) $(1, \infty)$
- (c) $(-\infty, 0)$
- (d) $(-\infty, \infty)$

Q 12.

The domain of the function

$$f(x) = \sin^{-1}\left(\frac{1-|x|}{3}\right) + \tan^{-1}\left(\frac{1-|x|}{3}\right) \text{ is}$$

- (a) $[-1, 1]$
- (b) $[-2, 2]$
- (c) $[-3, 3]$
- (d) $[-4, 4]$

Q 13.

$$\text{If } f(x) = \frac{1}{2}\left(f(x-1) + \frac{3}{f(x+1)}\right); f(x) > 0 \forall x \in \mathbb{R}$$

R. Then $\lim_{x \rightarrow \infty} f(x)$ is equal to

- (a) $(a)\sqrt{2}$
- (b) $\sqrt{3}$
- (c) 2
- (d) $\sqrt{5}$

Q 14.

$$\text{If } f(x) = \begin{cases} \frac{\cos^{-1}(\sin x)}{x - \frac{\pi}{2}} & x \neq \frac{\pi}{2} \\ 1 & x = \frac{\pi}{2} \end{cases} \text{ then}$$

- (a) $\lim_{x \rightarrow \frac{\pi}{2}} f(x)$ exists
- (b) $\lim_{x \rightarrow \frac{\pi}{2}} f(x)$ does not exist
- (c) $f(x)$ is continuous at $x = \frac{\pi}{2}$
- (d) $\lim_{x \rightarrow \frac{\pi}{2}} f(x) = 1$

Q 15.

The given function $f(x) = |x - 1| + \cos |x|$ is not differentiable at x is equal to

- (a) 0
- (b) 1
- (c) 1
- (d) 0 and 1

Q 16.

If $y = e^{e^{x+e^{x+\dots\infty}}}$ then $\frac{dy}{dx}$ is equal to

- (a) $\frac{x}{1+x}$
- (b) $\frac{x}{1+y}$
- (c) $\frac{y}{1-y}$
- (d) $\frac{y}{1-y^2}$

Q 17.

If $\sqrt{x-y} - \sqrt{x+y} = c$ then $\left(\frac{dy}{dx}\right)_{(a,a)}$ is

- (a) $\frac{c}{2a}$
- (b) $\frac{1}{2a}$
- (c) $\frac{1}{\sqrt{2a}}$
- (d) $-\frac{c}{\sqrt{2a}}$

Q18.

The period T for simple pendulum is $T = 2\pi \sqrt{\frac{l}{g}}$, Then the error in T due to possible error of 2 % in l and 1.5 % in g is

- (a) 0.1
- (b) 0.25
- (c) 0.2
- (d) 1.5

Q19.

Let $f(x) = \int e^{2x} (x - 4) (x - 5) dx$, then f decrease in the interval

- (a) (2, 4)
- (b) (2, 5)
- (c) (4, 5)
- (d) (0, 5)

Q20.

If $f(x) = e^x \cos x$ where $x \in [0, \pi]$, then $f(x)$ has maximum slope at

- (a) 0
- (b) $\frac{\pi}{4}$
- (c) $\frac{\pi}{2}$
- (d) π

Q21.

$\int \frac{dx}{(1+x)^{1/2} - (1+x)^{1/3}}$ is equal to

- (a) $2(1+x)^{1/2} + 3(1+x)^{1/3} + 6(1+x)^{1/6} + 6 \ln |(1+x)^{1/6} - 1| + c$
- (b) $2(1+x)^{1/2} + 3(1+x)^{1/3} + 6(1+x)^{1/6} + c$
- (c) $6 \ln |(1+x)^{1/6} - 1| + C$
- (d) $2(1+x)^{1/2} + 3(1+x)^{1/3} + c$

Q22.

$\int_0^1 \cos \left(2 \cot^{-1} \sqrt{\frac{1+x}{1-x}} \right) dx$ is equal to

- (a) 0
- (b) $\frac{1}{2}$
- (c) -1
- (d) $-\frac{1}{2}$

Q 23.

$\frac{dy}{dx} = \frac{y(x-y\ln y)}{x(x\ln x - y)}$ is equal to

- (a) $\frac{x\ln x + y\ln y}{xy} = c$
- (b) $x\ln x + y\ln y = c$
- (c) $\frac{x\ln x}{y\ln y} = c$
- (d) $x\ln x - y\ln y = c$

Q 24.

One of the bisector of the angle between the lines $a(x-1)^2 + 2h(x-1)(y-1) + b(y-2)^2 = 0$ is $x + 2y - 5 = 0$. The other bisector is

- (a) $2x + y = 0$
- (b) $2x - y = 0$
- (c) $x + 2y = 4$
- (d) $x - 2y + 6 = 0$

Q 25.

The equation of the pair of straight lines parallel to y axis and which are tangents to the circle $x^2 + y^2 - 2x - 4y - 4 = 0$ is

- (a) $x^2 - 4x - 5 = 0$
- (b) $x^2 = 4x + 5 = 0$
- (c) $x^2 - 6x + 11 = 0$
- (d) $x^2 - 8x + 16 = 0$

Q 26.

The coordinates of the point on the parabola $y^2 = 8x$, which is at minimum distance from the circle $x^2 + (y+6)^2 = 1$ are

- (a) $(1, -4)$
- (b) $(-2, 4)$
- (c) $(2, -4)$
- (d) $(0, -6)$

Q 27.

The set of positive value of m for which a line with slope m is common tangent to ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ and parabola $y^2 = 4ax$ is given by

- (a) $(2, 1)$
- (b) $(0, 1)$
- (c) $(2, 4)$
- (d) $(3, 5)$

Q 28.

The equation of the plane through the point (1, 2, 3) perpendicular to the planes $x + 2y + 4z = 1$ and $x - 3y - 5z = 2$ is

- (a) $x + 3y + 3z = 4$
- (b) $2x + 5y + 7z = 3$
- (c) $2x + 9y - 5z = 5$
- (d) $3x + 6y + 8z = 6$

Q 29.

$\sqrt{2 + \sqrt{2 + \sqrt{2 + \dots + \sqrt{2(1 - \cos\theta)}}}}$; (n number of 2's) is equal to

- (a) $2\sin\left(\frac{\theta}{2^n}\right)$
- (b) $2\sin\left(\frac{\theta}{2^{n+1}}\right)$
- (c) $2\sin\left(\frac{\theta}{2^{n-1}}\right)$
- (d) None of these

Q 30.

The number of solutions of the equation $\cot x + \operatorname{cosec} x = 2\sin x$ lying in the interval $[0, 2\pi]$ are

- (a) 0
- (b) 1
- (c) 2
- (d) 3