

PAPER-1

PART-1 (MATHEMATICS)

Straight objective type

Q 1.

Let $A \equiv \{a, b, c, d\}$ and $B \equiv \{e, f, g, h, i, j\}$. Let us define mapping $f: A \rightarrow B$ such that $f(a) = g$. How many such mappings are possible

- a. 216
- b. 125
- c. 243
- d. None of these

Q 2.

Let n_1 be the number of roots of $f(x) = g(x)$ and n_2 be the number of roots of $f(x) = x$. Also n_3 is the number of roots of $g(x) = x$. If $f(x)$ and $g(x)$ are inverse of each other then

- a. $n_1 > n_2 = n_3$
- b. $n_1 > n_2 < n_3$
- c. $n_1 = n_2 > n_3$
- d. None of these

Q 3.

Area bounded by one of the loop of the graph $|y| = |\sin |x||$ is

- a. 1
- b. $\frac{2}{\pi}$
- c. $\frac{\pi}{2}$
- d. None of these

Q 4.

Let a function f satisfy the condition $|f(x_1) - f(x_2)| < \beta |x_1 - x_2|$ for all x_1 and x_2 lying in some interval (a, b) . Also given $x_1 \neq x_2$ then

- a. $f(x)$ must be continuous at every point with in (a, b)
- b. $f(x)$ may be continuous at every point with in (a, b)
- c. $f(x)$ must be differentiable at every point with in (a, b)
- d. NOThing can be said.

Q 5.

Largest interval of a for which $|x - a| < 3 - x^2$ for atleast one negative x is,

a. $\frac{-13}{4} < a < 0$

b. $0 < a < 3$

c. $\frac{-13}{4} < a < 3$

d. None of these

Q 6.

Three students, VIDIT, SUSHANT and ABHINAV went to market to buy few books. VIDIT bought few copies of physics books while SUSHANT bought few copies of physics, Chemistry and Mathematics books. Also it is known that ABHINAV bought few copies of Physics, Chemistry, Mathematics, English and Hindi books. In the evening they have found that they bought 24 books. In how many different ways these books would have been bought :

- a. 13
- b. 12
- c. 11
- d. None of these

Section – II

Multiple correct answer type

Q 7.

Consider a sequence which consist of all possible products of first n natural numbers taken two at a time

- a. number of terms in the sequence will be $\frac{n(n-1)}{2}$
- b. sum of all terms of sequence must be $\frac{n(n+1)}{12}(3n^3 - n - 2)$
- c. sum of all terms of sequence is $\frac{n(n+1)}{2} + \frac{n(n+1)(2n+1)}{6}$
- d. number of terms in the sequence will be n .

Q 8.

Let $x^2 - ax + b = 0$ be a quadratic equation where a and $b \in R$.

- a. if a is odd and b is even then roots of equation must be rational only.
- b. if a is odd and b is even then roots may be rational.
- c. if a and b both are odd then roots canNOT be rational.
- d. if a and b both are odd then roots may be rational.

Q 9.

$|x^2 - 3| |x + 2| = a$ where $a \in R$

- a. max. possible number of real roots of above equation is 8.
- b. sum of real roots of above equation should be zero irrespective of a .
- c. product of real roots of above equation must be negative only irrespective of a .
- d. equation can NOT have any real roots if $a < 0$.

Q 10.

Which of the following functions are non-monotonic in the indicated sets.

- a. $f(x) = \cos x$, $x = 1, 2, 3, 4, \dots, 90$
- b. $f(x) = \cos x$, $x \in (0, \pi)$

c. $f(x) = \cos x, x \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

d. $f(x) = x \cos x, x \in \left(0, \frac{\pi}{4}\right)$

Section – III

Reason type

Q 11.

Let $f(x)$ is an increasing function from $[0, \infty]$ to $[0, \infty]$ while $g(x)$ is a decreasing function from $[0, \infty]$ to $[0, \infty]$ $h(x) = f(g(x)), h(0) = 0$.

STATEMENT-1

$$h(x) - h(1) = 0 \text{ for all } x \text{ in } [0, \infty]$$

and

STATEMENT-2

$$H(x) = 0 \text{ for all } x \text{ in } [0, \infty]$$

a. STATEMENT-1 is True, STATEMENT-2 is True;

STATEMENT-2 is a correct explanation for
STATEMENT-1.

b. STATEMENT-1 is True, STATEMENT-2 is True;

STATEMENT-2 is **NOT** a correct explanation of
STATEMENT-1.

c. STATEMENT-1 is True, STATEMENT-2 is False.

d. STATEMENT-1 is False, STATEMENT-2 is True.

Q 12.

$$\text{Let } A = \begin{bmatrix} 1 & -1 & 0 \\ 2 & -1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$$

STATEMENT-1

$$A^2 = A^{-1}$$

And

STATEMENT-2

$$A^3 = I_3$$

a. STATEMENT-1 is True, STATEMENT-2 is True;

STATEMENT-2 is a correct explanation for
STATEMENT-1.

b. STATEMENT-1 is True, STATEMENT-2 is True;

STATEMENT-2 is **NOT** a correct explanation ofr
STATEMENT-1.

c. STATEMENT-1 is True, STATEMENT-2 is False.

d. STATEMENT-1 is False, STATEMENT-2 is True.

Q 13.

Consider the equation of a conic $2x^2 + 3y^2 + kxy + x + y = 0$

STATEMENT-1

The equation represents ellipse for all values of k.

And

STATEMENT-2

If coefficients of x^2 and y^2 in the equation $ax^2 + by^2 + 2gx + 2fy + c = 0$ are of the same sign but are NOT equal then this equation represents an ellipse

a. STATEMENT-1 is True, STATEMENT-2 is True;

STATEMENT-2 is a correct explanation for
STATEMENT-1.

b. STATEMENT-1 is True, STATEMENT-2 is True;

STATEMENT-2 is **NOT** a correct explanation ofr
STATEMENT-1.

c. STATEMENT-1 is True, STATEMENT-2 is False.

d. STATEMENT-1 is False, STATEMENT-2 is True.

Q 14.

STATEMENT-1

The last three digits of 3^{50} are 249.

And

STATEMENT-2

$$3^{50} = (10 - 1)^{25} = {}^{25}C_0 10^{25} - {}^{25}C_1 10^{24} + \dots + {}^{25}C_{24} 10 - {}^{25}C_{25}$$

a. STATEMENT-1 is True, STATEMENT-2 is True;

STATEMENT-2 is a correct explanation for

STATEMENT-1.

b. STATEMENT-1 is True, STATEMENT-2 is True;

STATEMENT-2 is **NOT** a correct explanation ofr

STATEMENT-1.

c. STATEMENT-1 is True, STATEMENT-2 is False.

d. STATEMENT-1 is False, STATEMENT-2 is True.

Section-IV

Paragraph for Question Nos. 15 to 17

A complex number Z_1 represent a point (x_1, y_1) on the Argand plane. $|Z_1|$ which is defined as $\sqrt{x_1^2 + y_1^2} = |Z_1|$ represent distance of (x_1, y_1) from origin. Further, we define $Z_1 - Z_2$ as $Z_1 - Z_2 = (x_1 - x_2) + i(y_1 - y_2)$ where $Z_1 = x_1 + iy_1, Z_2 = x_2 + iy_2$ and thus $|Z_1 - Z_2| = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$ represent distance between (x_1, y_1) and (x_2, y_2) .

Q 15.

Locus of Z represented by $|Z - Z_1| + |Z - Z_2| = |Z_1 - Z_2|$ on the argand plane,

a. ellipse

b. circle

c. line

d. None of these

Q 16.

Locus of Z represented by $|Z - Z_1| + |Z - Z_2| = K$, where $0 < K < |Z_1 - Z_2|$ on the argand plane

- a. ellipse
- b. circle
- c. line
- d. hyperbola

Q 17.

What will be the eccentricity of the curve represented by equation (2)

- a. $\frac{K}{|Z_1 - Z_2|}$
- b. $\left| \frac{|Z_1 - Z_2|}{K} \right|$
- c. $\frac{|Z_1 - Z_2|^2}{K^2}$
- d. $\frac{K^2}{|Z_1 - Z_2|^2}$

Paragraph for Question Nos. 18 to 20

Consider the equation $x^2 + 2(m - 1)x + m + 5 = 0$, where m is a real number

Q 18.

The equation will have both roots positive if m lies in

- a. $(-\infty, -5)$
- b. $(-1, 5)$
- c. $(-5, -1)$
- d. None of these

Q 19.

The expression $x^2 + 2(m - 1)x + m + 5$ will be negative in the interval $[0, 1]$ if

- a. $m < -\frac{4}{3}$
- b. $m < -5$
- c. $-5 < m < -\frac{4}{3}$
- d. None of these

Q 20.

The biquadratic equation $x^4 + 2(m - 1)x^2 + m + 5 = 0$ will NOT have any real roots if m lies in the interval

- a. $(-5, 1)$
- b. $(-1, \infty)$
- c. $(0, \infty)$
- d. $(1, \infty)$

Paragraph for Question Nos. 21 to 23

Consider the conic $x^2 + y^2 + xy = 0$ whose centre is origin. The semi major and semi minor axis of this conic will be a point on the conic at a maximum and minimum distances respectively.

Q 21.

The length of major axis of the conic is

- a. $2\sqrt{3}$
- b. $2\sqrt{6}$
- c. $3\sqrt{2}$
- d. None of these

Q 22.

The eccentricity of the conic is

a. $\frac{1}{3}$

b. $\frac{1}{\sqrt{3}}$

c. $\frac{1}{\sqrt{2}}$

d. None of these

Q 23.

The distance of the directrix of the conic from centre is

a. $3\sqrt{2}$

b. $2\sqrt{3}$

c. 6

d. None of these

PART – II (PHYSICS)**Section-I**

Straight objective type

Q 24.

In a thermodynamical process, Argon satisfies the relation $TP^{-2/5} = \text{constant}$. The amount of heat required for n moles to double its temperature is

a. 8 RT

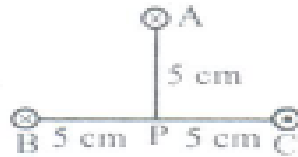
b. 4 RT

c. 16 RT

d. Zero

Q 25.

Three infinitely long wires carry equal current of 5 A as shown in the figure. The magnetic field induction at P is [in Micro-Tesla]



- a. 44.8
- b. 0.48
- c. 2.48
- d. 4.48

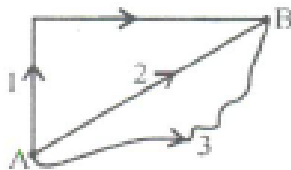
Q 26.

An a.c. voltage of $E = E_0 \sin 100 t$ is applied in a circuit. It was found that the phase difference between V and I is $\frac{\pi}{4}$. Then

- a. $R = 100\Omega$, $C = 1 \mu\text{F}$
- b. $R = 1 \text{ k}\Omega$, $C = 10 \mu\text{F}$
- c. $R = 10\Omega$, $L = 1 \text{ H}$
- d. $R = 1 \text{ k}\Omega$, $L = 10 \text{ H}$

Q 27.

In a gravitational field created by a mass M , a particle is shifted from a point A to another point B along three paths 1, 2 and 3 [see figure]. The workdone W_1 , W_2 and W_3 in the three paths are related as.



- a. $W_1 = W_2 > W_3$
- b. $W_1 > W_2 = W_3$
- c. $W_1 = W_2 = W_3$
- d. $W_1 > W_2 > W_3$

Q 28.

A plane mirror is placed at the bottom of a tank containing a liquid of refractive index μ . An observer O, (vertically above a point P) observes the point P (height h above the mirror) and its image. The apparent separation between them is

a. $2 \mu h$

b. $\frac{2h}{\mu}$

c. $\frac{2h}{\mu-1}$

d. $h \left(1 + \frac{1}{\mu}\right)$

Q 29.

The momentum associated with a photon of red colour with a frequency 400×10^{12} Hz moving in free space is

a. Zero

b. $8.8 \times 10^{-28} \text{ kg ms}^{-2}$

c. $17.6 \text{ MeV}/c$

d. Data insufficient

Section-II

Multiple Correct Answer Type**Q 30.**

A string of length L is stretched along the x-axis and is rigidly clamped at its ends. It undergoes transverse as a function of time t as

a. $y = A \sin \left(\frac{n\pi x}{L}\right) \cos \omega t$

b. $y = A \sin \left(\frac{n\pi x}{L}\right) \sin \omega t$

c. $y = A \cos \left(\frac{n\pi x}{L}\right) \cos \omega t$

d. $y = A \cos \left(\frac{n\pi x}{L}\right) \sin \omega t$

Q 31.

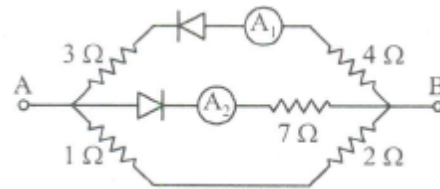
A ring of radius R holding a charge Q (spread uniformly) is placed in yz -plane with its centre at its origin.

- a. Field at the centre is Zero.
- b. Potential at the centre is kQ/R
- c. The field at the centre is kQ/R^2
- d. Potential at the point $(x, 0, 0)$ is $\frac{kQ}{R^2+x^2}$

Q 32.

In the circuit shown below, the diodes are ideal. The ammeters A_1 and A_2 have a resistance of 5Ω .

If the potential of the points A and B are V_A and V_B with $|V_A - V_B| = 14 \text{ V}$, then



- a. A_1 and A_2 will show same reading always.
- b. Reading of A_1 and A_2 depend on whether $V_A > V_B$ or $V_B > V_A$.
- c. When A_1 shows $2A$, $A_2 = 0$
- d. When A_2 shows $2A$, $A_1 = 0$

Q 33.

A long straight wire carries a current along the x -axis. If the current is I , the magnetic field B

- a. at $(1, 1, 1)$ is $\mu_0 I / 2\sqrt{2}\pi$
- b. at $(1, 1, 1)$ and at $(0, 1, 1)$ are equal by magnitude.
- c. at $(1, 1, 1)$ makes 45° with xy plane.
- d. at $(0, 1, 1)$ is parallel to x -axis.

Section-III

Reasoning Type

Q 34.

STATEMENT-1

In a chain of 10 bulbs in series, one bulb is fused. If the remaining are connected in series to the same supply, the brightness in the room will be increased.

and

STATEMENT-2

Resistance of 9 bulbs will be less than the resistance of 10 bulbs.

a. STATEMENT-1 is True, STATEMENT-2 is True;

STATEMENT-2 is a correct explanation for
STATEMENT-1.

b. STATEMENT-1 is True, STATEMENT-2 is True;

STATEMENT-2 is **NOT** a correct explanation ofr
STATEMENT-1.

c. STATEMENT-1 is True, STATEMENT-2 is False.

d. STATEMENT-1 is False, STATEMENT-2 is True.

Q 35.

STATEMENT-1

In the arrangement shown, the potential of N is negative.

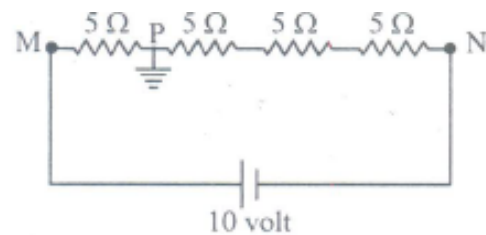
and

STATEMENT-2

a. STATEMENT-1 is True, STATEMENT-2 is True;

STATEMENT-2 is a correct explanation for
STATEMENT-1.

b. STATEMENT-1 is True, STATEMENT-2 is True;



STATEMENT-2 is **NOT** a correct explanation ofr
STATEMENT-1.

c. STATEMENT-1 is True, STATEMENT-2 is False.

d. STATEMENT-1 is False, STATEMENT-2 is True.

Q 36.

STATEMENT-1

As wind blows in a stadium and the ball is spun, there will be lifting of the ball.

and

STATEMENT-2

Spinning ball creates a low pressure above the ball causing a lift to itself.

a. STATEMENT-1 is True, STATEMENT-2 is True;

STATEMENT-2 is a correct explanation for
STATEMENT-1.

b. STATEMENT-1 is True, STATEMENT-2 is True;

STATEMENT-2 is **NOT** a correct explanation ofr
STATEMENT-1.

c. STATEMENT-1 is True, STATEMENT-2 is False.

d. STATEMENT-1 is False, STATEMENT-2 is True.

Q 37.

STATEMENT-1

The focal length of a lens for red colour is more than that for violet colour.

and

STATEMENT-2

The material of lens shows a different character for different colours.

a. STATEMENT-1 is True, STATEMENT-2 is True;

STATEMENT-2 is a correct explanation for
STATEMENT-1.

b. STATEMENT-1 is True, STATEMENT-2 is True;

STATEMENT-2 is **NOT** a correct explanation of STATEMENT-1.

c. STATEMENT-1 is True, STATEMENT-2 is False.

d. STATEMENT-1 is False, STATEMENT-2 is True.

Section-IV

Paragraph for Question Nos. 38 to 40

A metallic bar MN of length l and mass M is placed on a frictionless metallic wedge (ϕ). A uniform magnetic field B is applied perpendicular to the ground through the wedge. The bar slides from rest.

Q 38.

Terminal speed of the bar is proportional to

a. $(\sin \phi)^{-1}$

b. $\cot \phi$

c. $\tan \phi$

d. $\cos \phi$

Q 39.

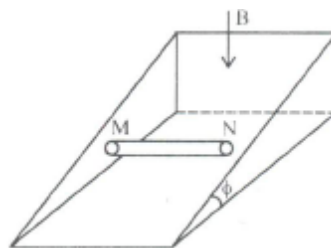
If the net resistance in the circuit (closed) is R , the rate at which electrical energy is converted into thermal energy is

a. $\frac{B^2 l^2 v \cos^2 \phi}{R}$

b. $\frac{B^2 l^2 v^2 \sin^2 \phi}{R}$

c. $\frac{B^2 l^2 v^2 \cos^2 \phi}{R}$

d. $\frac{B^2 l^2 v \sin^2 \phi}{R}$



Q 40.

The rate at which work is done by gravity after attaining terminal velocity is proportional to

- a. $v^2 \cos^2 \phi$
- b. $v \cos^2 \phi$
- c. $v \sin^2 \phi$
- d. $v^2 \sin^2 \phi$

Paragraph for Question Nos. 41 to 43

According to Kepler's laws:

- (i) All planets move around the sun in elliptical path with sun at its focus
- (ii) The line joining the sun and the planet sweeps equal areas in equal time intervals.
- (iii) The square of the time period of revolution is proportional to the cube of the semi-major axis of the orbit.

In the absence of external torque, angular momentum remains conserved while the angular speed, kinetic energy etc., change with time and position on the orbit.

Q 41.

For orbiting planets around the sun, the physical invariants is

- a. Linear speed
- b. Angular speed
- c. K.E.
- d. Angular momentum

Q 42.

For a satellite orbiting around a planet, K.E. associated is proportional to (T-Time period).

- a. T^{-1}
- b. T^{-2}
- c. T^{-3}
- d. $T^{-2/3}$

Q 43.

Choose the incorrect statement regarding Kepler's law.

- a. The first two laws are for one planet while the III law is a general one.
- b. The laws are experimental conclusions
- c. The laws are NOT experimental conclusions.
- d. All the three laws are explained by Newton's law of gravitation.

Paragraph for Question Nos. 44 to 46

Neutron is a chargeless particle having a non-zero magnetic moment of 9.66×10^{-27} A-m². Neutrons are said to compose an "up" and two "down" quarks with charge $+\frac{2e}{3}$ and $-\frac{e}{3}$ respectively. The magnetic moment of neutrons is explainable if quarks are considered to move with uniform speed v in a circular path of radius say r . the direction of magnetic moment is decided by the clockwise or anti-clockwise sense of motion of quarks.

Q 44.

The current due to circular up quark is,

- a. $\frac{ev}{6\pi r}$
- b. $\frac{ev}{3\pi r}$
- c. $\frac{ev}{\pi r}$
- d. $\frac{2ev}{\pi r}$

Q 45.

The magnetic moment of the up quark is,

- a. $\frac{evr}{3}$
- b. $\frac{2evr}{3}$
- c. $\frac{4evr}{3}$
- d. evr

Q 46.

If all the quarks forming a neutron, move in the same direction, the magnetic moment will be

a. $\frac{evr}{3}$

b. $\frac{2evr}{3}$

c. evr

d. None of these

PART-III (Chemistry)

Section-I

Straight Objective Type

Q 47.

Total volume occupied by the atoms in hexagonal close packing is

a. $\frac{8}{3}\pi r^3$

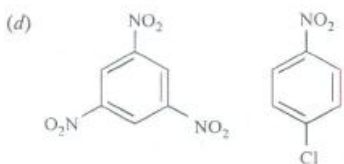
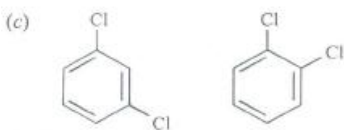
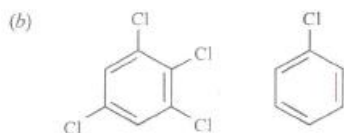
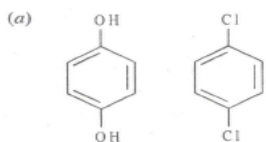
b. $8r^3$

c. $\frac{16}{3}\pi r^3$

d. $\frac{32}{\sqrt{2}}r^3$

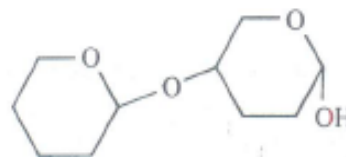
Q 48.

A pair in which the dipole moment of first compound is more than second is

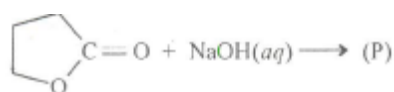


Q 49.

Which type of linkage is present in the following abbreviated sugar formula ?



- a. α -Linkage
- b. β -Linkage
- c. γ -Linkage
- d. None of these.

Q 50.

The compound (P) is

- (a)
- (b)
- (c)
- (d)

Q 51.

Which of the following metal oxide is reduced into metal without using any reducing material ?

- a. Ag_2O
- b. SnO_2
- c. Cu_2O
- d. Al_3O_3

Q 52.

What would be the conductivity at 25°C of a solution which is 10^{-3} M both HCl and LiCl ? Neglect the interionic interactions.

$$(\lambda_{\text{H}^+}^0 = 349.8, \lambda_{\text{Cl}^-}^0 = 76.4, \lambda_{\text{Li}^+}^0 = 38.6 \text{ ohm}^{-1} \text{ cm}^2 \text{ eq}^{-1})$$

- a. $5.41 \times 10^{-3} \text{ ohm}^{-1} \text{ cm}^{-1}$

b. $6.23 \times 10^{-4} \text{ ohm}^{-1} \text{ cm}^{-1}$

c. $5.41 \times 10^{-4} \text{ ohm}^{-1} \text{ cm}^{-1}$

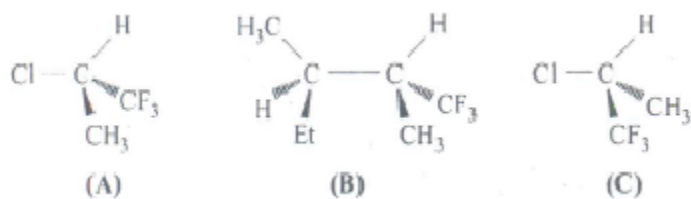
d. $2.89 \times 10^{-2} \text{ ohm}^{-1} \text{ cm}^{-1}$

Section-II

Multiple Correct Answer Type

Q 53.

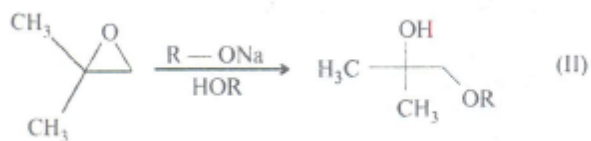
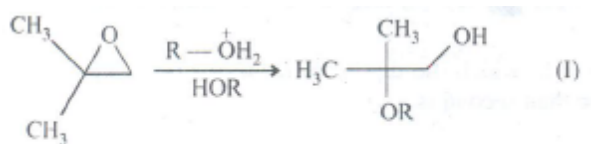
Which of the following is correct for the following structure?



- a. (A) and (C) are enantiomers
- b. (B) and (C) are NOT isomers
- d. (A) and (B) are stereoisomers
- d. (A) and (C) are stereoisomers

Q 54.

The correct statement for the reaction (s)



- a. Both reactions are regioselective
- b. Reaction (II) involves carbocation mechanism
- c. Reaction (I) involves carbocation reaction
- d. Both reactions are nucleophilic addition reactions

Q 55.

Which of the following is correct?

- a. pH of buffer changes with temperature
- b. specific conductance decreases with dilution
- c. Equivalent conductance is independent of dilution
- d. Equivalent conductance increases with dilution.

Q 56.

Which of the following can be used as oxidizing as well as reducing agent ?

- a. HNO_2
- b. O_3
- c. H_2O_2
- d. SO_2

Section-III

Reasoning Type

Q 57.

STATEMENT-1

The deviation of a gas from ideal gas behavior is greatest in the vicinity of the critical point.

and

STATEMENT-2

The first and second derivatives of P with respect to V at critical point must be zero.

- a. STATEMENT-1 is True, STATEMENT-2 is True;

STATEMENT-2 is a correct explanation for

STATEMENT-1.

- b. STATEMENT-1 is True, STATEMENT-2 is True;

STATEMENT-2 is **NOT** a correct explanation ofr

STATEMENT-1.

c. STATEMENT-1 is True, STATEMENT-2 is False.

d. STATEMENT-1 is False, STATEMENT-2 is True.

Q 58.

STATEMENT-1

S_N1 reaction is stereoselective as well as stereospecific reaction.

and

STATEMENT-2

S_N1 reaction gives two stereoisomers via nucleophilic substitution.

a. STATEMENT-1 is True, STATEMENT-2 is True;

STATEMENT-2 **is** a correct explanation for
STATEMENT-1.

b. STATEMENT-1 is True, STATEMENT-2 is True;

STATEMENT-2 **is Not** a correct explanation of
STATEMENT-1.

c. STATEMENT-1 is True, STATEMENT-2 is False.

d. STATEMENT-1 is False, STATEMENT-2 is True.

Q 59. STATEMENT-1

$CuSO_4$ when dissolves in NaOH gives pale blue colour while when dissolves in excess of NH_4OH gives deep blue colour.

and

STATEMENT-2

In both cases the compound formed in solution contains Cu^{2+} ion.

a. STATEMENT-1 is True, STATEMENT-2 is True;

STATEMENT-2 **is** a correct explanation for
STATEMENT-1.

b. STATEMENT-1 is True, STATEMENT-2 is True;

STATEMENT-2 **is Not** a correct explanation of

STATEMENT-1.

c. STATEMENT-1 is True, STATEMENT-2 is False.

d. STATEMENT-1 is False, STATEMENT-2 is True.

Q 60.

STATEMENT-1

On the basis of enthalpy of formation we can say graphite is more stable than diamond yet diamond does not change into graphite for years.

and

STATEMENT-2

The activation energy of the conversion of diamond into graphite is very high.

a. STATEMENT-1 is True, STATEMENT-2 is True;

STATEMENT-2 is a correct explanation for

STATEMENT-1.

b. STATEMENT-1 is True, STATEMENT-2 is True;

STATEMENT-2 is **Not** a correct explanation of

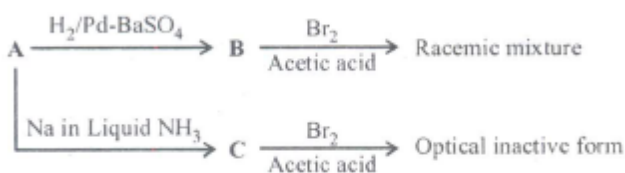
STATEMENT-1.

c. STATEMENT-1 is True, STATEMENT-2 is False.

d. STATEMENT-1 is False, STATEMENT-2 is True.

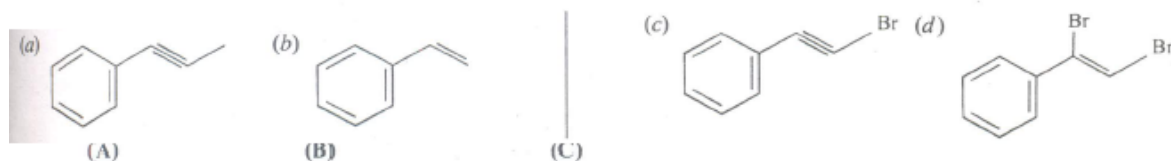
Section-IV

Paragraph for Question Nos. 61 to 63



Q 61.

The compound (A) is



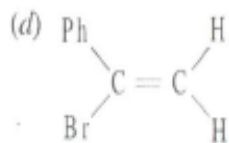
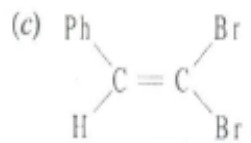
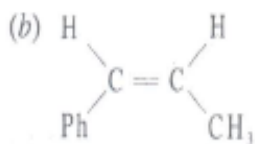
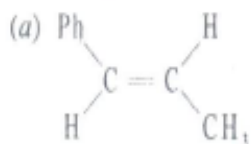
Q 62.

The compounds (B) and (C) are

- a. stereoisomers
- b. diastereomers
- c. geometrical isomers
- d. all of these

Q 63.

The compound (B) is

**Paragraph for Question Nos. 64 to 66**

The element of 14th group combine with oxygen to form oxide of the general formula MO_2 . These oxides differ in their structures and properties. The lower oxidation number of the elements of the group is stable only for heavier elements due to inert pair effect. Carbon because of the absence of d-orbital cannot expand its valence shell as other can do.

Q 64.

Which of the following is a giant molecule ?

- a. CO_2
- b. SnO_2
- c. SiO_2
- d. GeO_2 .

Q 65.

In PbO_2 each oxygen surrounded by

- a. Three Pb atoms
- b. Four Pb atoms
- c. Six Pb atoms
- d. None of these.

Q 66.

Which of the following pair of ions not exists together?

- a. Pb^{2+} , Sn^{2+}
- b. Pb^{4+} , Sn^{2+}
- c. Pb^{4+} , Sn^{4+}
- d. Pb^{2+} , Sn^{4+}

Paragraph for Question Nos. 67 to 69

A first order reaction is that in which the reaction rate is determined by only one concentration variable and the rate constant is given as

$$K = \frac{1}{t} \ln \frac{a}{(a-x)}$$

While a reaction is said to be of second order when its rate depends upon two concentration terms and the rate constant of reaction given as

$$K = \frac{1}{t} \frac{x}{a(a-x)}$$

The half life of reaction is depend on the temperature and order of reaction.

Q 67.

The ratio of half life of first order reaction (t_1) and second order reaction (t_2) for 2M concentration of reactants in each is

[assuming $k_1 = k_2$.]

- a. 2
- b. 0.5
- c. 1.4
- d. None of these

Q 68.

Given a value of $k = 3.66 \times 10^{-3} \text{ s}^{-1}$ and initial $[\text{H}_2\text{O}_2] = 0.882 \text{ M}$. Determine the time at which $[\text{H}_2\text{O}_2] = 0.600 \text{ M}$.

- a. 200 s
- b. 105 s
- c. 96 s
- d. 56 s.

Q 69.

75% of the first order and second order reaction for 2 M concentration of reactants in each are completed in 20 and 30 second respectively. The ratio of k_1/k_2 is

- a. 2.5
- b. 4.16
- c. 3.8
- d. 4.6