

# Mathematics Mock Paper

## Section-I

### Straight Objective Type

#### Q 1.

Which of the following functions does not have 2009 as its period ?

a.  $\sin 2\pi x$

b.  $\tan \pi x$

c.  $n - [x]$

d.  $\sin \frac{x}{2009}$

#### Q 2.

A number K is said to be a triangular number if it is of the type  $\frac{n(n+1)}{2}$ . The first few triangular numbers are 1, 3, 6, 10, .... Etc. if m is the nth triangular number then

a.  $n = \frac{\sqrt{1+8m} - 1}{2}$

b.  $m = \frac{\sqrt{1+8n} - 1}{2}$

c.  $m = \frac{n(n+1)}{2}$

d. None of these

#### Q 3.

if the point (1, 0) is joined with (0, 10), point (2, 0) is joined to (0, 9) and point (3, 0) is joined to (0, 8), (3, 0) and (0, 8). All these line segments will touch which of the following curves ?

a.  $(y - x)^2 - 22y - 22x + 121 = 0$

b.  $(y + x)^2 - 22y - 22x + 121 = 0$

c.  $y^2 - x^2 + 1 = 0$

d. None of these

**Q 4.**

Let  $E_n$  ( $n \geq 5$ ) be the number of distinct triangles which may arise by dividing a polygon of  $n$  sides through lines joining its vertices then  $E_n$  must be equal to

a.  $\frac{2.4.6 \dots (4n-10)}{(n-1)!}$

b.  $\frac{2.4.6 \dots (4n-8)}{n!}$

c.  $\frac{2.4.6 \dots (4n-6)}{n!}$

d. None of these

**Q 5.**

Consider the equations  $\tan (\sin x) = 0$ ,  $\sin (\tan x) = 0$ , then

- a. both equations have finitely many solutions.
- b. both equations have infinitely many solutions.
- c. first equation has finitely many solutions.
- d. second equation has finitely many solutions.

**Q 6.**

Let  $f(x)$  be the twice differentiable function on  $[0, 1]$ , such that  $f''(x) > 0$  on  $[0, 1]$ . If  $\phi(x) = f(x) + f(1-x)$ , then

- a.  $\phi(x)$  is increasing in  $\left[0, \frac{1}{2}\right]$
- b.  $\phi(x)$  is decreasing in  $\left[0, \frac{1}{2}\right]$
- c.  $\phi'\left(\frac{1}{2}\right) = 0$  by Rolle's theorem
- d. None of these

**Q7.**

Consider the function defined by  $f(x) = \cos x + x$ ,  $\mathbb{R} \rightarrow \mathbb{R}$ . If  $g(x)$  is inverse of  $f(x)$  and  $\int_0^n g(x) dx = \frac{\pi^2}{2} - k$ , then  $k$  must be equal to

- a. 0
- b. 1
- c.  $\sqrt{2}$
- d. -1

**Q8.**

The chord of the parabola  $y^2 = 4x$  passes through a point  $P(1, k)$  which cuts the parabola at  $R$  and  $S$ .

If  $PR \cdot PS = 3|k|$ , then maximum value of  $|k|$  is

- a. 3
- b. 6
- c. 4
- d. None of these

**Q9.**

In an acute angled triangle the minimum value of  $\cot \frac{A}{2} \cot \frac{B}{2} \cot \frac{C}{2}$  is

- a.  $\frac{R}{2s}$
- b.  $\frac{r}{2s}$
- c. 1
- d.  $3\sqrt{3}$

## Section-II

### Reasoning Type

#### Q 10.

Let a function  $f(x)$  be defined from the set of natural numbers to set of real numbers. The function satisfies

$$f(n + 9) = f(n), f(n + 16) = f(n) \text{ for all } n.$$

STATEMENT-1

The function  $f(x)$  is periodic with fundamental period 9.

and

STATEMENT-2

The function  $f(x)$  is periodic with fundamental period 1.

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 11.

Let a coin be tossed 2009 times

STATEMENT-1

The probability of getting 1005 heads is maximum.

and

STATEMENT-2

${}^{2n+1}C_r$  is maximum if  $r = n$ .

- 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 F1alse, STATEMeNT-2 is True.

**Q 12.**

Consider the determinant  $D = \begin{vmatrix} (b+c)^2 & a^2 & bc \\ (c+a)^2 & b^2 & ac \\ (a+b)^2 & c^2 & ab \end{vmatrix}$

STATEMENT-1

The determinant is not divisible by  $a^2 + b^2 + c^2$

and

STATEMENT-2

The determinant is divisible by

$$(a-b)(b-c)(c-a)(a+b+c)$$

- 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;  
STAMTEMENT-2 is NOT a correct explanation ofr  
STATEMENT-1.
- c. STATEMENT-1 is True, STATEMENT-2 is False.
- d. STATEMENT-1 is F1alse, STATEMeNT-2 is True.

**Q 13.**

Let a binary operation be defined as  $a * b * c * d$  can take five values.

and

STATEMENT-2

$a * b * c$  takes two values namely  $a * (b * c)$  and  $(a * b) * c$

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-III**

Paragraph for Question Nos. 14 to 16

Consider the function  $f(x) \begin{vmatrix} x + c_1 & x + a & x + a \\ x + b & x + c_2 & x + a \\ x + b & x + b & x + c_3 \end{vmatrix}$

**Q 14.**

$f(x)$  is a polynomial of degree

a. 9

b. 3

c. 1

d. None of these

**Q 15.** if  $g(x) = (c_1 - x)(c_2 - x)(c_3 - x)$ , then  $f(0)$  is equal to

a.  $\frac{b g(b) - a g(a)}{b - a}$

b.  $\frac{b g(a) - a g(b)}{b - a}$

c.  $b g(b) - a g(a)$

d. None of these

**Q 16.**

$f(-a)$  is equal to

a.  $f(a)$

b.  $g(a)$

c.  $f(-a)$

d.  $g(-a)$

Paragraph for Question Nos. 17 to 19

Consider the  $3 \times 3$  matrix  $A$  given by  $A = \begin{bmatrix} 1 & 0 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$

**Q 17.**

We must have

a.  $A(A^2 - I) = A^2 - I$

b.  $A(A^2 + I) = A^2 + I$

c.  $A(A^2 - I) = A^2 + I$

d. None of these

**Q 18.**

$A^{20}$  must be equal to

- a.  $10 A^2 + 9I$
- b.  $10 A^2 - 9I$
- c.  $10 A^2 + 20I$
- d. None of these

**Q 19.**

For every integer  $n \geq 4$ ,  $A^n$  is equal to

- a.  $A^{n-2} + A^3 + A$
- b.  $A^{n-2} + A^3 - A$
- c.  $A^{n-2} + A^3 - A$
- d. None of these

## Section-IV

### Matrix Match Type

**Q 20.**

Consider the arrangement of 7 boys and 5 girls among which are Sachin and Sania. Match the answers of following :

- |   |                             |
|---|-----------------------------|
| a. Number of arrangements in which two girls are adjacent               | p. $6 \times 11!$           |
| b. Number of arrangements in which Sachin is ahead of Sania.            | q. $8! \times 5! \times 98$ |
| c. Number of arrangements in which all the girls are not together       | r. $7! \times 5! \times 46$ |
| d. Number of arrangements in which Sachin and Sania stand in the middle | s. $2 \times 8!$            |



**Q 21.**

Consider the equation of two planes given by  $x + 2y + kz - 1 = 0$ ,  $x + 2y + 3z + l = 0$ , where  $l, n$  are constants. Match the following :

- |   |               |
|---|---------------|
| a. $P_1$ and $P_2$ will meet in a line  | p. $l = -1$   |
| b. The line of intersection of $P_1$ and $P_2$ will cut $yz$ plane in a point | q. $k \neq 3$ |
| c. The line of intersection of $P_1$ and $P_2$ will cut $yz$ plane in a point | r. $k = 3$    |
| d. The line of intersection of $P_1$ and $P_2$ will cut $yz$ plane in a line  |               |

**Q 22.**

Match the following :

- |   |        |
|---|--------|
| a. $x = \sum_{k=1}^{\infty} \frac{1}{k^2}$ , $y = \sum_{k=1}^{\infty} \frac{1}{(2k-1)^2}$ then $\frac{x}{8y}$ must be | p. 1   |
| b. The number of solutions of the equation $x^3 3^{ x-2 } + 3^{x+1} = x^3 \cdot 3^{x-2} 3^{ x-2 +3}$                  | q. 3/2 |
| c. In any triangle $\cos A + \cos B + \cos C$ lies between $\alpha$ and $\beta$ , then $\alpha$ and $\beta$ are       | r. 4   |
| d. $\int \frac{\cos 6x + \cos 9x}{1 - 2 \cos 5x} = -\frac{\sin 4x}{k} - \sin x + C$ , then $k =$                      |        |

**PART-II (PHYSICS)**

**Section-I**

**Straight Objective Type**

**Q 23.**

If a current  $I = I^2 e^{-t}$  flows through an inductor of 2 mH, the time at which the emf will become zero is

- a. 1 s
- b. 2 s
- c. 3 s
- d. 4 s

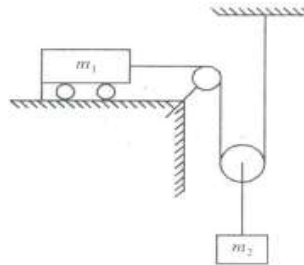
**Q 24.**

In young's double slit experiment, if  $I_0$  is the intensity at the central bright fringe and  $\beta$  its width, then the intensity as a function of distance  $y$  from the central bright fringe is

- a.  $I_0 \cos^2 (y/\beta)$
- b.  $I_0 \cos^2 (\beta/y)$
- c.  $I_0 \cos^2 \left(\frac{\pi\beta}{y}\right)$
- d.  $I_0 \cos^2 \left(\frac{\pi y}{\beta}\right)$

**Q 25.**

In the arrangement of frictionless and massless pulleys, the acceleration of  $m_1$  and  $m_2$  are  $a_1$  and  $a_2$ . Then



- a.  $a_1 = a_2$
- b.  $a_1 = 2a_2$
- c.  $a_2 = 2a_1$
- d.  $a_2 = 4a_1$

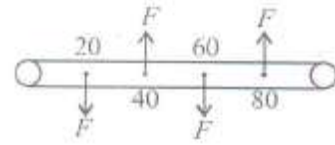
**Q 26.**

A small sphere of mass  $m$  moving horizontally with velocity  $v_0$  collides on a pendulum bob of mass  $M$ . if the bob along with the sphere performs a vertical circle about the point of suspension (length  $l$ ) the value of  $v_0$  is,

- a.  $\sqrt{5gl}$
- b.  $\frac{(M+m)}{m} \sqrt{5gl}$
- c.  $\frac{(M+m)}{M} \sqrt{5gl}$
- d.  $10\sqrt{5gl}$

**Q 27.**

Four equal and parallel forces ( $F$ ) are acting on a rod at a distance of 20 cm, 40 cm, 60 cm and 80 cm from one end of the rod as shown in the figure. Then the rod will be



- a. at rest
- b. experiencing a torque
- c. having translator motion
- d. having rotation as well as translation.

**Q 28.**

The acceleration of a particle as seen from two frames  $S_1$  and  $S_2$  have equal magnitude of  $4 \text{ ms}^{-2}$ . Then

- a.  $S_1$  and  $S_2$  are both at rest with respect to each other.
- b.  $S_1$  and  $S_2$  may move but neither of them accelerates.
- c.  $S_2$  accelerates with  $8 \text{ ms}^{-2}$  with respect to  $S_1$ .
- d.  $S_2$  accelerates with  $4 \text{ ms}^{-2}$  with respect to  $S_1$ .

**Q 29.**

A table tennis racket has a flat rectangular handle of mass  $m$ , length  $l$  with a circular disc of radius  $r$  and mass  $m$ . The moment of inertia about an axis perpendicular to its plane and passing through its centre of mass is

- a.  $\frac{ml^2}{12} + \frac{mr^2}{2}$
- b.  $\frac{ml^2}{3} + \frac{3mr^2}{2}$
- c.  $\frac{2ml^2}{4} + 2mr^2$
- d.  $\frac{ml^2}{12} + \frac{Mr^2}{2} + \frac{m}{8}(l + 2r)^2$

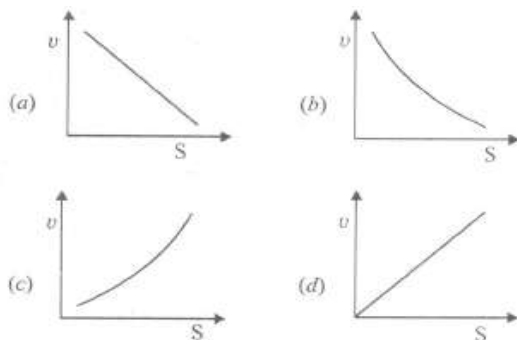
**Q 30.**

A force  $\vec{F} = (2\hat{i} + \hat{j} + 3\hat{k})\text{N}$  acts on a particle of 1 kg mass for  $w$  seconds. If initial velocity of particle is  $\vec{u} = 2(2\hat{i} + \hat{j}) \text{ms}^{-1}$ , the speed of the particle at the end of 2 second is

- a.  $12 \text{ms}^{-1}$
- b.  $6 \text{ms}^{-1}$
- c.  $9 \text{ms}^{-1}$
- d.  $4 \text{ms}^{-1}$

**Q 31.**

If acceleration associated with a body is  $a = kv$  where  $k$  is a constant, the velocity ( $v$ ) varies with displacement ( $S$ ) as,



**Section-II**

**Reasoning Type**

**Q 32.**

STATEMENT-1

A body having an acceleration  $2t$  will have a parabolic  $v$ - $t$  graph.

and

STATEMENT-2

Equation of motion are not applicable for variably accelerated bodies.

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 F1alse, STATEMeNT-2 is True.

**Q 33.**

STATEMENT-1

As light from a point source falls on a plane mirror, interference takes place for all angles of incidence except  $\theta = 0^\circ$ .

and

STATEMENT-2

A virtual source is formed by the reflected light which interfere with the original incident light.

- 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;  
STAMTEMENT-2 is NOT a correct explanation ofr  
STATEMENT-1.
- c. STATEMENT-1 is True, STATEMENT-2 is False.
- d. STATEMENT-1 is F1alse, STATEMeNT-2 is True.

**Q 34.**

STATEMENT-1

Torque experienced by a current carrying coil in a magnetic field as the field passes along its surface is maximum.

and

STATEMENT-2

Torque experienced by current carrying coil in a magnetic field is a useful tip in almost all measuring metres.

- 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 F1alse, STATEMeNT-2 is True.

**Q 35.**

STATEMENT-1

In capillary rise, the vertical rise is only accounted and not the slant height.

and

STATEMENT-2

The pressure difference in the fluid depends on the vertical height, viz.  $p = h\rho g$  where symbols carry usually meaning.

- 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;  
STAMTEMENT-2 is NOT a correct explanation ofr  
STATEMENT-1.
- c. STATEMENT-1 is True, STATEMENT-2 is False.
- d. STATEMENT-1 is F1alse, STATEMeNT-2 is True.

## Section-III

### Linked Comprehension Type

This section contains 2 Paragraphs. Based upon each paragraph, 3 multiple choice questions have to be answered. Each question has 4 choices (a), (b), (c), and (d), out of which ONLY ONE is correct.

Paragraph for Question Nos. 36 – 38

A dam has a width of  $L$  to hold water of density  $\rho$  to a height  $H$ . Due to the pressure of the liquid there exists force on the walls and this will be more at the bottom and tends to slide the wall it along.

#### **Q 36.**

The total horizontal force is

(a)  $\rho g L H^2$

(b)  $\frac{1}{2} \rho g L H^2$

(c)  $2 \rho g L H^2$

(d)  $\frac{3}{2} \rho g L H^2$

#### **Q 37.**

The torque about a point on the wall at its bottom is,

(a)  $\frac{1}{6} \rho g L H^3$

(b)  $\frac{1}{3} \rho g L H^3$

(c)  $\rho g L H^3$

(d)  $2 \rho g L H^3$

**Q 38.**

The moment arm of the resultant horizontal force about a point on the wall at its bottom is,

(a)  $\frac{H}{4}$

(b)  $\frac{H}{2}$

(c)  $\frac{H}{3}$

(d)  $\frac{2H}{3}$

Paragraph for Question Nos. 39 to 41

A particle electrically interacts with another particle by creating an electric field. Due to a point charge  $Q$  the electric field at a point distance  $r$  is  $E = \frac{Q}{4\pi\epsilon_0 r^2}$ . If a charge distribution is given, one can find the resultant field considering the direction due to each elementary portion. A ring of radius  $R$  with charge  $Q$  uniformly spread is given. Then,

**Q 39.**

Electric field at a point, distance  $x$  ( $x \gg R$ ) along its axis is proportional to

a.  $x$

b.  $x^{-2}$

c.  $x^{-3}$

d.  $x^2$

**Q 40.**

A negatively charged particle of mass  $m$  charge  $e$  placed along the axis at a distance  $x$  ( $\ll R$ ) will execute a SHM of time period  $2\pi$  times.

a.  $\sqrt{\frac{eQ}{\epsilon_0 m R^2}}$

b.  $\sqrt{\frac{Qe}{\epsilon_0 m}}$

c.  $\sqrt{\frac{\epsilon_0 m R^3}{Qe}}$

d.  $16 \times \sqrt{\frac{\pi^2 \epsilon_0 m R^2}{Qq}}$



**Q 41.**

The speed  $v$  to be given to the -ve charge 'e', mass  $m$  placed at the centre of the ring to move out of the electrostatic attractive force is

a.  $\sqrt{\frac{4\pi eQ}{\epsilon_0 m R^2}}$

b.  $\sqrt{\frac{eQ}{4\pi\epsilon_0 m R^2}}$

c.  $\sqrt{\frac{2\pi m Q e}{\epsilon_0 R}}$

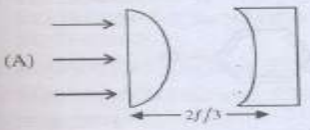
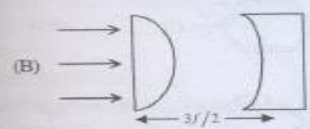
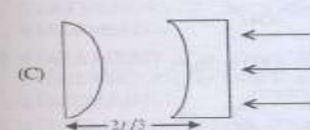
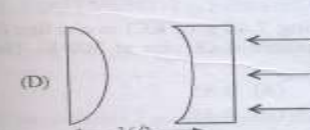
d.  $\sqrt{\frac{m Q e}{2\pi\epsilon_0 R}}$

**Section-IV**

**Matrix Match Type**

**Q 42.**

A glass disc is cut and the lenses formed are placed as shown in Column I to receive light. Column II gives the converging or diverging nature and position of the image from  $L_2$ . Match them.

Column I	Column II
(A) 	(P) Converging, $< f$
(B) 	(Q) Diverging, $< f$
(C) 	(R) Converging, $> f$
(D) 	(S) Diverging, $> f$

**Q 43.**

Column I

- a. Adiabatic Process
- b. Isothermal Process
- c. Critical temperature
- d. Rising air column

Column II

- p.  $\Delta S = 0$
- q. Cools on expansion
- r. Bursting of an air filled tube
- s. Coexistence of liquid and gas.

**Q 44.**

Column I

- a. Bohr radius
- b. Magnetic field due to orbiting electron
- c. Velocity of  $e^-$  on transit to higher energy level.
- d. Total energy  $e^-$  on transit to higher energy level.

Column II

- p.  $n^{-5}$
- q.  $n^{-1}$
- r.  $n^2$
- s.  $n^{-2}$

## **PART-III (CHEMISTRY)**

### **Section-I**

#### **Straight Objective Type**

**Q 45.**

$TiCl_4$  is reduced by Na under an atmosphere of

- a. oxygen
- b. nitrogen
- c. argon
- d. hydrogen.

**Q 46.**

The substance formed when quartz is heated with an excess of coke in an electric furnace

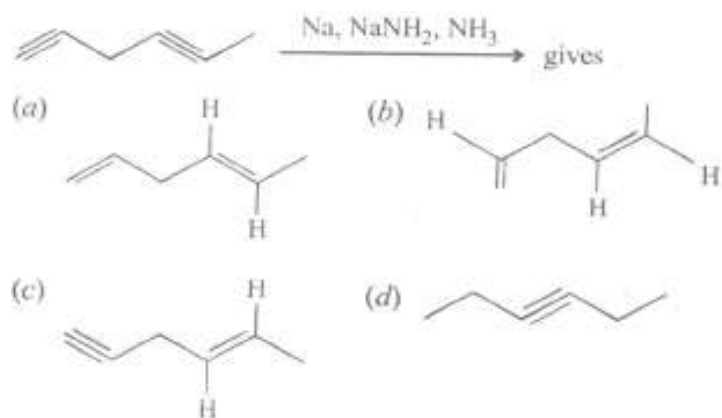
- a. Si
- b. SiO
- c. SiC
- d.  $SiCO_3$

**Q 47.**

The sodium/lead alloy on reaction with ethyl chloride gives

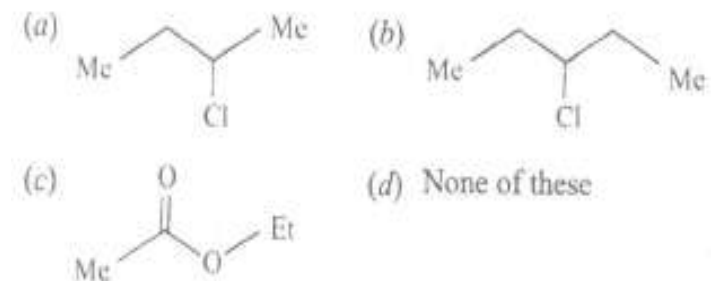
- a.  $C_2H_6$
- b.  $C_2H_4$
- c.  $PbCl_2$
- d.  $PbEt_4$ .

**Q 48.**

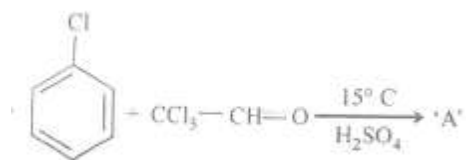


**Q 49.**

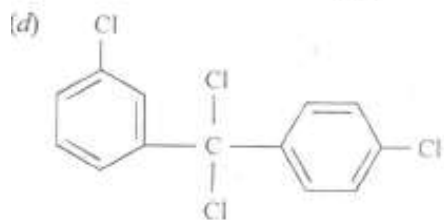
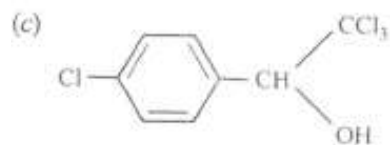
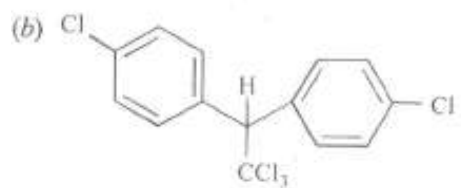
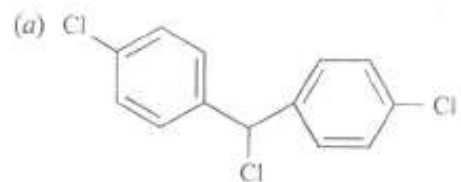
Which of the following compound gives iodoform reaction ?



**Q 50.**



'A' will be



**Q 51.**

A solution of KCl containing 7.45 g of KCl in One litre of water has an osmotic pressure 4.68 atm at 300 K. The osmotic coefficient is

- a. 0.95
- b. 0.85
- c. 0.75
- d. 0.45

**Q 52.**

The number of radial nodes present in 4d orbital is

- a. One
- b. Zero
- c. Two
- d. Three

**Q 53.**

The bond order of  $\text{NO}_3^-$  ion is

- a. 1.5
- b. 1.33
- c. 2.5
- d. 1.25

## Section-II

### Reasoning Type

**Q 54.**

STATEMENT-1

Allyl chloride is more reactive than ethyl chloride in  $\text{S}_\text{N}2$  reaction.

and

STATEMENT-2

Allyl carbocation is stabilized by resonance.

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 55.**

STATEMENT-1

Chloral gives disproportionation reaction with sodium hydroxide.

and

STATEMENT-2

Chloral gives chloral hydrate in water.

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 for  
STATEMENT-1.

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

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

**Q 56.**

STATEMENT-1

The charge densities in the various parts of the atom can be explained only when electron is considered a cloud of negative charge rather than a particle.

and

STATEMENT-2

Electron has wave character only.

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 57.**

STATEMENT-1

The nickel-silver alloy contains 20 percent of silver

and

STATEMENT-2

Nickel-silver alloy contains only copper and nickel.

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;

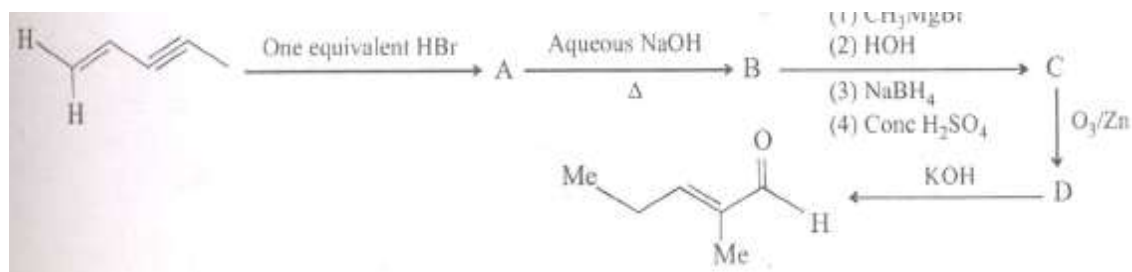
STATEMENT-2 is NOT a correct explanation of STATEMENT-1.

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

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

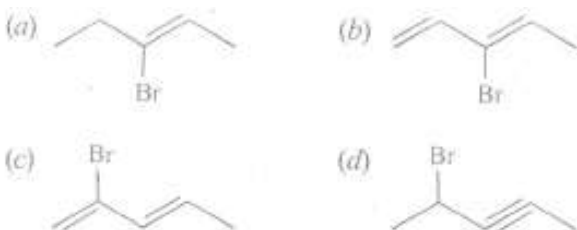
## Section-III

Paragraph for Question Nos. 58 to 60



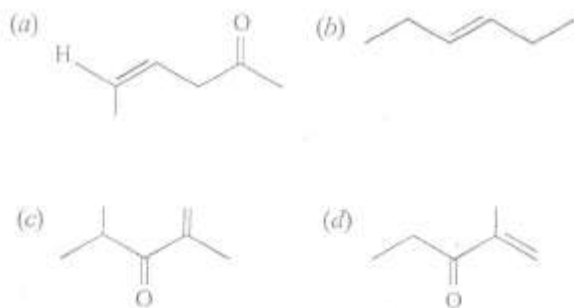
**Q 58.**

The compound (A) is



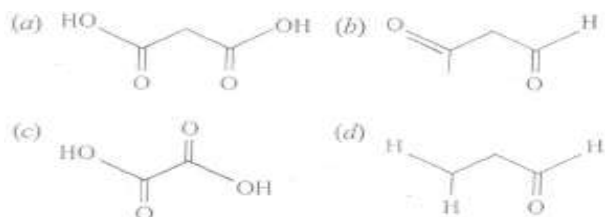
**Q 59.**

The compound (C) is



**Q 60.**

The compound (D) is





### Paragraph for Question Nos. 61 to 63

A silver electrode is immersed in saturated solution of  $\text{Ag}_2\text{SO}_4$ . The potential difference between the silver and the SHE is found to be 0.711 V and standard reduction potential of hydrogen and silver are 0.00 V and 0.799 V respectively.

#### **Q 61.**

The molarity of  $\text{Ag}^+$  ions in solution is equal to

- a.  $3.2 \times 10^{-2}$
- b.  $4.6 \times 10^{-3}$
- c.  $3.7 \times 10^{-7}$
- d.  $2.6 \times 10^{-3}$

#### **Q 62.**

The molarity of  $\text{SO}_4^{2-}$  ions in solution is

- a.  $2.3 \times 10^{-3}$
- b.  $3.2 \times 10^{-2}$
- c.  $1.6 \times 10^{-2}$
- d.  $1.3 \times 10^{-3}$

#### **Q 63.**

The  $K_{\text{sp}}$  of  $\text{Ag}_2\text{SO}_4$  is

- a.  $1.75 \times 10^{-7}$
- b.  $1.85 \times 10^{-5}$
- c.  $1.6 \times 10^{-5}$
- d.  $1.45 \times 10^{-6}$

## Section-IV

### Matrix Match Type

**Q 64.**

	P	Q	R	S
A	(P)	●	●	(S)
B	●	(Q)	(R)	●
C	(P)	(Q)	●	●
D	(P)	●	(R)	(S)

Column I


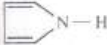


- $(\text{NH}_4)_2 \text{Cr}_2\text{O}_7 \xrightarrow{\Delta}$
- $\text{Cu} + \text{dil HNO}_3 \rightarrow$
- $\text{NH}_4\text{NO}_3 \xrightarrow{\Delta}$
- $\text{pb}(\text{NO}_3)_2 \xrightarrow{\Delta}$

Column II

- $\text{N}_2\text{O}$
- $\text{N}_2$
- $\text{NO}$
- $\text{NO}_2$

**Q 65.**

Column I

Column I
(A) 
(B) 
(C) 
(D) 

Column II

- All  $\text{sp}^2$  hybrid atoms in ring
- Aromatic
- Paramagnetic
- Diamagnetic

**Q 66.**

Column I

- $\text{MnO}_2$
- $\text{KO}_2$
- $\text{SO}_2$
- $\text{I}_3^-$

Column II

- Paramagnetic
- V shaped
- Linear
- Bond order is 1.5