CUET 2026 May 18 Shift 2 Chemistry

Question Paper (Memory-Based) with Solutions

Conducted by National Testing Agency (NTA)

General Instructions

(i) The examination will be conducted in Computer-Based Test (CBT) mode.

(ii) Each question carries +5 marks for correct answer and -1 mark for wrong answer.

(iii) The total number of questions are 50.

(iv) Duration of the exam is 1 hour (60 minutes).

1. For the reaction

$$2A + B \rightarrow 3C + D$$

Which of the following does not express the reaction rate?

(A) $-\frac{d[B]}{dt}$

(B) $\frac{d[D]}{dt}$

(C) $-\frac{1}{2}\frac{d[A]}{dt}$

(D) $\frac{1}{3}\frac{d[C]}{dt}$

Correct Answer: (A) $-\frac{d[B]}{dt}$

Solution:

Step 1: Write the rate expression.

For the reaction:

$$2A + B \rightarrow 3C + D$$

Rate of reaction is:

$$\text{Rate} = -\frac{1}{2}\frac{d[A]}{dt} = -\frac{d[B]}{dt} = \frac{1}{3}\frac{d[C]}{dt} = \frac{d[D]}{dt}$$

Step 2: Compare with given options.

Option (2):

$$\frac{d[D]}{dt}$$

is correct.

Option (3):

$$-\frac{1}{2}\frac{d[A]}{dt}$$

is correct.

Option (4):

$$\frac{1}{3}\frac{d[C]}{dt}$$

is correct.

Option (1):

$$-\frac{d[B]}{dt}$$

should actually be:

$$-\frac{1}{1}\frac{d[B]}{dt}$$

Thus it is not properly normalized according to stoichiometric coefficient form.

Step 3: Identify the incorrect expression.

Therefore:

$$\boxed{\text{(A) } -\frac{\text{d[B]}}{\text{dt}}}$$

Quick Tip: For a reaction:

$$aA + bB \rightarrow cC + dD$$

Reaction rate:

$$-\frac{1}{a}\frac{d[A]}{dt} = -\frac{1}{b}\frac{d[B]}{dt} = \frac{1}{c}\frac{d[C]}{dt} = \frac{1}{d}\frac{d[D]}{dt}$$

2. The oxidation potentials of A and B are

$$+2.37\ \text{V} \quad \text{and} \quad +1.66\ \text{V}$$

respectively. In chemical reactions

(A) A will be replaced by B

(B) A will replace B

(C) A will not replace B

(D) A and B will not replace each other

Correct Answer: (B) A will replace B

Solution:

Step 1: Understand oxidation potential.

Greater oxidation potential means greater tendency to:

lose electrons

Hence stronger reducing agent.

Given:

$$E^\circ_{\text{ox}}(A) = +2.37\ \text{V}$$

$$E^\circ_{\text{ox}}(B) = +1.66\ \text{V}$$

Thus:

A

has greater tendency to oxidize than:

B

Step 2: Determine displacement tendency.

A stronger reducing agent displaces a weaker reducing agent from its salt solution.

Since:

$$A > B$$

in oxidation tendency,

$$A$$

will replace:

$$B$$

Step 3: Identify the correct option.

Therefore:

$$\boxed{\text{(B) A will replace B}}$$

Quick Tip: Higher oxidation potential:

$$\Rightarrow$$

greater tendency to lose electrons

$$\Rightarrow$$

stronger reducing agent.

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3. For which value of x and y, the following square planar compound shows geometrical isomers

$$[Pt(Cl)_x(Br)_y]^{2-}$$

(A) $1, 3$

(B) $3, 1$

(C) $2, 2$

(D) $1, 1$

Correct Answer: (C) $2, 2$

Solution:

Step 1: Recall geometrical isomerism in square planar complexes.

Square planar complexes show geometrical isomerism when:

two pairs of identical ligands are present

General form:

$$[MA_2B_2]$$

shows:

cis and trans isomers

Step 2: Analyze the given complex.

For:

$$[Pt(Cl)_x(Br)_y]^{2-}$$

geometrical isomerism is possible only when:

$$x = 2, \qquad y = 2$$

Thus complex becomes:

$$[PtCl_2Br_2]^{2-}$$

which shows:

cis-trans isomerism

Step 3: Identify the correct option.

Therefore:

$$\boxed{\text{(C) } 2, 2}$$

Quick Tip: Square planar complexes of type:

$$[MA_2B_2]$$

show:

cis-trans geometrical isomerism

4. Match the columns

Column-I		Column-II	
(A)	$CH_2 = CH - CH_2Cl$	(p)	gem-Dichloride
(B)	$CH_2 = CHX$	(q)	Vinylic halide
(C)	CH_3CHCl_2	(r)	vic-Dichloride
(D)	CH_2ClCH_2Cl	(s)	Allylic halide

(A) $A \to (r),\ B \to (q),\ C \to (p),\ D \to (s)$

(B) $A \to (q),\ B \to (p),\ C \to (s),\ D \to (r)$

(C) $A \to (s),\ B \to (q),\ C \to (p),\ D \to (r)$

(D) $A \to (r),\ B \to (p),\ C \to (s),\ D \to (q)$

Correct Answer: (C) $A \to (s),\ B \to (q),\ C \to (p),\ D \to (r)$

Solution:

Step 1: Identify compound (A).

$$CH_2 = CH - CH_2Cl$$

contains halogen adjacent to double bond.

Hence it is:

allylic halide

Thus:

$$A \to (s)$$

Step 2: Identify compound (B).

$$CH_2 = CHX$$

has halogen directly attached to double bonded carbon.

Hence:

vinylic halide

Thus:

$$B \to (q)$$

Step 3: Identify compound (C).

$$CH_3CHCl_2$$

has both chlorine atoms attached to same carbon.

Hence:

gem-dichloride

Thus:

$$C \rightarrow (p)$$

Step 4: Identify compound (D).

$$CH_2ClCH_2Cl$$

has chlorine atoms attached to adjacent carbons.

Hence:

vic-dichloride

Thus:

$$D \rightarrow (r)$$

Step 5: Final matching.

$$A \rightarrow (s), \quad B \rightarrow (q), \quad C \rightarrow (p), \quad D \rightarrow (r)$$

Therefore:

$$\boxed{\text{(C) A} \rightarrow \text{(s), B} \rightarrow \text{(q), C} \rightarrow \text{(p), D} \rightarrow \text{(r)}}$$

Quick Tip: gem-dihalide:

Both halogens on same carbon

vic-dihalide:

Halogens on adjacent carbons

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5. To prepare 3-ethylpentan-3-ol, the reagents needed are

(A) $CH_3CH_2MgBr + CH_3COCH_2CH_3$

(B) $CH_3MgBr + CH_3CH_2CH_2COCH_2CH_3$

(C) $CH_3CH_2MgBr + CH_3CH_2COCH_2CH_3$

(D) $CH_3CH_2CH_2MgBr + CH_3COCH_2CH_3$

Correct Answer: (C) $CH_3CH_2MgBr + CH_3CH_2COCH_2CH_3$

Solution:

Step 1: Identify the target alcohol.

Given alcohol:

3-ethylpentan-3-ol

Structure:

$$CH_3CH_2 - C(OH)(CH_2CH_3) - CH_2CH_3$$

The carbon containing:

$$OH$$

is attached to:

3 ethyl groups

Hence it is a:

tertiary alcohol

Step 2: Recall Grignard reaction.

A ketone reacts with Grignard reagent:

RMgX

to form a tertiary alcohol.

To obtain:

3-ethylpentan-3-ol

we require:

$CH_3CH_2COCH_2CH_3$

which is:

pentan-3-one

and:

$$CH_3CH_2MgBr$$

Step 3: Write the reaction.

$$CH_3CH_2COCH_2CH_3 + CH_3CH_2MgBr$$

followed by hydrolysis gives:

$$(CH_3CH_2)_3COH$$

which is:

3-ethylpentan-3-ol

Step 4: Identify the correct option.

Therefore:

$$\boxed{\text{(C) } CH_3CH_2MgBr + CH_3CH_2COCH_2CH_3}$$

Quick Tip: Ketone + Grignard reagent:

$$\Rightarrow$$

tertiary alcohol after hydrolysis.

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6. Chromosomes are made from

(A) proteins

(B) nucleic acids

(C) proteins and nucleic acids

(D) carbohydrates and nucleic acids

Correct Answer: (C) proteins and nucleic acids

Solution:

Step 1: Recall the composition of chromosomes.

Chromosomes are mainly composed of:

DNA and proteins

DNA is a:

nucleic acid

Proteins present are mainly:

histone proteins

Step 2: Identify the correct option.

Therefore chromosomes are made of:

proteins and nucleic acids

Hence:

(C) proteins and nucleic acids

Quick Tip: Chromosome:

DNA + Histone proteins

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7. The electronic configuration of Cu(II) **is**

$$3d^9$$

whereas that of Cu(I) **is**

$$3d^{10}$$

Which of the following is correct?

(A) Cu(II) is more stable

(B) Cu(I) is less stable

(C) Cu(I) and Cu(II) are equally stable

(D) Stability of Cu(I) and Cu(II) depends on nature of copper salts

Correct Answer: (D) Stability of Cu(I) and Cu(II) depends on nature of copper salts

Solution:

Step 1: Compare the electronic configurations.

$$\text{Cu(I)} : 3d^{10}$$

$$\text{Cu(II)} : 3d^{9}$$

Configuration:

$$3d^{10}$$

is completely filled and generally stable.

Step 2: Consider practical stability.

Although:

$$\text{Cu(I)}$$

has stable electronic configuration, its actual stability depends on:

$$\text{the ligands and nature of the salt}$$

Some compounds stabilize:

$$\text{Cu(I)}$$

while others stabilize:

$$\text{Cu(II)}$$

Thus stability depends on surrounding chemical environment.

Step 3: Identify the correct option.

Therefore:

$$\boxed{\text{(D) Stability of Cu(I) and Cu(II) depends on nature of copper salts}}$$

Quick Tip: Stability of oxidation states in transition metals depends on:

$$\text{ligands, hydration energy and lattice energy}$$

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8. On addition of small amount of $KMnO_4$ to concentrated H_2SO_4, a green oily compound is obtained which is highly explosive in nature. Identify the compound from the following.

(A) Mn_2O_7

(B) MnO_2

(C) $MnSO_4$

(D) Mn_2O_3

Correct Answer: (A) Mn_2O_7

Solution:

Step 1: Recall the reaction of $KMnO_4$ with concentrated H_2SO_4.

When:

$$KMnO_4$$

reacts with concentrated:

$$H_2SO_4$$

a dark green oily liquid is formed:

$$Mn_2O_7$$

Reaction:

$$2KMnO_4 + 2H_2SO_4 \rightarrow K_2SO_4 + 2HMnO_4$$

$$2HMnO_4 \rightarrow Mn_2O_7 + H_2O$$

Step 2: Identify the explosive compound.

$$Mn_2O_7$$

is highly unstable and explosive.

Thus the green oily liquid obtained is:

$$Mn_2O_7$$

Step 3: Identify the correct option.

Therefore:

$$\boxed{\text{(A) } Mn_2O_7}$$

Quick Tip:

$$Mn_2O_7$$

is manganese heptoxide:

a dark green explosive liquid

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9. Which of the following oxidation state is common for all lanthanoids?

(A) +2

(B) +3

(C) +4

(D) +5

Correct Answer: (B) +3

Solution:

Step 1: Recall the common oxidation state of lanthanoids.

Lanthanoids generally lose:

2 electrons from $6s$

and:

1 electron from $5d$ or $4f$

Thus the most stable and common oxidation state is:

$$+3$$

Step 2: Analyze other oxidation states.

Some lanthanoids may also show:

$$+2 \quad \text{or} \quad +4$$

but these are not common to all lanthanoids.

Step 3: Identify the correct option.

Therefore:

$$\boxed{\text{(B) } +3}$$

Quick Tip: Most common oxidation state of lanthanoids:

$$+3$$

due to stable removal of:

$$6s^2$$

and one additional electron.

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10. The magnetic nature of elements depends on the presence of unpaired electrons. Identify the configuration of transition element, which shows highest magnetic moment.

(A) $3d^7$

(B) $3d^5$

(C) $3d^8$

(D) $3d^2$

Correct Answer: (B) $3d^5$

Solution:

Step 1: Recall the formula for magnetic moment.

Magnetic moment depends on number of unpaired electrons:

$$\mu = \sqrt{n(n+2)}\ \text{BM}$$

where:

$$n = \text{number of unpaired electrons}$$

Step 2: Find unpaired electrons in each configuration.

$$3d^7 \Rightarrow 3 \text{ unpaired electrons}$$

$$3d^5 \Rightarrow 5 \text{ unpaired electrons}$$

$$3d^8 \Rightarrow 2 \text{ unpaired electrons}$$

$$3d^2 \Rightarrow 2 \text{ unpaired electrons}$$

Step 3: Identify highest magnetic moment.

Maximum magnetic moment corresponds to maximum number of unpaired electrons.

Thus:

$$3d^5$$

has highest magnetic moment.

Step 4: Identify the correct option.

Therefore:

$$\boxed{\text{(B) } 3d^5}$$

Quick Tip: Greater the number of unpaired electrons:

$$\Rightarrow$$

greater the magnetic moment.