OUICK APPROACH TO A' LEVEL PRACTICALS.

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WORKED OUT EXAMPLES

UNEB 2015

PRACTICALS You are provided with a substance **k** which contains **two cations** and **two anions**, carry out he following tests on \mathbf{k} and identify the cations and anions in it.

Identify any gases evolved. Record your observations and deductions in the table below.

TESTS	OBSERVATION	DEDUCTIONS	
a) Heat a spatula endful	Purple/violet vapour forms.	Iodine gas given off, thus I ⁻	
of k in a dry test tube	Purple/black sublimate.	ZnO formed.	
	Vapour turns blue litmus to		
	red.		
oOr.	Yellow residue when hot and		
.091	white when cold.		
b) Shake 3 spatula endful	Colourless filtrate	Non transition metal ions	
of K with about 5cm ³	White residue.	OR	
of water and filter. Keep		Zn ²⁺ , Ca ²⁺ , Mg ²⁺ , Ba ²⁺ , Al ³⁺ ,	
both the filtrate and		Pb ²⁺ ions present.	
residue.			
c) Divide the filtrate into	White precipitate insoluble in	Ca ²⁺ , Mg ²⁺ , Ba ²⁺ probably	
seven parts.	excess.	present.	

•			
i)	To the 1 st part of the		
	filtrate, add dilute		
	sodium hydroxide		
	solution dropwise		
	until in excess.		
ii)	To the 2 nd part of the	White precipitate insoluble in	Mg ²⁺ and Ba ²⁺ suspected.
	filtrate, add ammonia	excess.	
	solution dropwise		
	until in excess and		
	allow the mixture to		okr
	stand.		, Po.
		, C	
iii)	To the third portion	White precipitate formed.	Ba²⁺ suspected.
,	of the filtrate add 2-3		1
	drops of dilute		
	sulphuric acid.		
:)		V-lless initiate involution	Ba ²⁺ confirmed.
iv)	to the fourth part of the	Yellow precipitate insoluble	
	filtrate add 2-3 drops	in ethanoic acid.	Note: no mark for deduction if
	of potassium chromate	\bigcirc	insoluble is not mentioned.
	(VI) solution followed		
	by 2-3 drops of	,	
	ethanoic acid. Allow		
	the mixture to stand.		
v)	To the fifth part of the	Brown vapour/ fumes.	NO_2 gas thus NO_3^- present.
	filtrate add copper	<u>OR</u>	
	turnings followed by	reddish-brown fumes.	I_2 gas thus I^-
	2-3 drops of		
	concentrated sulphuric	Purple/ violet vapour.	
	acid and heat the		
	mixture.		

vi)	To the sixth part of the	Pale yellow precipitate	I ⁻ suspected
	filtrate add 2-3 drops	insoluble in excess ammonia	No mark for deduction
	of nitric acid then 2-3	solution.	if in soluble is missing.
	drops of silver nitrate		
	solution followed		
	dilute ammonia		.5
	solution dropwise		
	until in excess.		
vii)	To the seventh part of	Yellow precipitate	I ⁻ confirmed.
	the filtrate add 2-3		164
	drops of lead (II)		
	nitrate solution.		
d)	Wash the residue with	Residue dissolves to form a	Non transition metal cations
	water and the dissolve	Colourless solution.	OR
	it in dilute		Zn ²⁺ , Ca ²⁺ , Mg ²⁺ , Ba ²⁺ , Al ³⁺ ,
	hydrochloric acid.		Sn ²⁺ , Sn ⁴⁺ ions present.
	Divide the acidic		<u>Note:</u> No mark for Pb ²⁺
	solution into 3 parts.		because it does not dissolve in
		$\langle \mathcal{O} \rangle$	HCl
i)	To the first part of the	White precipitate soluble in	Zn ^{2+,} Al ³⁺ present.
	acidic solution add	excess to a Colourless	
	sodium hydroxide	solution.	
	solution dropwise		
	until excess.		
ii)	To the first part of the	White precipitate soluble in	Zn ²⁺ present.
\bigcirc	acidic solution add	excess to a Colourless	Note: No mark if soluble is
	dilute ammonia	solution.	missing.
	solution dropwise		
	until excess.		

To the third part of the acidic	White precipitate soluble in	Zn ²⁺ confirmed.
solution add a small amount of	excess ammonia to a	<u>Note:</u> No mark if soluble in
solid ammonium chloride.	Colourless solution.	ammonia is missing.
shake and add 2-3 drops of		
disodium hydrogen phosphate		
solution by dilute ammonia		S S
solution dropwise until in		
excess.		

Cations in K are $\underline{Ba^{2+}, Zn^{2+}}$ and the anions in K are $\underline{NO_3^{-}, I^{-}}$

UNEB 2014

You are provided with substance **Y** which contains **two cations** and **two anions**. You are required to carry out the following tests on **Y** and identify the anions and cation in it. Record your observations and deductions in the table below.

6.KH

TESTS	OBSERVATIONS	DEDUCTIONS
a) Heat 2 spatula endful	Colourless liquid that turned	Water of crystallization thus a
of Y strongly in a dry	anhydrous copper (II)	hydrated salt.
test tube.	sulphate blue.	CO_2 gas thus CO_3^{2-} ,
	Colourless gas that turns blue	$HC0_{3}^{-}, C_{2}0_{4}^{2-},$
. 09/-	litmus red and lime water	The residue is ZnO
	milky.	
	Yellow residue when hot and	
$O_{D_{12}}$	white when cold.	
b) To 3 spatula endfuls of	Effervescence of a Colourless	CO_2 thus CO_3^{2-} present.
Y, add dilute nitric	gas that turns blue litmus red	
acid dropwise until in	and lime water milky.	
there is no further		
change and warm.		

c)	To the solution from	White precipitate insoluble in	Ca ²⁺ , Mg ²⁺ , Ba ²⁺
,	(b) above, add dilute	excess.	
	sodium hydroxide	Colourless filtrate	Zn ²⁺ Al ³⁺ , Sn ^{2+,} Pb ²⁺
	dropwise until there is	White residue.	$Ca^{2+}, Mg^{2+}, Ba^{2+}$ present
	no further change	Winte residue.	cu , ng , bu present
	Filter the mixture.		. 5
	Keep both the residue		
1)	and filtrate.	XX71 '	7 2+ 4 13+ 0 2+ pt 2+ 0 4+
d)	To the filtrate, add	White precipitate soluble in	Zn^{2+} Al ³⁺ , Sn ^{2+,} Pb ^{2+,} Sn ⁴⁺
	dilute nitric acid until	excess to a Colourless	present
	the solution is just	solution.	$\langle B \rangle$
	acidic and divide the		<u>с, , , , , , , , , , , , , , , , , , , </u>
	acidic filtrate into six	M3,	
	parts.	CH/V.	
i)	To the first part of the	Yellows precipitate insoluble	Br ⁻ , I ⁻ suspected
	acidified solution add	in excess.	
	2-3 drops of silver		
	nitrate solution		
	followed by dilute	$\langle \mathcal{O} \rangle$	
	ammonia dropwise		
	until in excess.		
ii)	To the second part of	Brown solution formed which	I_2 given off thus I ⁻
	the acidified filtrate,	turned to Colourless on adding	
	add 6 drops of	$Na_2S_2O_3$ solution.	
	concentrated sulphuric		
	acid and warm. To the		
	mixture add sodium		
	thiosulphate solution.		

iii)	To the third part of the	Yellow precipitate	I ⁻ confirmed
	acidified filtrate, add		
	2-3 drops of lead (ii)		
	nitrate solution.		
iv)	To the fourth part of	White precipitate soluble in	Zn ²⁺ Al ³⁺ , Sn ^{2+,} Pb ^{2+,} Sn ⁴⁺
	the acidified filtrate,	excess forming a Colourless	present
	add sodium hydroxide	solution.	
	solution dropwise		
	until in excess.		
v)	To the fourth part of	White precipitate soluble in	Zn ²⁺ present
	the acidified filtrate,	excess forming a Colourless	
	add ammonia solution	solution.	
	dropwise until in		
	excess.	CHK.	
vi)	To the sixth part of the	White precipitate soluble in	Zn ²⁺ confirmed.
	acidified solution, add	excess ammonia forming a	
	a spatula endful of	Colourless solution.	
	ammonium chloride		
	followed by 3-4 drops	$\langle \mathcal{O} \rangle$	
	of disodium hydrogen		
	phosphate followed by		
	dropwise addition of		
	ammonia solution		
	until in excess.		
e)	Wash the residue and	Dissolves to give a Colourless	Ca ²⁺ , Mg ²⁺ , Ba ²⁺ suspected
	dissolve it in dilute	solution.	
	hydrochloric acid and		
	divide the solution into		
	3 parts.		

i)	To the first part of the	White precipitate insoluble in	Ca ²⁺ , Mg ²⁺ , Ba ²⁺ present
	acidic solution, add	excess	
	dilute sodium		
	hydroxide solution		
	dropwise until in		
	excess.		
ii)	To the first part of the	White precipitate insoluble in	Mg ²⁺ , Ba ²⁺ present.
	acidic solution, add	excess	
	dilute sodium		
	hydroxide solution		0
	dropwise until in		
	excess.		
iii)	To the third part of the	Yellow precipitate	Ba ²⁺ confirmed
	acidified solution, add		
	2-3 drops of potassium		
	chromate (VI)		
	solution.		

- f) (i) The anions in **Y** are CO_3^2 , **I**
- (ii) The cations in Y are **Ba²⁺, Zn²⁺**

UACE 2013

You are provided with substance W which contains **two cations** and **two anions**. You are required to carry out the following tests on W and identify the anions and cation in it. Record your observations and deductions in the table below. Identify any gas(es) evolved.

TESTS	OBSERVATIONS	DEDUCTIONS
a) Heat 1 spatula endful	Colourless liquid / condensate	Hydrated salt
of W strongly in a dry	that turns anhydrous copper	×10h
test tube until there is	(II) sulphate to blue.	
no further no change	Colourless gas that turns blue	alt
	litmus red and lime water	CO_2 gas thus CO_3^{2-} , HCO_3^{-} or
	milky.	$C_2O_4^{2-}$
		<i>C</i> ,
	Reddish brown residue when	PbO or Fe ₂ O ₃
	hot and yellow when cold.	
	Black residue.	
b) To a spatula endful of	Effervescence/ gas bubbles of	CO_2 gas therefore CO_3^{2-} ,
W, add 2-3 drops of	a Colourless gas that turns	HCO_3^- . <u>Note:</u> reject $C_2O_4^2$
concentrated sulphuric	blue litmus to red and lime	
acid and warm.	water milky.	
c) To 2 spatula endfuls of	Effervescence/ gas bubbles of	CO_2 gas thus CO_3^{2-} confirmed
W, add dilute nitric	a Colourless gas that turns	Zn^{2+} Al ³⁺ , Sn ²⁺ , Pb ²⁺ , Sn ⁴⁺
acid until there is no	blue litmus to red and lime	present
further no change.	water milky.	
Add sodium		Mn ²⁺ present.
hydroxide dropwise	White precipitate insoluble in	
until in excess	excess turns brown.	
Filter and keep both	Colourless filtrate	
the filtrate and residue.	Brown residue	Zn^{2+} Al ³⁺ , Sn ^{2+,} Pb ^{2+,} Sn ⁴⁺
		present

d)	To the filtrate, add	White precipitate soluble in	Zn ²⁺ Al ³⁺ , Sn ^{2+,} Pb ^{2+,} Sn ⁴⁺
	dilute nitric acid until	the acid to form a Colourless	probably present
	the solution is just	solution.	
	acidic. Divide the		
	resultant solution into		.5
	four parts.		
i)	To the first part of the	White precipitate soluble in	Zn ²⁺ Al ³⁺ , Sn ²⁺ , Pb ²⁺ , Sn ⁴⁺
	acidic filtrate, add	excess to a Colourless solution	probably present
	sodium hydroxide		16L
	solution dropwise		
	until in excess.		
ii)	To the second part of	White precipitate insoluble in	Al ^{3+,} Pb ²⁺ present
	the acidic filtrate add	excess	
	aqueous ammonia		
	solution dropwise		
	until in excess.		
iii)	To the third part of the	White precipitate formed	Pb ²⁺ probably present
	acidic solution, add	$\langle \mathcal{O} \rangle$	
	dilute sulphuric acid		
iv)	Use the fourth part of		
	the acidic solution to		
	carry out the test of		
	your own choice to		
	confirm on of the		
$ O\rangle$	cation in W.	Yellow precipitate	
	PROCEDURE: Add		Pb ²⁺ confirmed present
	3 drops of potassium		
	iodide solution.		
	OR		

	Add potassium	Yellow precipitate	
	chromate (VI)		
	followed BY sodium		
	hydroxide solution.	White precipitate soluble on	
	OR	heating.	
	Add a soluble chloride		
	e.g. HCl and heat.		
e)	To two spatula endfuls	Colourless filtrate	Non transition metal ions
	W, add about 5cm ³ of	White residue	probably Zn²⁺, Ca²⁺, Mg²⁺,
	water, shake and filter.		Ba^{2+} , Al^{3+} , Pb^{2+} both in
	Divide the filtrate into		residue and filtrate.
	five parts.		Mn ²⁺ probably present
i)	To the first part of the	White precipitate insoluble in	
	filtrate, add sodium	excess turns brown.	
	hydroxide solution		
	dropwise until in		
	excess.		
ii)	To the second part of		Mn ²⁺ probably present
	the filtrate add	White precipitate insoluble in	
	aqueous ammonia	excess turns brown.	
	dropwise until in		
	excess.		
	$\frac{\partial \lambda}{\partial \lambda}$		
iii)	Use the third part of		
	the acidic solution to		
\bigcirc	carry out the test of		
	your own choice to		
	confirm on of the		
	cation in W.		

PROCEDURE:		
Add concentrated		
nitric acid followed by		
solid sodium		
bismuthate.		
OR: Add concentered		Mn ²⁺ confirmed present.
nitic acid followed		
solid PbO ₂ and heat.	Purple solution	
<u>NOTE;</u>		
\checkmark The order of		164
reagents		
matters.		
✓ Sodium		
bismuthate	CHK1.	
solution is		
rejected		
✓ If PbO ₂ is used		
heating is a		
must.	$\langle O \rangle$	
iv) To the fourth part of	White precipitate insoluble on	Cl- absent,
the filtrate, add 2-3	heating	SO4 ²⁻ , SO3 ²⁻ probably present
drops of lead (II)		
nitrate solution and		
heat.		
v) Use the fifth part of the	White precipitate insoluble in	SO ₄ ²⁻ confirmed.
filtrate to carry out the	the acid.	
test of your own		
choice to confirm on		
of the anions in W.		

PROCEDURE:	

Add barium nitrate solution followed by dilute nitric acid.

- f) Identify the;
- i) Cations in W Mn²⁺ Pb^{2+}
- ii) Anions in W CO_3^{2-} SO_4^{2-}

UACE 2012

You are provided with substance which contains **two cations** and **two anions**. You are required to carry out the following tests on **W** and identify the anions and cation in it. Record your observations and deductions in the table below.

m D C M		DEDUCTION
TEST	OBSERVATION	DEDUCTION
a) Heat 2 spatula endful of W	Colourless condensate/ liquid	Water given off thus a
strongly in a dry test tube	turned anhydrous copper (II)	hydrated compound.
	sulphate blue.	Sulphur dioxide gas given off
	Colourless gas turned blue	probably SO_3^{2-} , SO_4^{2-} .
	litmus red and acidified	Propanone vapour given off
	K ₂ Cr ₂ O ₇ solution from orange	probably CH3COO/Acetal
C/P	to green.	ion
- R	Gas with sweet smell.	NiO or FeO
	Solid turned green	
ctr.	<u>Note:</u> fruity smell is rejected.	
b) To two spatula endfuls of w, in a	Colourless gas turned blue	Probably acetate ion or
dry test tube, add concentrated	litmus paper red.	CH ₃ COO ⁻
sulphuric acid and warm.	Vinegar smell.	
	Fruity smell is rejected.	

ACTICALS

c) Dissolve three spatula endfuls of	Dissolves to give a green	
W in about 3cm ³ of water to	solution.	
make a solution.		
a) Use 1 cm^3 of the solution of W to		
carry out a test of your own		
choice to confirm one of the		, حر
anions in W		CH ₃ COO ⁻ confirmed
PROCEDURE:	Reddish –brown solution from	
To the solution add aqueous iron (III)	a brown precipitate.	
chloride and heat.		obr
OR		otr.
Add few drops of concentrated sulphuric	, ć	$\langle k \rangle$
acid followed by ethanol and heat/ warm.	Sweet-fruity smell.	S .
acterionowed by enhanor and near warm.	Sweet-fruity shieli.	
b) To the remaining solution	Green precipitate insoluble in	Ni ²⁺ , Fe ²⁺ present.
of W add dilute sodium hydroxide	excess.	Al^{3+} , Pb^{2+} , Zn^{2+} , Sn^{2+}
solution dropwise until there is no further	Colourless filtrate	suspected.
change.	Green residue.	Ni ²⁺ ,Fe ²⁺ suspected.
Filter and keep both filtrate and residue.	Green residue.	NI ,I'e suspected.
-	White an einitete disselves in	
c) Add dilute hydrochloric		$A1^{3+}$ $7\pi^{2+}$ $8\pi^{2+}$ successed
acid dropwise to the		Al ³⁺ , Zn ²⁺ , Sn ²⁺ suspected.
filtrate until the solution	Colourless solution.	<u>NOTE</u> : Pb^{2+} forms a white
is just acidic. Divide the		ppt with HCl
solution into four		
portions.		
i) To the first	White precipitate soluble in	Al ³⁺ , Zn ²⁺ , Sn ²⁺ suspected.
portion of the	excess to a Colourless	
acidified filtrate	solution.	
add dilute sodium		
hydroxide		

	solution dropwise		
	until in excess.		
ii)	To the second part	No observable change	Pb ²⁺ absent.
	of the acidified		
	filtrate add		
	potassium iodide		,ς
	solution .		C Ale
iii)	To the third	Blue solution/ blue lake	Al ³⁺ confirmed
	portion of the		
	acidified filtrate		opr
	add 5drops of		
	litmus solution		<i>(h.</i>)
	followed by dilute		Ç.
	ammonia solution		
		CK/v	
	dropwise until in		
	excess.		
iv)	To the fourth	White precipitate formed.	SO_4^{2-} present.
	portion of the		
	acidified filtrate	$\langle \mathcal{O} \rangle$	
	add 5 drops of		
	barium nitrate		
	solution.		
d) Wash	the residue with	Dissolved to give green	Ni ²⁺ , Fe ²⁺ probably present.
water	and dissolve in	solution.	
dilute	hydrochloric acid.		
Divide	e the acidic solution		
into 3	portions.		
i)	To the first		
	portion of the	Green precipitate insoluble in	Ni ²⁺ ,Fe ²⁺ probably present.
	acidic solution	excess.	
	add sodium		
	uuu soululli		

	hydroxide		
	solution dropwise		
	until in excess.		
ii)	To the second	Green precipitate soluble in	Ni ²⁺ probably present.
	portion of the	excess to a light blue solution.	
	acidic solution,		
	add dilute		
	ammonia solution		
	dropwise until in		
	excess.		164.
iii)	Use the third	Red precipitate formed.	Ni ²⁺ confirmed present.
iii)	Use the third portion of the	Red precipitate formed.	Ni ²⁺ confirmed present.
iii)		Red precipitate formed.	Ni ²⁺ confirmed present.
iii)	portion of the	Red precipitate formed.	Ni ²⁺ confirmed present.
iii)	portion of the acidic solution to	Red precipitate formed.	Ni ²⁺ confirmed present.
iii)	portion of the acidic solution to carry out a test of	Red precipitate formed.	Ni ²⁺ confirmed present.
iii)	portion of the acidic solution to carry out a test of your own choice	Red precipitate formed.	Ni ²⁺ confirmed present.
iii) PROCEDURE:	portion of the acidic solution to carry out a test of your own choice to confirm one of	Red precipitate formed.	Ni ²⁺ confirmed present.
	portion of the acidic solution to carry out a test of your own choice to confirm one of the cations in W. Add excess	Red precipitate formed.	Ni ²⁺ confirmed present.
PROCEDURE:	portion of the acidic solution to carry out a test of your own choice to confirm one of the cations in W. Add excess on followed by	Red precipitate formed.	Ni ²⁺ confirmed present.

e) i) The cations in W are Ni²⁺ Al³⁺ ii) The anions in W are CH₃COO⁻, SO4²⁻

UACE 2011

You are provided with substance \mathbf{P} which contains **two cations** and **two anions**. You are required to carry out the following tests on \mathbf{p} and identify the anions and cation in it. Record your observations and deductions in the table below. Identify any gas(es) evolved

TES	STS	OBSERVATION	DEDUCTIONS.
a)	Heat one spatula endful of P in a	Colourless liquid turns anhydrous	Hydrated salts thus water of crystallization
	dry testube.	copper (II) sulphate blue.	The gas is CO_2 thus CO_3^{2-} , HCO_3^{-} or C_2
		Colourless gas that turns blue	CH ₃ COO-
		litmus paper red and lime water	SO ₃ gas, SO ₂ gas thus SO ₄ ²⁻ , SO ₃ ²⁻
		milky	CuO,FeO,NiO (for black) and Fe ₂ O
		White fumes Colourless gas which	brown).
		turns acidified K2Cr2O7 green.	
		Green solid turns black/ brown	
		residue.	
b)	To 2 spatula endfuls of P, add	Green filtrate.	Transition metal ions probably Cu ²⁺ , Fe ²⁺
	about 3cm3 of water. Shake	Green residue	or Cr^{3+} in both filtrate and residue.
	vigorously and filter. Divide the		
	filtrate into 5 parts. Keep the	$\mathbf{v}O_{\mathbf{k}}$	
	residue.		
i)	To the first part of the filtrate		Probably Ni ²⁺ , Fe ²⁺ present.
	add dilute sodium hydroxide	Green precipitate insoluble in	
	solution dropwise until in	excess.	
	excess.		
	$\mathcal{A}_{\mathcal{A}}$		
ii) To the first part of the filtrate	Green precipitate insoluble in	Fe ²⁺ present.
	add dilute ammonia solution	excess turns brown.	
	dropwise until in excess.		

iii) To the third part of the filtrate	Green solution turns yellow(or	Fe^{2+} oxidized to Fe^{3+} thus Fe^{2+} confirmed.
add 3-4 drops of concentrated	orange) then blood red on addition	
nitric acid followed by 2-3 drops	of potassium thiocyanate solution.	
of potassium thiocyanate.		
iv) To the fourth part of the filtrate	White precipitate insoluble or	Cl^{-} absent or $SO_4^{2^-}$, $SO_3^{2^-}$ suspected.
add 2-3 drops of lead(II) nitrate	heating	
solution. Heat and allow to cool.		CAL
v) Use the fifth part of the filtrate to	White precipitate insoluble in the	SO ₄ ²⁻ confirmed present.
carry out the test of your own	acid.	
choice to confirm one of the		164.
anions in P.		
PROCEDURE:		
Add barium nitrate solution followed by	CON-	
dilute nitric acid		
OR:		
Add acidified barium chloride solution.		
c) Wash the residue with water and	Effervescence of a Colourless gas	The gas is CO ₂ thus CO ₃ ²⁻ confirmed
dissolve it in dilute hydrochloric	which turned blue litmus red and	Probably Ni ²⁺ , Cu ²⁺ or Fe ²⁺ present
acid. Divide the resultant solution	lime water milky.	
into 3 portions.	Green solution formed	
a) To the first portion add dilute	Green precipitate insoluble in	Ni ²⁺ , Fe ²⁺ present
sodium hydroxide solution	excess.	
dropwise until in excess.		
b) To the first portion add dilute	Green precipitate soluble in	Ni ²⁺ present
ammonia solution dropwise until in	excess to a pale blue solution.	
excess.		
c) Use the third portion of the solution	red precipitate	Ni ²⁺ confirmed present.
to carry out a test of your own		
choice to confirm one of the cations		
in P		

<u>PROCEDURE:</u>		
Add aqueous		
ammonia		
followed by 2		
drops of		
dimethylglyoxime		S
solution.		
d) Identify	the;	
i) Cations	in P are $\underline{Fe^{2+}}$ and $\underline{Ni^{2+}}$	
ii) Anions	in p are $\underline{CO_3}^{2-}$ and $\underline{SO_4}^{2-}$	104,
	~	
TRIAL QUESTIONS		
PRACTICAL ONE	C_{L}	
You are provided with substance	e T which contains three cations and	one anion. You are required
	The second se	

- d) Identify the;
- Cations in P are $\underline{Fe^{2+}}$ and $\underline{Ni^{2+}}$ i)
- Anions in p are $\underline{CO_3}^{2-}$ and $\underline{SO_4}^{2-}$ ii)

TRIAL QUESTIONS

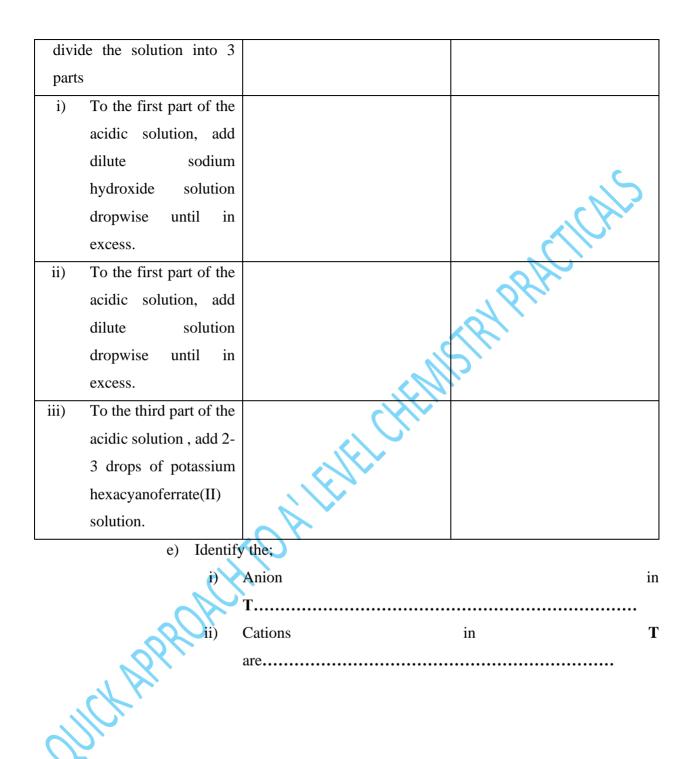
PRACTICAL ONE

You are provided with substance **T** which contains three cations and one anion. You are required to carry out the following tests on T and identify the anions and cation in it. Record your observations and deductions in the table below.

TEST	OBSERVATIONS	DEDUCTIONS	
a) Heat a spatula endful of t in			
a dry test tube until there is			
no further change.			
ρ_{χ}			
N Mi			
<i>6</i> 2.			

b) Shake 2 spatula		
endfuls of t with about 3cm ³ of		c
water. Add dilute sodium		
hydroxide solution to the		
mixture dropwise until in		
excess, warm, and filter. Keep		
both the filtrate and the		16L
residue.		
c) To the filtrate add dilute		
nitric acid dropwise until		
the solution is just acidic.		
Divide the acidic solution		
into six parts.	$\langle O \rangle$	
i) To the first part of the		
acidic solution, add		
dilute sodium		
hydroxide solution		
dropwise until in		
excess.		
Warm the mixture		
ii) To the second part of		
the acidic solution		
,add dilute ammonia		

b	ropwise until in		
	xcess.		
	o the third part acidic		
	olution , add 2-3		
	rops of potassium		C
	odide solution.		
	o the fourth part of		
	ne acidic solution		
,8	add 2-3 drops of		
li	tmus solution ,		$\gamma \delta \iota_{i}$
fo	ollowed by ammonia		R
S	olution dropwise		
u	ntil in excess.		
v) T	o the fifth part of the		
a	cidic solution ,add 2-		
3	drops lead (II)		
e	thanoate solution.		
vi) U	Use the sixth part to		
С	arry out a test of your	$\langle O \rangle$	
0	wn choice to confirm		
tł	ne anion in T		
	Or.		
	obe		
	X Bri		
)	K,		
	~		
d) V	Vash the residue with		
water	and dissolve it in		
dilute l	nydrochloric acid and		



PRACTICAL 2

You are provided with substance **Y** which contains **two cations** and **two anions**. You are required to carry out the following tests on **Y** and identify the anions and cation in it. Identify any gases evolved. Record your observations and deductions in the table below.

TEST	OBSERVATION	DEDUCTIONS
a) Heat one spatula endful of Y in a dry testube.		5RYPRACICAL»
 b) To two spatula endfuls of Y in a testube, add about 3cm³of water. Shake and filter keep both filtrate and residue. Divide the filtrate into 5 parts 	(OA)	
i) To the first part of the filtrate, add dilute sodium hydroxide solution dropwise until in excess.		
ii) To the first part of the filtrate, add dilute ammonia solution dropwise until in excess.		
iii) Use the third part of the filtrate to carry out a test of your own choice to confirm one		

of the cations present in Y				
iv) To the fourth part of the filtrate, add 2-3 drops of lead (II) nitrate solution.				
v) Use the fifth part of the filtrate to carry out a test of your own choice to confirm one of the anions present in Y			40	TICALS
c) Wash the residue and dissolve it in dilute hydrochloric acid. Divide the solution into 4 parts.			187 pr.	
i) To the first part of the solution, add dilute sodium hydroxide solution dropwise until in excess.		ECHEN		
ii) To the first part of the solution, add dilute ammonia solution dropwise until in excess.	O A LE			
iii) To the third part of the solution, add potassium thiocyanate.				
iv) Use the fourth part of the solution to carry out a attest of your own choicer to confirm one of the cations present in Y.				
d) (i)	the ca	ations prese	ent in	Y a
			••••••	
	the		present	in
<u>-</u>				

PRACTICAL 3

You are provided with substance \mathbf{R} which contains **two cations** and **two anions**. You are required to carry out the following tests on \mathbf{R} and identify the anions and cations in it. Identify any gases evolved. Record your observations and deductions in the table below.

TESTS	OBSERVATIONS	DEDUCTIONS
a) Heat one spatula endful of R in a dry testube.		SRIPPHCIICA.
	(0r	
b) To one spatula endful		
of R in a dry testube , add 2-		
3 drops of concentrated		
sulphuric acid and warm		
gently.		
c) Put 2 spatula endfuls of R		
in a testube. Add about		
5cm ³ of water, shake well		
and filter. Keep both		
filtrate and residue.		

d)	Divide the filtrate into		
four p	portions.		
i)	To the first portion of		
	the filtrate add5 drops		
	of neutral iron (III)		
	chloride solution and		
	heat gently to boiling.		
ii)	To the second part of		
	the filtrate, add dilute		
	sodium hydroxide		,0%,
	solution dropwise		
	until in excess.		
	Heat the mixture.		
iii)	To the third part of the		
	, add ammonia		
	solution dropwise		
	until in excess.		
Use t	he fourth portion of the		
filtrat	e to carry out a test of	$\langle \mathcal{O} \rangle$	
your	own choice to confirm		
one of	f the cations in R.		
	20'		
	\mathcal{O}		
	1 Pi		
	2,		
e)	Wash the residue with		
a lit	tle water. transfer into a		
test	tube and dissolve in		
dilut	te hydrochloric acid.		

divide the solution into 3		
portions.		
i) To the second portion		
of the solution, add		
dilute sodium		
hydroxide solution		.5
dropwise until in		
excess and Heat the		
mixture.		, Ac
ii) To the second portion		164
of the solution, add		
ammonia solution		
dropwise until in		
excess		
iii) Add 3 drops of		
potassium		
hexacyanoferrate(II)		
solution		
OR	$\langle \mathcal{O} \rangle$	
Add potassium iodide		
solution.		
OR		
Add potassium iodide		
solution followed by		
sodium thiosulphite		
solution.		
f) Identify	•	

- i) The cations in R.....
- ii) The anions in R.....

PRACTICAL 4

You are provided with a substance Z which contains two cations and two anions, carry out the following tests on \mathbf{Z} and identify the cations and anions in it.

dontify any again avaluad	Decord your charge	tions and daduations in t	ha tahla halaw
dentify any gases evolved.	Record your observa	tions and deductions in t	ne table below.
TESTS	OBSETVATIONS	DEDUCTIONS	
a) Heat a spatula endful of Z in a dry test tube.	OBSETVATIONS	CINIS R	5. Kr.
	AOTE		
b) Dissolve three			
spatula endfuls of Z in water.			
i) To the first part			
of the solution			
add dilute			
hydrochloric acid .			
ii) To the second			
part of the			
solution add			
iron(III)			
chloride.			
iii) To the third part			
of the solution			

		1	
add barium			
nitrate solution.			
iv) To the fourth part of			
the solution add			
dilute sodium			
hydroxide solution			
dropwise until ion			
excess and filter.			, 5
Keep both the filtrate			
and residue.			
c) Acidify the			
filtrate with dilute			Clip
hydrochloric acid and			
divide it into 3 portions.			361
i) To the first portion			X ·
of the acidified			•
filtrate add dilute		·//`.	
sodium hydroxide			
solution dropwise			
until in excess.			
ii) To the second			
portion of the			
acidified filtrate add		\sim	
dilute ammonia			
solution dropwise			
until in excess.			
iii) To the third portion	SOK.		
of the filtrate add 2-3			
drops of potassium			
iodide solution			
d) Wash the residue			
and dissolve it in			
dilute hydrochloric			
acid. Divide the			
resultant solution into			
two parts.			
i) To the first part of the solution add sodium			
1			
excess.			
ii)To the second portion of			
the resultant solution			
add dilute ammonia			
		L	

solution dropwise until	
in excess.	

- e) Identify the ions in substance Z
 - i) Cations.....
 - ii) Anion

Question5

s ar You are provided with a substance **D** which contains two cations and two anions, carry out the following tests on **D** and identify the cations and anions in it.

Identify any gases evolved. Record your observations and deductions in the table below.

TESTS	OBSERVATIONS	DEDUCTIONS
a) Heat a spatula endful of D strongly in a dry test tube.		
b) Place 2 spatula endful of D in a test tube, add about 5cm ³ of water. Shake and filter. Keep both the filtrate and the residue.		

i) To the first portion of		
the filtrate add dilute		
sodium hydroxide		
solution dropwise		
until in excess.		
· ·		
the filtrate add dilute		
ammonia solution		, 5
dropwise until in		
excess.		
iii) To the third portion of		
the filtrate add few		
drops of		
hexacyanoferrate(II)		
solution.		
iv) To the fourth portion		.01
of the filtrate add 2		$\langle \mathcal{P} \rangle$
drops of lead (II)		
nitrate solution and		
warm.		
v) Use the fifth portion of		
the filtrate to confirm		
one of the anions in D		
	\sim	
c) Wash the residue with		
water. Heat a small portion		
of the residue strongly in a		
dry test tube.		
d) Transfer the rest of the		
residue to a test tube and		
dissolve it in dilute		
hydrochloric acid. Divide		
the solution into 3 parts.		
i) To the first part of the		
solution add dilute		
sodium hydroxide		
dropwise until in		
excess.		

ii)	To the first part of the				
	solution add dilute				
	ammonia dropwise				
	until in excess.				
iii)	To the third part of the				
, í	solution, add 2-3 drops				
	of potassium				
	thiocyanate solution .		C		
		the ions in ions in substance D			
		Cations			
	,	Anions			
	11)				
			all		
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	OUICKARPROAL.				
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	\mathcal{N}				
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PART 3

ORGANIC CHEMISTRY PRACTICALS

<u>2015</u>

You are provided with an organic compound **M**. you are required to determine the nature of **M**. carry out the following tests on **M** and record your observations and deductions in the table below.

TESTS	OBSERVATIONS	DEDUCTIONS
a) Burn a small amount of M on the	White solid burns with a	Aliphatic saturated
tip of a dry spatula or dry porcelain.	blue non sooty flame	compound
b) (i) shake a half spatula endful of M	Dissolves to form a	Acidic compound OR
with about $2cm^3$ of dilute sodium	Colourless solution.	Carboxylic acid,
hydroxide solution.		alcohol.
		Acc: salt of amine
(ii) shake a half spatula endful of M	Dissolves to form a	Polar compound.
with about 2cm ³ of water and add 2-3	Colourless solution.	Acidic compound
drops of litmus solution.	Solution turns litmus	probably carboxylic
	solution to red.	acid.
		Acc: salt of amine
c) Shake a spatula endful of M with	Effervescence/	Carboxylic acid
about 5cm3 of water and divide the	Colourless gas bubbles	probably present.
solution into 3 parts.	given off.	
i) To the first part of the solution		
add 2-3 drops of sodium		
hydrogen carbonate solution.		
ii) To the second part of the	No observable change	Aldehyde, ketone
solution, add 2-3 drops of 2,4-	OR	absent
dinitrophenylhydrazine(Brady's) solution.	No yellow precipitate	Acc: carbonyl absent.
(iii) To the third part of the solution	No observable change	Phenol absent.
add 2-3 drops of iron (III)	OR	i nenoi absent.
chloride solution and warm.	No purple colouration.	
d) Dissolve a spatula endful of M in	White precipitate	Cl ⁻ released.
about 5cm3 of water.	Acc: white residue	
To the solution add about 1-2 cm3 of		
dilute sodium hydroxide solution. heat		
the mixture, cool, add 2-3 drops of silver		
• • • •		

nitrate solution and filter. Keep both the filtrate and the residue.		
e) To the residue add dilute ammonia	e	Cl ⁻ present.
dropwise until in excess.	a Colourless solution.	
f) To the filtrate add about equal	Sweet fruity smell	Ester formed/
volume of ethanol followed by 3-4 drops		Esterification occurs
of concentrated sulphuric acid. Heat the		thus carboxylic acid
mixture and cool.		confirmed 🤇

State the nature of M **g**)

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