

Mangalore University
Scheme of Practical Examination
B.Sc. VI Semester Chemistry Practical VII
Inorganic and Physical Chemistry

Duration: 4 hours

Max.Marks:25

Note: Only those students with certified class records are allowed to attend the practical examination.

Any one of the following experiments may be set for practicals.

1. Study of hydrolysis of methyl acetate using different concentrations of HCl and determination of relative strength.
2. Study of hydrolysis of methyl acetate in the presence of HCl at two different temperatures and calculation of energy of activation.
3. Determination of variation of viscosity of a liquid with temperature.
4. Determination of the p^H of acetic acid & sodium acetate buffer using p^H meter.
5. Determination of the strength of the given acid mixture (Acetic acid + hydrochloric acid) Conductometrically using standard alkali solution.
6. Conductometric titration of weak acid (CH_3COOH) with salt versus $CuSO_4$.
7. Conductometric titration of strong acid (HCl) with salt (NH_4Cl) versus $NaOH$.
8. Potentiometric titration of ferrous ammonium sulphate using $K_2Cr_2O_7$ as titrant and calculation of the redox potential of Fe^{+2}/Fe^{+3} system on the hydrogen scale.
9. Potentiometric titration of weak acid (acetic acid) versus $NaOH$ and also calculate the dissociation constant of weak acid.
10. Gravimetric determination of Ni in Cu and Ni Mixture.
11. Gravimetric estimation of Cu in Cu and Zn Mixture.
12. Gravimetric estimation of Fe in Fe_2O_3 .
13. Volumetric estimation of Zn in Cu Zn Mixture.
14. Volumetric Estimation of Ni in Ni and Zn mixture.
15. Estimation of calcium and Magnesium in Dolomite.

SCHEME OF VALUATION

Experiment .1 Study of hydrolysis of methyl acetate using different concentrations of HCl and determination of relative strength.

Velocity constant value at two concentrations of HCl: **10 marks each 10x2=20Marks**

Error in each rate constant value:

up to $\pm 10\%$	-	10 marks
$\pm 10\%$ to $\pm 20\%$	-	8 marks

$\pm 20\%$ to $\pm 30\%$	-	6 marks
$\pm 30\%$ to $\pm 40\%$	-	4 marks
<i>Any other values</i>	-	2 marks
Calculation of velocity constant K_1		2 marks
K_2		2 marks
K_1/K_2		1 mark

Experiment.2. Study of hydrolysis of methyl acetate in the presence of HCl at two different temperatures and calculation of energy of activation.

Velocity constant values at two different temperatures: **10marks each** **10x2=20M**

Error in each velocity constant value:

up to $\pm 10\%$	-	10 marks
$\pm 10\%$ to $\pm 20\%$	-	8 marks
$\pm 20\%$ to $\pm 30\%$	-	6 marks
$\pm 30\%$ to $\pm 40\%$	-	4 marks
<i>Any other values</i>	-	2 marks
Calculation of Energy of activation-		5 marks

Experiment.3 determination of the variation of viscosity of a liquid at different temperature.

- i) Graph 9marks
 - A good Graph covering maximum number of points 9marks
 - Any other Graph 5marks

(Marks may be proportionally reduced for deviation in graph.)
- ii) Calculation: 16 Marks (4x4=16)
 - Calculation of density of water – 04 (any four temperatures)
 - Calculation of density of Benzene - 04 (any four temperatures)
 - Calculation of viscosity of water - 04 (any four temperatures)
 - Calculation of viscosity of Benzene – 04 (any four temperatures)

Experiment .4. Determination of the p^H of acetic acid & sodium acetate buffer using p^H meter.

- i) pH values for three sets of buffer solutions 7marks each 7x3=21Marks
- ii) Calculation 4 Marks

Error in each p^H value:

up to $\pm 5\%$	-	7 marks
$\pm 5\%$ to 10%	-	5 marks
$\pm 10\%$ to 20%	-	3 marks
Any other value	-	2 marks

Experiment . 5 Determination of the strength of the given acid mixture (Acetic acid + hydrochloric acid) Conductometrically using standard alkali solution.

- i) Graph (good plot) - 10 marks
Other Plots - 06 marks
(Marks may be proportionally reduced for deviation in graph)
- ii) Two Titre values: 5 marks each 5x2 =10 marks
Error in each titre value
 - $\pm 0.1 \text{ ml}$ 5 marks
 - $\pm 0.2 \text{ ml}$ 4 marks
 - $\pm 0.3 \text{ ml}$ 3 marks
 - $\pm 0.4 \text{ ml}$ 2 marks
 - Other values 1 mark
- iii) Calculation of strength 5marks

Experiment . 6 Conductometric titration of weak acid (CH_3COOH) with salt versus $CuSO_4$.

- i) Graph (good plot) 7 marks
Other plots 5 marks
(Marks may be proportionally reduced for deviation in graph.)
- ii) Three titre values: 4marks each 4x3=12Marks
Error in each titre value
 - $\pm 0.1 \text{ ml}$ 4 marks
 - $\pm 0.2 \text{ ml}$ 3 marks

$\pm 0.3 \text{ ml}$ 2 marks

Other values 1 mark

iii) Calculation of strength 6 marks

Experiment . 7 Conductometric titration of strong acid (HCl) with salt (NH_4Cl) versus NaOH).

i) Graph (good plot) 10 marks

Other plots 6 marks

(Marks may be proportionally reduced for deviation in graph.)

ii) Two titre values: 5 Marks each 5x2=10marks
Error in each titre value

$\pm 0.1 \text{ ml}$ 5 marks

$\pm 0.2 \text{ ml}$ 4 marks

$\pm 0.3 \text{ ml}$ 3 marks

Other values 2 marks

iii) Calculation of strength 5 marks

Experiment . 8 Potentiometric titration of ferrous ammonium sulphate using $\text{K}_2\text{Cr}_2\text{O}_7$ as titrant and calculation of the redox potential of $\text{Fe}^{+2}/\text{Fe}^{+3}$ system on the hydrogen scale.

Graph (good plot) 10 marks

Other plots 6 marks

(Marks may be proportionally reduced for deviation in graph.)

Titre Value - 12Marks

Error in titre value:

$\pm 0.2 \text{ ml}$ - 12 marks

$\pm 0.3 \text{ ml}$ - 10 marks

$\pm 0.4 \text{ ml}$ – 08 marks

$\pm 0.5 \text{ ml}$ 06 marks

Other values 04 marks

Calculation of redox potential of $\text{Fe}^{+2}/\text{Fe}^{+3}$ 03 marks

Experiment. 9 Potentiometric titration of weak acid (acetic acid) versus NaOH and also calculate the dissociation constant of weak acid.

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|----|-------------------|---|----------|
| i) | Graph (good plot) | - | 10 marks |
| | Other plots | - | 6 marks |

(Marks may be proportionally reduced for deviation in graph.)

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|-----|-----------------------------|----------------------|----------|
| ii) | <i>Error in titre value</i> | $\pm 0.2 \text{ ml}$ | 12 marks |
| | | $\pm 0.3 \text{ ml}$ | 10 marks |
| | | $\pm 0.4 \text{ ml}$ | 08 marks |
| | | $\pm 0.5 \text{ ml}$ | 06 marks |
| | | Other values | 04 marks |

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|------|--------------------------------------|---|----------|
| iii) | Calculation of dissociation constant | - | 03 marks |
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Gravimetric Estimations: Experiment 10, 11 and 12.

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|----|--------------------------------|----------|
| i) | Marks for mass of precipitate: | 20 marks |
|----|--------------------------------|----------|

Error in mass of precipitate:

- | | | |
|-----|--------------------------|----------|
| | Upto $\pm 2\%$ | 20 marks |
| | $\pm 2\%$ to $\pm 5\%$ | 18 marks |
| | $\pm 5\%$ to $\pm 10\%$ | 15marks |
| | $\pm 10\%$ to $\pm 15\%$ | 10marks |
| | <i>Any other value</i> | 5marks |
| ii) | Calculations | 5marks |

Volumetric Estimations:

Experiment 13. Volumetric estimation of Zn in Cu Zn Mixture.

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|-----|---------------------------|---------------|
| i) | Two titre values: | 8x2 =16Marks. |
| ii) | Calculations: | 09Marks. |
| | Error in each titre value | |
| | $\pm 0.2 \text{ ml}$ | 8 marks |
| | $\pm 0.3 \text{ ml}$ | 6 marks |
| | $\pm 0.4 \text{ ml}$ | 4 marks |
| | Other value | 2 marks |

Experiment 14. Volumetric Estimation of Ni in Ni and Zn mixture.

Same as Experiment 13.

Experiment 15. Estimation of calcium and Magnesium in Dolomite.

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|-----|---------------------------------|-------------|
| i) | Three titre values: 6marks each | 6x3=18Marks |
| ii) | Calculation | 7Marks |
| | Error in each titre value | |
| | $\pm 0.2 \text{ ml}$ | 6 marks |
| | $\pm 0.3 \text{ ml}$ | 4 marks |
| | $\pm 0.4 \text{ ml}$ | 3 marks |
| | Other value | 2 marks |

Allotment of practical Internal Assessment Marks:

Total marks to be awarded	25
<u>Distribution of marks</u>	
Class Records	5 marks
Continuous evaluation during practicals	5 marks
Internal practical Examination	15 marks

Note:

Neat class records with 10 experiments may be awarded full marks. Marks to be reduced proportionally for lesser number of experiments and neatness.

Internal practical examination is to be conducted as per the university practical exam model (Max.Marks: 25) and then the total marks is to be reduced to 15.

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