

 JAIPUR ENGINEERING COLLEGE AND RESEARCH CENTRE	Jaipur Engineering college and research centre, Shri Ram kiNangal, via Sitapura RIICO Jaipur- 302 022.	<b>Academic year-2020-21</b>
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## Viva Voce

**Year: B. Tech. I Year Semester-I & II**

**Subject& Code: Engineering Chemistry Lab (2FY2-21)**

Lab Outcomes	
LO1	<b>Carry out, record and analyze the results of chemical experiments through different titrations.</b>
LO2	<b>Analyze water with respect to dissolve impurities and coal with respect to proximate analysis.</b>
LO3	<b>Determine the flash and fire point, cloud and pour point, viscosity of different lubricants and calorific value of coal, also to synthesize Aspirin.</b>

Experimet No.	LO	Object of the Experiment
1.	LO2	<b>To determine the hardness of given water sample by complexometric method using EDTA.</b>
		<ol style="list-style-type: none"> <li>1. Define hardness of water.</li> <li>2. How many types of hardness are there?</li> <li>3. Name any two methods to determine the hardness of water.</li> <li>4. Draw the structure of EDTA.</li> <li>5. Name the indicator used for this titration.</li> <li>6. Draw the structure of EBT.</li> <li>7. What are the units of hardness?</li> <li>8. What will be the color change at end point in this titration?</li> <li>9. What is the molecular weight of EDTA.</li> <li>10. How will you prepare standard hard water..</li> </ol>
2.	LO2	<b>To determine the amount of residual chlorine in a given sample of water.</b>
		<ol style="list-style-type: none"> <li>1. What do you mean by residual chlorine?</li> <li>2. Which type of titration is the determination of residual chlorine in water?</li> <li>3. Why do we do chlorination of water?</li> <li>4. What are WHO standards for residual chlorine in drinking water?</li> <li>5. Name any four disinfectants?</li> </ol>



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		<ol style="list-style-type: none"><li>6. What will be the color change at end point in this titration?</li><li>7. Name the indicator used for this titration.</li><li>8. What is the chemical formula of starch?</li><li>9. What is the color of iodo-starch complex?</li><li>10. Differentiate iodometric and iodimetric titrations.</li></ol>
<b>3.</b>	<b>LO2</b>	To determine the amount of dissolved oxygen (D.O.) present in given sample of water.
		<ol style="list-style-type: none"><li>1. Name all the chemicals required to perform this experiment.</li><li>2. Explain the role of <math>\text{NaN}_3</math> in this experiment.</li><li>3. Name the type of titration it is.</li><li>4. What is the significance of this titration?</li><li>5. What is the colour of basic manganic hydroxide's precipitate?</li><li>6. What is the formula of strength?</li><li>7. Write all the reactions involved in this titration.</li><li>8. What is the colour change at end point in this titration?</li><li>9. Differentiate end point and equivalence point.</li><li>10. List any three precautions of this experiment.</li></ol>
<b>4.</b>	<b>LO1</b>	<b>To determine the strength of ferrous ammonium sulphate <math>[\text{FeSO}_4 \cdot (\text{NH}_4)_2\text{SO}_4 \cdot 6\text{H}_2\text{O}]</math> solution by titrating it against N/40 potassium dichromate <math>(\text{K}_2\text{Cr}_2\text{O}_7)</math> solution using diphenyl amine as internal indicator.</b>
		<ol style="list-style-type: none"><li>1. What is the common name of FAS?</li><li>2. Define titration.</li><li>3. How many types of titrations are there?</li><li>4. Which type of titration is this experiment?</li><li>5. Name the indicator used for this titration.</li><li>6. Draw the structure of di-phenyl amine.</li><li>7. Write all the reactions involved in this experiment.</li><li>8. Write equivalent weight of FAS.</li><li>9. What are primary and secondary standard solutions?</li><li>10. Define normality.</li></ol>
<b>5</b>	<b>LO1</b>	<b>To determine the strength of unknown solution of copper sulphate <math>(\text{CuSO}_4 \cdot 5\text{H}_2\text{O})</math> by titrating it against standard solution (N/40) of sodium thio-sulphate <math>(\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O})</math> iodometrically.</b>
		<ol style="list-style-type: none"><li>1. Write common name of copper sulphate.</li><li>2. Give chemical formula of copper sulphate.</li><li>3. Write chemical structure of sodium thiosulphate.</li><li>4. What is equivalent weight of copper sulphate?</li><li>5. Write all the reactions involved in this titration.</li><li>6. What is the colour change at end point in this titration?</li><li>7. Which type of titration this experiment is?</li><li>8. What are redox titrations?</li><li>9. What are internal &amp; external indicators? Give examples.</li></ol>



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		10. What is the chemical name of the compound giving milky white colour?
6.	LO1	<b>To determine the strength of sodium hydroxide (NaOH) and sodium carbonate (Na<sub>2</sub>CO<sub>3</sub>) in the given alkali mixture (or in water sample) by titrating against an intermediate (N/20) solution of hydrochloric acid (HCl) using phenolphthalein and methyl orange as indicator.</b>
		<ol style="list-style-type: none"><li>1. Which type of titration this experiment is?</li><li>2. What are neutralization titrations?</li><li>3. What are secondary standard solutions? Give example.</li><li>4. Name the indicators used in this titration?</li><li>5. What is the pH range for methyl orange indicator?</li><li>6. What will the pH range for phenolphthalein indicator?</li><li>7. Draw the structure of phenolphthalein &amp; methyl orange.</li><li>8. What will be the color change at first &amp; second end point?</li><li>9. What will be the color of phenolphthalein in basic and acidic medium?</li><li>10. What are the equivalent weights of NaOH &amp; Na<sub>2</sub>CO<sub>3</sub>.</li></ol>
7.	LO2	<b>To carry out proximate analysis of given solid fuel (coal).</b>
		<ol style="list-style-type: none"><li>1. Why is proximate analysis so called?</li><li>2. Define calorific value</li><li>3. Give significance of fixed carbon.</li><li>4. What is meant by ignition temperature?</li><li>5. Why good fuel must have low moisture content and low ash content?</li><li>6. In a sample of coal moisture content can be determined at .....temp.</li><li>7. In proximate analysis moisture in coal sample is determined at.....temp.</li><li>8. What is the calorific value of coal?</li><li>9. Name the type of coal you are using in your experiment?</li><li>10. Name any four primary fuel.</li></ol>
8(a)	LO3	<b>To determine the flash and fire points of given lubricating oil sample using Pensky Marten's apparatus.</b>
		<ol style="list-style-type: none"><li>1. The fire point of an oil is about _____ higher than the flash point.</li><li>2. Pensky-Marten's apparatus is used to find out the _____</li><li>3. Oil cup in Pensky-marten's apparatus is made of _____</li><li>4. Name the oil used in this experiment.</li><li>5. Name the instrument used for this experiment.</li><li>6. Name any four lubricating oils.</li><li>7. Name the various part of the apparatus you are using.</li><li>8. What is the function of pilot burner.</li></ol>



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		<ol style="list-style-type: none"><li>9. Define lubricant.</li><li>10. List any five functions of lubricants.</li><li>11. State significance of this experiment.</li></ol>
<b>8(b)</b>	<b>LO3</b>	To determine cloud and pour points of given lubricating oil sample using cloud and pour point apparatus
		<ol style="list-style-type: none"><li>1. The temperature expressed in multiples of 1°C at which the haze of the wax crystal appears when the oil is cooled under prescribed conditions is called _____</li><li>2. The cloud point is the index of the _____ temperature.</li><li>3. The cloud point is used as _____ control parameter.</li><li>4. Olive oil starts to solidify at _____</li><li>5. Pour point indicates the _____ of lubricating oil</li><li>6. Cooling bath contains suitable _____mixture.</li><li>7. In pour point experiment, the diameter of the cylindrical tube is of the diameter _____cm</li><li>8. The jacket is provided with a gasket that prevents the test jar from _____.</li><li>9. The cloudiness of the lubricant is observed for every _____sec.</li><li>10. Name the apparatus used for the experiment.</li><li>11. Give dimensions of flat bottom tube.</li><li>12. Name the oil used in this experiment.</li></ol>
<b>9.</b>	<b>LO3</b>	To determine the Kinematic viscosity of a given sample of lubricating oil using Redwood Viscometer No.1.
		<ol style="list-style-type: none"><li>1. Redwood viscometer no1 is used to find the viscosity of the _____ liquids.</li><li>2. What is the efflux of the redwood viscometer no2?</li><li>3. The oil cup is made up of _____metal.</li><li>4. The height and diameter of the oil cup is ____&amp;_____ respectively.</li><li>5. The jet is opened or closed by _____rod.</li><li>6. The cylindrical vessel will be around the oil cup which serves as a water bath made up of _____metal.</li><li>7. The water bath is provided with stirrer having _____ blades.</li><li>8. The capacity of the flask is about _____ml.</li><li>9. The entire redwood viscometer apparatus rests on _____stand.</li><li>10. The kinematic viscosity of the oil can be calculated by _____</li><li>11. The viscosity of an oil decrease when temperature _____</li><li>12. Viscosity means the flow of the liquid is resisted by _____</li></ol>



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		<p>13. The rate of change of the viscosity with raise in temperature is measured by an arbitrary scale called as _____</p> <p>14. The viscosity of the oil changes rapidly with the change in temperature has _____</p> <p>15. What are the units of viscosity?</p>
<b>10.</b>	<b>LO3</b>	To Synthesize Aspirin/ Paracetamol.
		<ol style="list-style-type: none"><li>1. Define drugs.</li><li>2. What is the chemical name of Aspirin?</li><li>3. Name the chemicals used in synthesis of Aspirin.</li><li>4. Write any two properties and uses of Aspirin.</li><li>5. Write any two properties and uses of Paracetamol.</li><li>6. Name the raw materials of Paracetamol.</li><li>7. Draw the structure of Paracetamol and Aspirin.</li><li>8. Write the chemical names of Paracetamol and aspirin.</li><li>9. Give any two side effects of Aspirin.</li><li>10. What are the uses of Aspirin?</li><li>11. List any two uses of Paracetamol.</li></ol>



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