

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

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

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

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

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



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		<ol style="list-style-type: none">6. What will be the color change at end point in this titration?7. Name the indicator used for this titration.8. What is the chemical formula of starch?9. What is the color of iodo-starch complex?10. Differentiate iodometric and iodimetric titrations.
3.	LO2	To determine the amount of dissolved oxygen (D.O.) present in given sample of water.
		<ol style="list-style-type: none">1. Name all the chemicals required to perform this experiment.2. Explain the role of NaN_3 in this experiment.3. Name the type of titration it is.4. What is the significance of this titration?5. What is the colour of basic manganic hydroxide's precipitate?6. What is the formula of strength?7. Write all the reactions involved in this titration.8. What is the colour change at end point in this titration?9. Differentiate end point and equivalence point.10. List any three precautions of this experiment.
4.	LO1	To determine the strength of ferrous ammonium sulphate $[\text{FeSO}_4 \cdot (\text{NH}_4)_2\text{SO}_4 \cdot 6\text{H}_2\text{O}]$ solution by titrating it against N/40 potassium dichromate ($\text{K}_2\text{Cr}_2\text{O}_7$) solution using diphenyl amine as internal indicator.
		<ol style="list-style-type: none">1. What is the common name of FAS?2. Define titration.3. How many types of titrations are there?4. Which type of titration is this experiment?5. Name the indicator used for this titration.6. Draw the structure of di-phenyl amine.7. Write all the reactions involved in this experiment.8. Write equivalent weight of FAS.9. What are primary and secondary standard solutions?10. Define normality.
5	LO1	To determine the strength of unknown solution of copper sulphate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$) by titrating it against standard solution (N/40) of sodium thio-sulphate ($\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$) iodometrically.
		<ol style="list-style-type: none">1. Write common name of copper sulphate.2. Give chemical formula of copper sulphate.3. Write chemical structure of sodium thiosulphate.4. What is equivalent weight of copper sulphate?5. Write all the reactions involved in this titration.6. What is the colour change at end point in this titration?7. Which type of titration this experiment is?8. What are redox titrations?9. What are internal & external indicators? Give examples.



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		10. What is the chemical name of the compound giving milky white colour?
6.	LO1	To determine the strength of sodium hydroxide (NaOH) and sodium carbonate (Na₂CO₃) 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.
		<ol style="list-style-type: none">1. Which type of titration this experiment is?2. What are neutralization titrations?3. What are secondary standard solutions? Give example.4. Name the indicators used in this titration?5. What is the pH range for methyl orange indicator?6. What will the pH range for phenolphthalein indicator?7. Draw the structure of phenolphthalein & methyl orange.8. What will be the color change at first & second end point?9. What will be the color of phenolphthalein in basic and acidic medium?10. What are the equivalent weights of NaOH & Na₂CO₃.
7.	LO2	To carry out proximate analysis of given solid fuel (coal).
		<ol style="list-style-type: none">1. Why is proximate analysis so called?2. Define calorific value3. Give significance of fixed carbon.4. What is meant by ignition temperature?5. Why good fuel must have low moisture content and low ash content?6. In a sample of coal moisture content can be determined attemp.7. In proximate analysis moisture in coal sample is determined at.....temp.8. What is the calorific value of coal?9. Name the type of coal you are using in your experiment?10. Name any four primary fuel.
8(a)	LO3	To determine the flash and fire points of given lubricating oil sample using Pensky Marten's apparatus.
		<ol style="list-style-type: none">1. The fire point of an oil is about _____ higher than the flash point.2. Pensky-Marten's apparatus is used to find out the _____3. Oil cup in Pensky-marten's apparatus is made of _____4. Name the oil used in this experiment.5. Name the instrument used for this experiment.6. Name any four lubricating oils.7. Name the various part of the apparatus you are using.8. What is the function of pilot burner.



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		<ol style="list-style-type: none">9. Define lubricant.10. List any five functions of lubricants.11. State significance of this experiment.
8(b)	LO3	To determine cloud and pour points of given lubricating oil sample using cloud and pour point apparatus
		<ol style="list-style-type: none">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 _____2. The cloud point is the index of the _____ temperature.3. The cloud point is used as _____ control parameter.4. Olive oil starts to solidify at _____5. Pour point indicates the _____ of lubricating oil6. Cooling bath contains suitable _____mixture.7. In pour point experiment, the diameter of the cylindrical tube is of the diameter _____cm8. The jacket is provided with a gasket that prevents the test jar from _____.9. The cloudiness of the lubricant is observed for every _____sec.10. Name the apparatus used for the experiment.11. Give dimensions of flat bottom tube.12. Name the oil used in this experiment.
9.	LO3	To determine the Kinematic viscosity of a given sample of lubricating oil using Redwood Viscometer No.1.
		<ol style="list-style-type: none">1. Redwood viscometer no1 is used to find the viscosity of the _____ liquids.2. What is the efflux of the redwood viscometer no2?3. The oil cup is made up of _____metal.4. The height and diameter of the oil cup is ____&_____ respectively.5. The jet is opened or closed by _____rod.6. The cylindrical vessel will be around the oil cup which serves as a water bath made up of _____metal.7. The water bath is provided with stirrer having _____ blades.8. The capacity of the flask is about _____ml.9. The entire redwood viscometer apparatus rests on _____stand.10. The kinematic viscosity of the oil can be calculated by _____11. The viscosity of an oil decrease when temperature _____12. Viscosity means the flow of the liquid is resisted by _____



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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>
10.	LO3	To Synthesize Aspirin/ Paracetamol.
		<ol style="list-style-type: none">1. Define drugs.2. What is the chemical name of Aspirin?3. Name the chemicals used in synthesis of Aspirin.4. Write any two properties and uses of Aspirin.5. Write any two properties and uses of Paracetamol.6. Name the raw materials of Paracetamol.7. Draw the structure of Paracetamol and Aspirin.8. Write the chemical names of Paracetamol and aspirin.9. Give any two side effects of Aspirin.10. What are the uses of Aspirin?11. List any two uses of Paracetamol.



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