

Home Assignment

Write answers in your own hand writing in your Chemistry notes copy. Draw labelled diagram, cite examples, etc. where required.

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ACR1C2 Chemistry and Environmental Science

Unit-4 Instrumental Techniques in Material Characterization

Q.1 a) Draw and explain basic block diagram of Instrumental techniques used in material testing.

b) Classify Instrumental methods used in material testing with examples.

c) What are advantages and limitations of instrumental techniques over older methods?

Q.2 Derive and Explain Beer-Lamberts law and its applications. Calculate the molar absorptivity of a 3×10^{-4} M solution, which has an absorbance of 0.30, when path length is 1 cm.

Q.3 Explain construction, working and applications of Colorimeter.

Q.4 Define and classify Spectroscopic techniques. What is the basis (principle) of qualitative and quantitative analysis by spectroscopic method?

Q.5 Define and classify Chromatography. What is the role of stationary phase and mobile phase in column chromatography?

Q.6 Which spectroscopic method is best suitable for identification of functional groups present in organic samples? Why this technique is often called “molecular finger prints”?

Q.7 Explain ^1H NMR spectroscopy. What informations are obtained by number of peaks, peak height, peaks splitting and position of peaks in the spectrum of sample?

Questions

Max marks: 20, Time: 70 mins

Note: Answer any four questions carrying equal marks.

Q.1 Define Flash point of lubricating oil and its importance. Explain construction working of Pensky-Marten apparatus.

Q.2 Define and classify Grease with examples mentioning one important lubrication property of each type of grease.

Q.3 A good quality lubricating oil should have _____ viscosity, _____ viscosity index, _____ Aniline point, _____ SEN, _____ carbon deposit. (Fill in the blank using low/moderate/high; also mentioning one line explanation for each property).

Q.4 Define Spectroscopy. How spectroscopic methods are classified? Explain basic principles used for qualitative and quantitative analysis by spectroscopic methods.

Q.5 Draw a well labelled basic block diagram of Colorimeter. What is the range of light source used in Colorimetric analysis? Colorimeter is used for which type of analysis?

