



Roll No. ....

राष्ट्रीय प्रौद्योगिकी संस्थान, हमीरपुर

**National Institute of Technology, Hamirpur**

B. Tech. (Chemical Engineering) - 7<sup>th</sup> Semester

End Sem Exam (14<sup>th</sup> December, 2020)

**CH - 432 Instrumental Analytical Techniques**

**Duration: 120 min**

**Max. Marks: 50**

Note

- *This question paper consists of seven questions and two pages.*
- *Wherever necessary, the diagram drawn should be neat and properly labelled.*

- Q1. a) Explain about Qualitative and Quantitative analysis. Define flame test. (5 marks)  
b) Explain about Electrochemical Analysis with a neat diagram. (5 marks)
- Q2. a) Write about Beer-Lambert's Law and its significance. (5 marks)  
b) Explain about the properties of electrochemical radiation. (4 marks)
- Q3. Explain about X-Ray Diffraction in detail and different XRD methods. (10 marks)

'or'

Q4. What do you understand by NMR spectroscopy? Where this method is mainly used for analysis?

Q5. Write about:

- a) High performance liquid chromatography (5 marks)  
b) Paper chromatography (5 marks)

Q6. Explain about scanning electron microscope (SEM), transmission electron microscopy (TEM) in detail. (10 marks)

'or'

Q7. Explain about:

- a) Differential thermal gravimetric analysis  
b) Differential scanning calorimeter

----- END OF THE QUESTION PAPER -----