

INSTRUCTIONS:

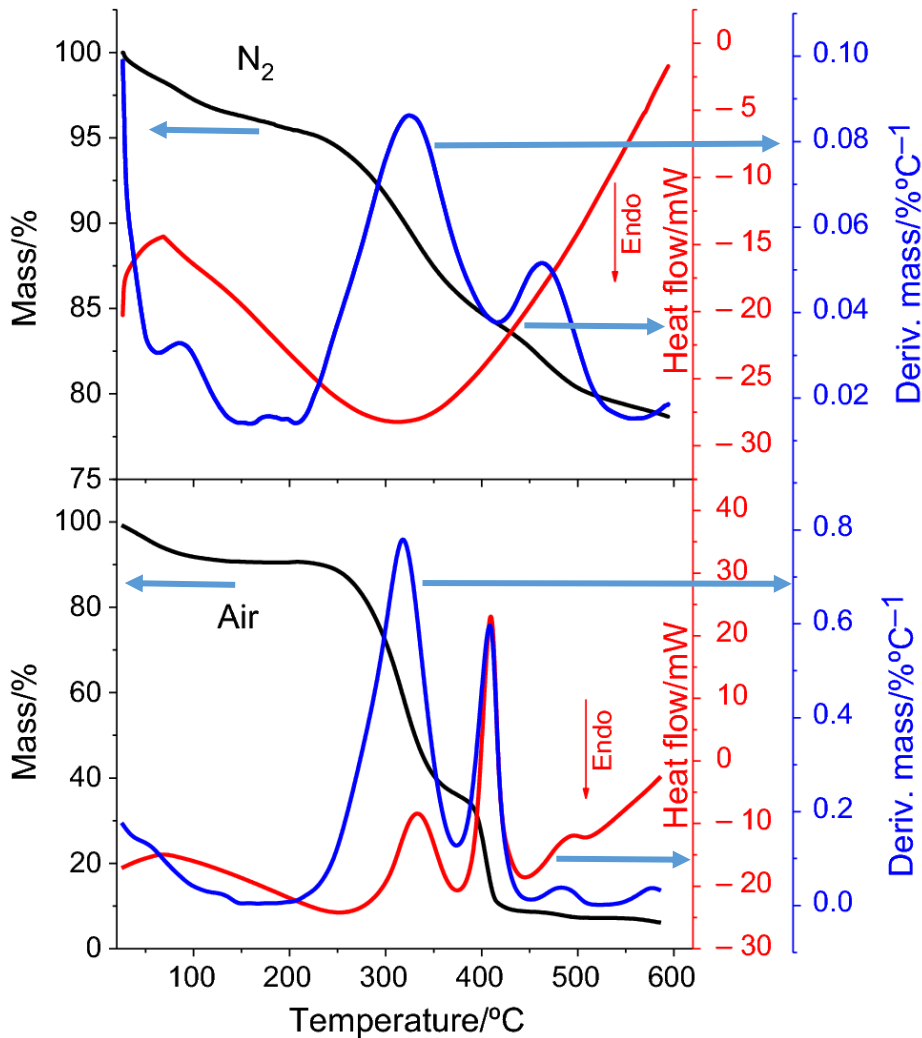
- Full open book exam. Any types of materials, such as laptop, calculator, books, class notes, etc are allowed.
- No mobile phone allowed.
- Answer in the question paper and return it
- Use extra A4 sheets as required

Q1 [15 M +15 M]

The figure below shows the real TG, DTG and DTA curves of straw samples from mortars, heated using nitrogen and air atmosphere.

(a). Analyse data

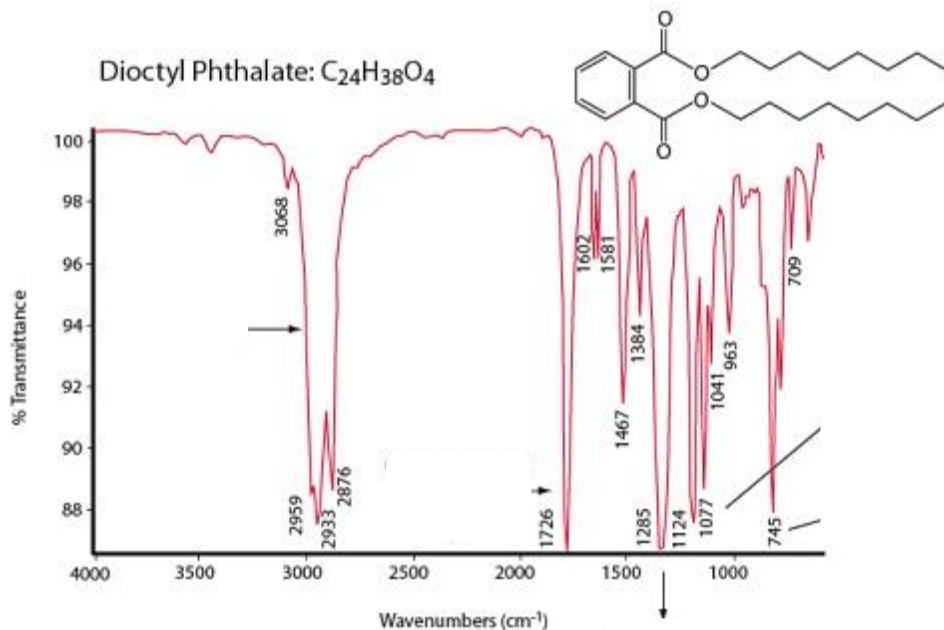
(b). Discuss differences based on the effect of environments on the material.



Q3 [45 M]

The figure below shows the FTIR spectrum of dioctyl phthalate plasticizer. Here wavenumbers of more than 16 significant peaks are indicated.

(a). Analyze the data provided with respect to all possible groups could be present and make a table of format shown below. One complete data entry is shown as an example in the table below.



| S.No | Peak position (cm ⁻¹) | Nature of bond | Ref. Peak position (cm ⁻¹) | Remarks | Ref. format example |
|------|-----------------------------------|------------------------------|--|------------------------------|---|
| 1 | 3068 | Asymmetric stretching of O-H | 3070 | Hydroxyl may come from water | XXX et al, Journal of FTIR, Volm YY, pages 10-15 (2019) |