Birla Institute of Technology and Science, Pilani Second Semester 2021-2022

Midsemester Examination		10 March (4:00-5:30 PM)
<u>Max Time: 90 min</u>	Total Max Marks: 90	Total questions: 3
INSTRUCTIONS:		

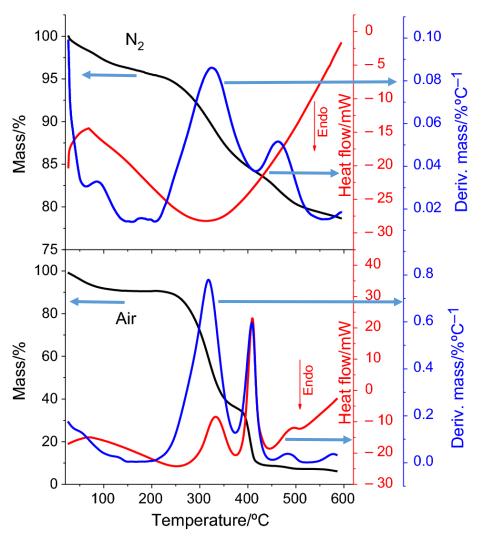
INSTRUC NS:

- 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.

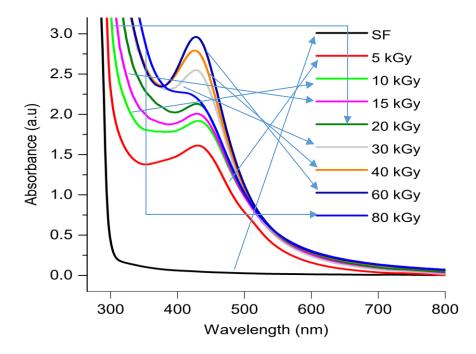
- (a). Analyse data
- (b). Discuss differences based on the effect of environments on the material.



Q2 [15 M]

The figure below shows UV-vis absorption spectra of silk fibroin (SF) and silk fibroin-silver nanoparticles. The SF-AgNO3 mixture solution was exposed to gamma radiation with the dose of X kGy/h. X is variable as indicated in the figure legend. Clearly the increase of absorbance value with gamma radiation dose indicates the increase of Ag nanoparticle concentration in suspension.

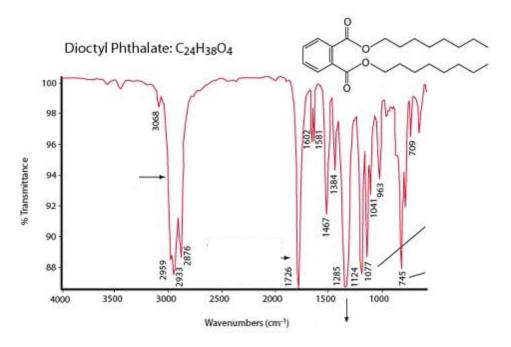
(a). Prepare a meaningful calibration graph from the data provided.



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)