Carboxylic acids and derivatives - 2021

1.	Nov	/2020	/Danor	12	/No.6a-	60
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		oic acid, ${\rm CC}l_{\rm 3}{\rm CO_2H}$, are both carboxylic acids. ide, ${\rm CH_3CONH_2}$.
		dity, starting with the least acidic.
	······ < ····	<
	least acidic	most acidic
		.0.
		[3]
Met	ethanoic acid, HCO ₂ H, and ethanedioic aci	d, HO ₂ CCO ₂ H, are two other carboxylic acids.
(i)	State which, if any, of ethanoic acid, me Fehling's reagent.	thanoic acid and ethanedioic acid will react with
(ii)	State which, if any, of ethanoic acid, me warm acidified manganate(VII) ions.	ethanoic acid and ethanedioic acid will react with
	***	[1]
Eth	nanamide can be made from ethanoic acid	I in a two-step synthesis.
	ethanoic acid $\xrightarrow{\text{step 1}}$ A	step 2 → ethanamide
(i)	Compound A contains chlorine.	
	Give the structural formula and name of	A.
	structural formula	
	name	[2]
	Eth Pla Ex	Ethanoic acid can be used to make ethanam Place these three compounds in order of acid Explain your answer. I least acidic Methanoic acid, HCO ₂ H, and ethanedioic acid, me Fehling's reagent. (ii) State which, if any, of ethanoic acid, me Fehling's reagent. (iii) State which, if any, of ethanoic acid, me warm acidified manganate(VII) ions. Ethanamide can be made from ethanoic acid ethanoic acid step 1 A (i) Compound A contains chlorine. Give the structural formula and name of structural formula

(ii)	Suggest suitable reagents for steps 1 and 2.	
	step 1	
	step 2	
		[2



2. March/2020/Paper_42/No.5a

Gallic acid, $C_7H_6O_5$, is a naturally occurring aromatic molecule.

gallic acid

(a) Gallic acid contains the carboxylic acid and phenol functional groups.

State and explain the relative acid strength of these two functional groups.	
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	2]
A Salpa Califi.	_,

and propanoic acid. Explain your answer.	>
most acidic	least acidic
explanation	
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3. June/2020/Paper_41/No.6a,6c-6d

(c) Three tests were carried out on separate samples of the organic acids shown in the table. The following results were obtained.

√ = observed change

x =no observed reaction

test	reagent(s) and conditions	HCO₂H	CH ₃ COCO ₂ H	HO ₂ CCO ₂ H	observed change
1		✓	x	X	
2		X	✓	x A	os de la companya de
3		✓	×	io,	

Complete the table with the reagent(s) and conditions and the observed change for each test. Assume these organic acids all have a similar acid strength. [5]

(d) A sample of pyruvic acid, CH₃COCO₂H, is analysed by carbon-13 NMR spectroscopy. Three peaks are observed.

Complete the table by:

- circling the carbon atom responsible for the chemical shift
- stating the hybridisation of the circled carbon atom.

chemical shift (δ)	carbon atom responsible for chemical shift	hybridisation of the circled carbon atom	
27	H—C—C—C———H		
163	H—C—C—C——H	wildde	
192	H—C—C—C——H		