1 Chromatography is used to separate the components of a mixture and can be cout in a range of different ways.				
	(a)	As	suitable example of a 'carrier gas' in gas chromatography is	(1)
	X	A	chlorine.	(1)
	X	В	nitrogen.	
	X	C	steam.	
	X	D	not possible to state, as there should be a vacuum.	
	(b)		paration is achieved in gas chromatography due to the components in the xture having different	(1)
	X	A	interactions with the stationary phase.	(1)
	X	В	interactions with the mobile phase.	
	X	C	colours.	
	X	D	solubility in the moving solvent.	
			(Total for Question = 2 mark	s)
2	W	√hic	h gas is the least suitable as a carrier gas in Gas-Liquid Chromatography?	
	×	Α	Argon	
	×	В	Carbon dioxide	
	×	C	Oxygen	
	×	D	Nitrogen	
			(Total for Question = 1 ma	rk)

3	explained by the fact that different amino acids have different interactions with		
	X	A	the mobile phase only.
	X	В	the stationary phase only.
	×	C	the mobile phase and the stationary phase.
	×	D	ninhydrin.
			(Total for Question = 1 mark)
4 Ninhydrin is used in thin-layer chromatography to help with the identification of amino acids. This is because the ninhydrin			
	X	A	reacts with amino acids to form a compound which has an intense colour.
	×] B	reacts with amino acids to form compounds each of which has a characteristic colour.
	X	C	increases the separation of the amino acids on the chromatogram.
	×	D	ensures that the mobile phase maintains a nearly constant pH for all the amino acids.
			(Total for Question = 1 mark)
5 In one type of high-performance liquid chromatography (HPLC), the stationary point is non-polar and a polar solvent is used as the eluent. Which of the following we travel through the chromatography column most quickly?			-polar and a polar solvent is used as the eluent. Which of the following would
	×	A	Tetrachloromethane
	X	В	Chloromethane
	X	C	lodomethane
	×	D	Hexane
			(Total for Question = 1 mark)

6	HPLC :	stands for
	\boxtimes A	high pressure liquid column.
	\blacksquare B	high performance liquid chromatography.
	区 C	heterogeneous phase liquid chromatography.
	\square D	homogenous phase liquid column.
		(Total for Question = 1 mark)
7	as the s	nromatography, mixtures are passed through a long tube containing a liquid stationary phase. The mixtures are separated into their components because the nents differ in
	\mathbf{X} A	relative molecular mass.
	\boxtimes B	melting temperature.
		volatility.
	\square D	force of attraction to the liquid.
		(Total for Question = 1 mark)
		istance on a chromatogram moved by an individual amino acid, in a mixture of rent amino acids, mainly depends on
	\square A	the molar mass of the amino acid.
	\boxtimes I	3 the molar mass of the solvent used.
	⊠ (the intermolecular forces between the solvent and the stationary phase.
	× I	the intermolecular forces between the amino acid and both the solvent and the stationary phase.
		(Total for Question = 1 mark)

9	_	ra of the compounds with the formulae CH ₃ CH(OH)CH ₃ and CH ₃ CH ₂ CH ₂ OH stinguished by
	$\boxtimes \mathbf{A}$ t	he value of m/e of the molecular ion in the mass spectrum.
	\boxtimes B t	he presence of a fragment with $m/e = 15$ in the mass spectrum.
	\boxtimes C t	he presence of an absorption peak due to O-H in the infrared spectrum.
	\square D	he number of peaks in the nmr spectrum.
		(Total for Question = 1 mark)
	10 Which	n of the following has two singlet peaks in its nmr spectrum?
	$\boxtimes \mathbf{A}$	Methanal, HCHO
	\boxtimes B	Methanol, CH ₃ OH
	\boxtimes C	Chloromethane, CH ₃ Cl
	\boxtimes D	Dichloromethane, CH ₂ Cl ₂
		(Total for Question = 1 mark)
		$ m CH_3$
	11 The nn	nr spectrum of 2,2-dimethylpropane, H ₃ C—C—CH ₃ , contains CH ₃
	\boxtimes A	one singlet peak.
	\boxtimes B	four singlet peaks.
		one quartet peak.
	■ D	four quartet peaks.
		(Total for Question = 1 mark)

affect the time taken for a component to pass through the column?		
	\boxtimes A	Type of detector
	⊠ B	Material of stationary phase
	区 C	Particle size of stationary phase
	■ D	Temperature of column
		(Total for Question = 1 mark)
13		many different peaks due to hydrogen atoms would you expect to see in a low tion proton nmr spectrum of propanoic acid, CH ₃ CH ₂ COOH?
	\square A	Two
	\boxtimes B	Three
	区 C	Five
	\boxtimes D	Six
		(Total for Question = 1 mark)
14		ligh resolution proton nmr spectrum of ethanoic acid, CH ₃ COOH, the peak due to drogen atoms in the methyl group would be a
	\mathbf{X} A	singlet.
	\mathbb{Z} B	doublet.
	区 C	triplet.
	⋈ D	quartet.
		(Total for Question = 1 mark)

15		propanone reacts with iodine in the presence of sodium hydroxide, the crystalline roduct has the formula
	$\boxtimes A$	CH ₃ I
	\boxtimes B	CHI_3
	■ C	CH ₃ COCH ₂ I
	⊠ D	CH ₃ COCI ₃
		(Total for Question = 1 mark)