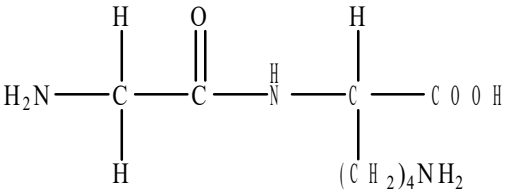
# F324 TEST 4 MARK SCHEME

**1.**



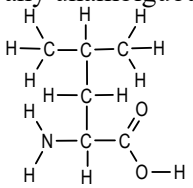
**(1)** for CONH and **(1)** for rest. Accept reverse order. 2

**[2]**

**2.** (a) (i) $RCH(NH_2)COOH$ **(1)** 1

*allow groups R, CH, $NH_2$, COOH in any order*

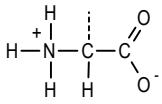
(ii) any unambiguous structure, e.g.:



**(1)** 1

(b) (i) molecule/ion/'it' has both + and – charges 1

(ii) description or diagram to show proton/$H^+$ transfer from COOH to $NH_2$ **(1)**



**(1)** 2

***NOT** just 'hydrogen' transfer*

(c) (i) heat/warm/reflux **(1)**

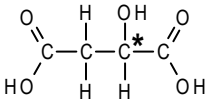
named strong acid/base
an enzyme (which need not be named) **(1)** 2

***NOT** conc $HNO_3$ or conc $H_2SO_4$*

(ii) hydrolysis **(1)** 1

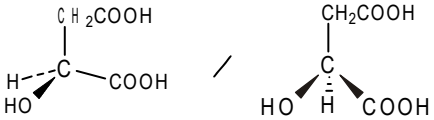
**[8]**

**3.** (i)



**(1)** 1

(ii) structure with correct use of at least two 3-D bonds **(1)** – e.g.



1

*allow ecf if lactic acid is labelled in (i)*

***NOT** if all four bond angles at 90°*

**[2]**

**4.** (a) alkene / C=C double bond
(primary) alcohol / hydroxy(l) **(1)** 1

(b) (i) molecules with the same structure / order of bonds … but
different arrangements in space / 3-D arrangment **(1)** 1

(ii) cis-trans / geometric **(1)** 1

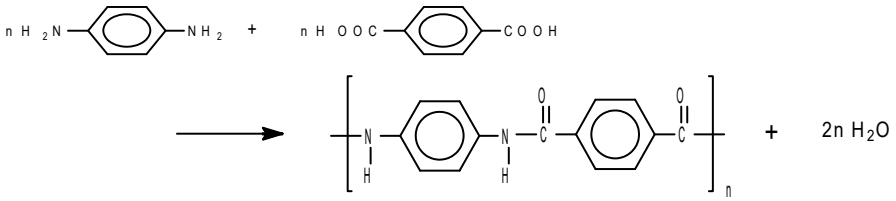
(iii) the double bond does not rotate **(1)** 1

(iv) same groups at one end / need different
groups at both ends of the C=C **(1) AW** 1

**[5]**

**5.** (i) eg fire resistant / bullet proof clothing / cycle tyres / tennis rackets **(1)** 1
*allow any use where a tough flexible material is needed*

(ii) <u>condensation</u> (polymerisation) **(1)**




structure of benzene-1,4-dicarboxylic acid **(1)**

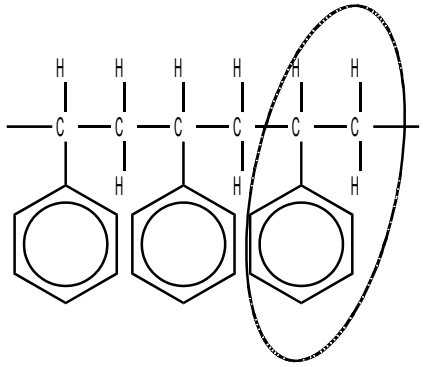
amide /peptide bond displayed **(1)**

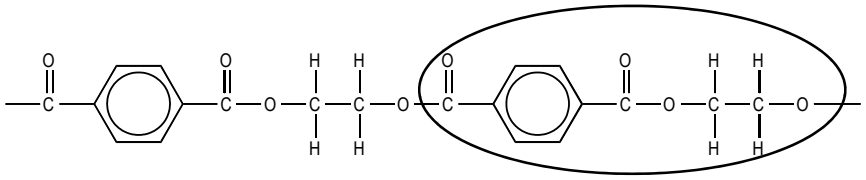
repeat unit of correct polymer indicated **(1)**

formula of water shown as the product in an equation **(1)** 5

**[6]**

**6.** (a) (i)





1 mark for each repeat unit **(1)(1)** 2

(ii) 1 mark for each monomer **(1)(1)** 2

(b) C=O absorbs radiation/breaks **(1)**
ester linkage hydrolysed **(1)** 2

**[6]**

**7.** (aspirin contains) ester **AND** carboxylic acid ✓

***IGNORE*** *arene or benzene or aromatic or phenyl or methyl but any other group loses the mark*
***ALLOW*** *carboxyl group*
***DO NOT ALLOW*** *acid*

(paracetamol contains) amide **AND** phenol ✓

***IGNORE*** *arene or benzene or aromatic or phenyl or menthyl but any other group loses the mark*
***ALLOW*** *peptide*
***ALLOW*** *hydroxy(l)*
***DO NOT ALLOW*** *hydroxide or alcohol*
***DO NOT ALLOW*** *amine*

**[2]**

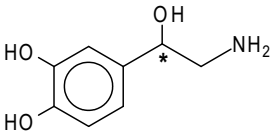
**8.** (a) (i) bromine / sodium hydroxide (solution) / $FeCl_3$ **(1)** 1

*NOT indicators*

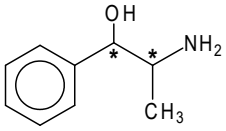
(ii) OH / phenol group in noradrenaline circled **(1)** 1

(iii) decolourises /white ppt / dissolves (in water better) / violet **(1)** 1

(b) (i)



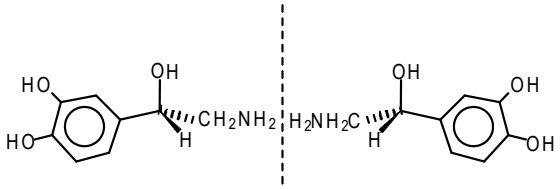

**(1)**




**(1)** 2

(ii) optical (isomerism) **(1)** 1

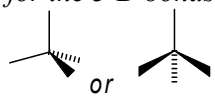
(iii) (stereo)isomers are non-superimposable (mirror images) /
the molecule is asymmetric /
the carbon has four different groups attached **(1)**




one 3-D isomer with all groups correct **(1)**

second isomer is a mirror image of a reasonable attempt at 3-D **(1)** 3

*for the 3-D bonds allow:*



*or*

*but **NOT**:*



(c) **Any three of:**

- only one stereoisomer has the right 3-D shape /
  shape similar to noradrenaline /
  is (pharmacologically) active **ora**
- presence of other (inactive) stereoisomers:
  will increase the amount needed for the dose
- may give harmful side effects
- may increase cost of separation 3

*ANY 3 out of 4 marks (1)(1)(1)*

**[12]**