

**FUNDAMENTALS OF CHEMISTRY 1B - CHEM1002****SECOND SEMESTER EXAMINATION****CONFIDENTIAL****PART B****NOVEMBER 2001****TOTAL TIME ALLOWED (FOR PARTS A & B): THREE HOURS**

GIVE THE FOLLOWING INFORMATION IN BLOCK LETTERS

<b>FAMILY NAME</b>		<b>SID NUMBER</b>	
<b>OTHER NAMES</b>		<b>TABLE NUMBER</b>	

**INSTRUCTIONS TO CANDIDATES**

- All questions are to be attempted. There are 15 pages of examinable material in two parts.
- Complete the written section of the examination paper in **INK**.
- Read each question carefully. Report the appropriate answer and show all relevant working in the space provided.
- The total score for Part A is 40% and for Part B is 60%. The possible score per question is shown.
- Each new question of the short answer section begins with a ●.
- Electronic calculators, including programmable calculators, may be used. Students are warned, however, that credit may not be given, even for a correct answer, where there is insufficient evidence of the working required to obtain the solution.
- Pages 5 and 12 are for rough working only.
- Part A of this examination is in a separate booklet.

**OFFICIAL USE ONLY****Multiple choice section**

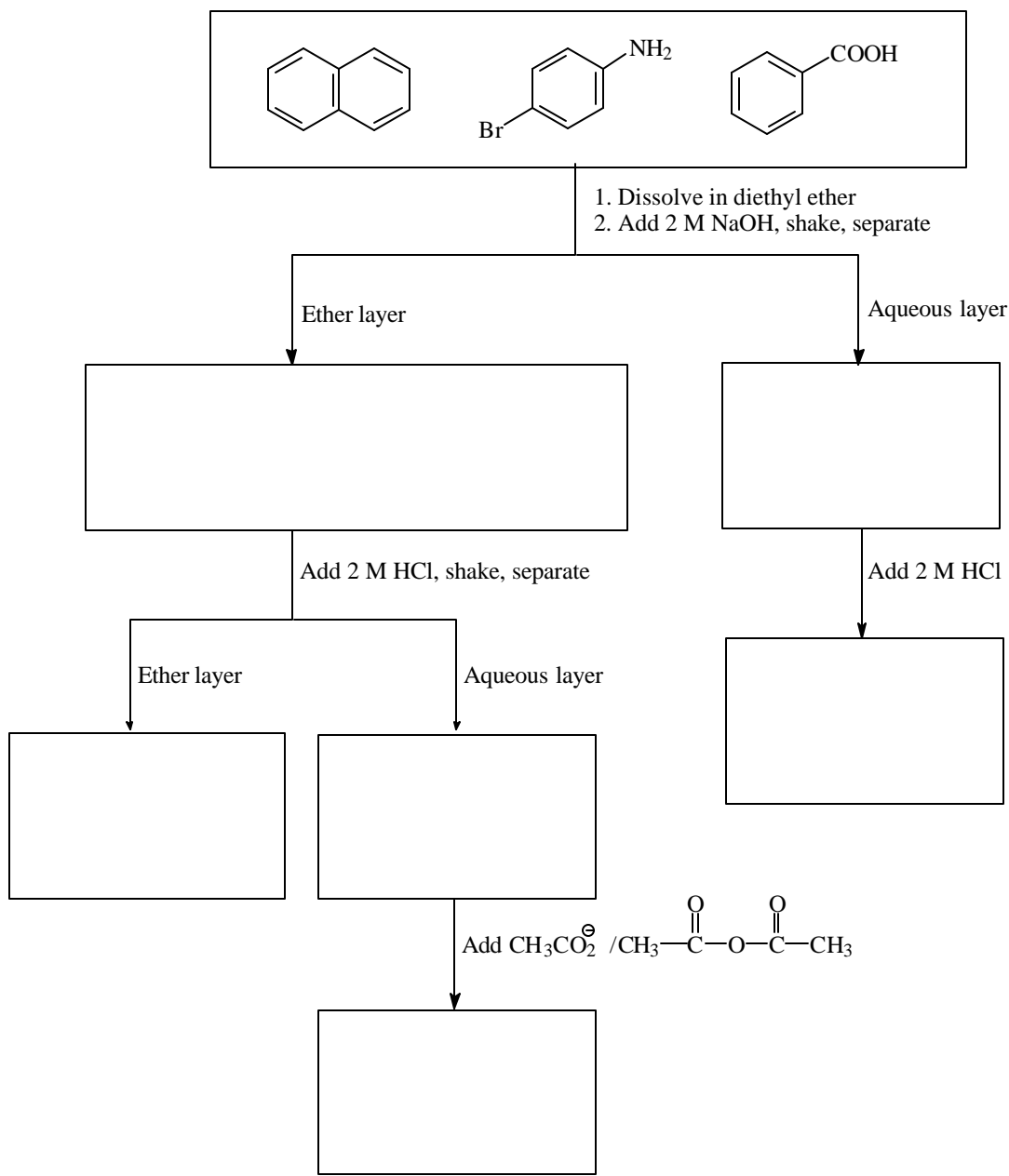
		Marks	
Pages	Max	Gained	
2 - 7	34		

**Short answer section**

Page	Marks		Marker
	Max	Gained	
8	6		
9	9		
10	5		
11	6		
<b>Total</b>	<b>26</b>		
<b>Check Total</b>			

- In experiment E28, a mixture of three compounds was separated by use of their acid-base properties. Complete the flow diagram by drawing the correct molecular structure representing the species present after each transformation.

**Marks**  
**6**

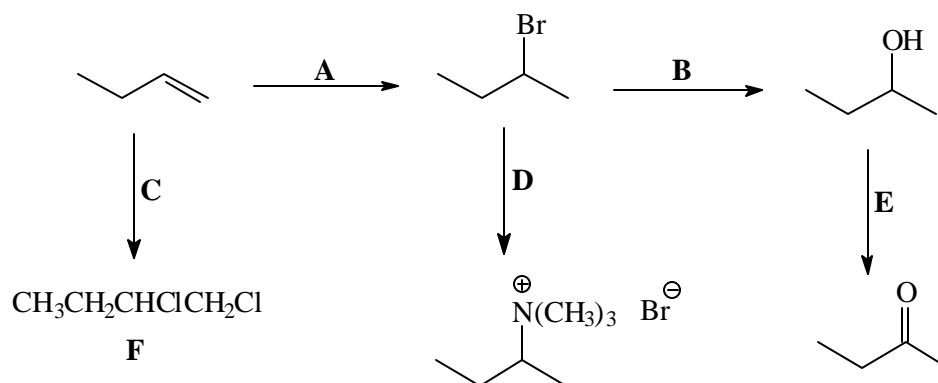


- Briefly describe the composition, structure and function of a biopolymer of your choice.

**Marks**  
**3**

- Consider the following sequence of reactions.

**6**



Write the appropriate reagents **A - E** to effect these reactions.

**A:**

**B:**

**C:**

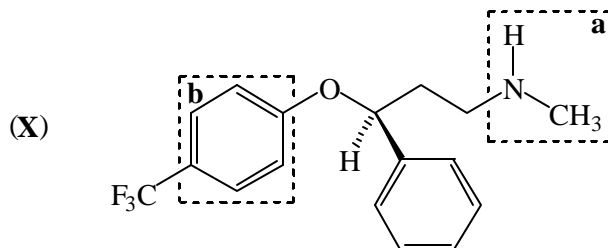
**D:**

**E:**

What is the name of compound **F**?

- Racemic fluoxetine is sold under the tradename Prozac as an antidepressant medication. Prozac has no effect on migraine headaches, but remarkably, one enantiomer of this drug, **(X)**, shown below, is an effective treatment for migraines.

**Marks**  
**5**



- On the above diagram mark the stereogenic centre in **(X)** with an asterisk (\*).
- List the substituents attached to the stereogenic centre in descending order of priority according to the sequence rules.

highest priority

lowest priority

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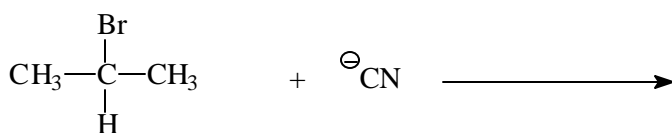
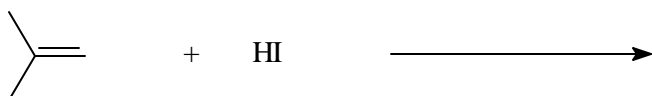
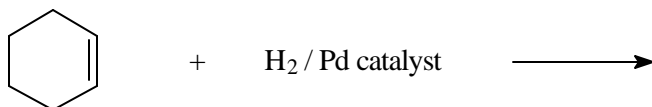
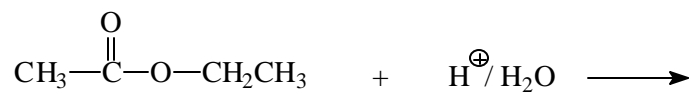
- What is the absolute stereochemistry of the anti-migraine drug **(X)**? Write (*R*) or (*S*).

- Name the functional groups highlighted by the boxes **a** and **b** present in this drug **(X)**.

**a** =

**b** =

- Draw the structures of the major organic product(s) formed in the following reactions.

**Marks**  
**6****THE REMAINDER OF THIS PAGE IS FOR ROUGH WORKING ONLY.**

**FUNDAMENTALS OF CHEMISTRY 1B - CHEM1002****SECOND SEMESTER EXAMINATION**

NOVEMBER 2001

TIME ALLOWED: THREE HOURS

**Numerical Data***Acid dissociation constants,  $pK_a$  at 298 K*nitrous acid,  $\text{HNO}_2$  3.14lactic acid,  $\text{CH}_3\text{CH}(\text{OH})\text{COOH}$  3.86acetic acid,  $\text{CH}_3\text{COOH}$  4.76ammonium ion,  $\text{NH}_4^+$  9.24**Periodic Table of the Elements**

Group																	
1	2											13	14	15	16	17	18
3 <b>Li</b>	4 <b>Be</b>											5 <b>B</b>	6 <b>C</b>	7 <b>N</b>	8 <b>O</b>	9 <b>F</b>	10 <b>Ne</b>
11 <b>Na</b>	12 <b>Mg</b>	3	4	5	6	7	8	9	10	11	12	13 <b>Al</b>	14 <b>Si</b>	15 <b>P</b>	16 <b>S</b>	17 <b>Cl</b>	18 <b>Ar</b>
19 <b>K</b>	20 <b>Ca</b>	21 <b>Sc</b>	22 <b>Ti</b>	23 <b>V</b>	24 <b>Cr</b>	25 <b>Mn</b>	26 <b>Fe</b>	27 <b>Co</b>	28 <b>Ni</b>	29 <b>Cu</b>	30 <b>Zn</b>	31 <b>Ga</b>	32 <b>Ge</b>	33 <b>As</b>	34 <b>Se</b>	35 <b>Br</b>	36 <b>Kr</b>
37 <b>Rb</b>	38 <b>Sr</b>	39 <b>Y</b>	40 <b>Zr</b>	41 <b>Nb</b>	42 <b>Mo</b>	43 <b>Tc</b>	44 <b>Ru</b>	45 <b>Rh</b>	46 <b>Pd</b>	47 <b>Ag</b>	48 <b>Cd</b>	49 <b>In</b>	50 <b>Sn</b>	51 <b>Sb</b>	52 <b>Te</b>	53 <b>I</b>	54 <b>Xe</b>
55 <b>Cs</b>	56 <b>Ba</b>	57 <b>La</b>	72 <b>Hf</b>	73 <b>Ta</b>	74 <b>W</b>	75 <b>Re</b>	76 <b>Os</b>	77 <b>Ir</b>	78 <b>Pt</b>	79 <b>Au</b>	80 <b>Hg</b>	81 <b>Tl</b>	82 <b>Pb</b>	83 <b>Bi</b>	84 <b>Po</b>	85 <b>At</b>	86 <b>Rn</b>
87 <b>Fr</b>	88 <b>Ra</b>	89 <b>Ac</b>	104 <b>Rf</b>	105 <b>Db</b>	106 <b>Sg</b>	107 <b>Bh</b>	108 <b>Hs</b>	109 <b>Mt</b>									

58 <b>Ce</b>	59 <b>Pr</b>	60 <b>Nd</b>	61 <b>Pm</b>	62 <b>Sm</b>	63 <b>Eu</b>	64 <b>Gd</b>	65 <b>Tb</b>	66 <b>Dy</b>	67 <b>Ho</b>	68 <b>Er</b>	69 <b>Tm</b>	70 <b>Yb</b>	71 <b>Lu</b>
90 <b>Th</b>	91 <b>Pa</b>	92 <b>U</b>	93 <b>Np</b>	94 <b>Pu</b>	95 <b>Am</b>	96 <b>Cm</b>	97 <b>Bk</b>	98 <b>Cf</b>	99 <b>Es</b>	100 <b>Fm</b>	101 <b>Md</b>	102 <b>No</b>	103 <b>Lr</b>