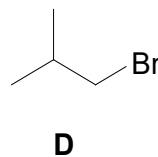
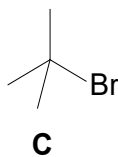
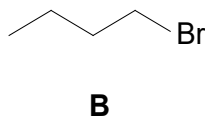
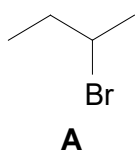


Self-Check Questions – Suggested Answers

1a



1b

A	B	C	D
2-bromobutane	1-bromobutane	2-bromo-2-methylpropane	1-bromo-2-methylpropane
2° bromoalkane	1° bromoalkane	3° bromoalkane	1° bromoalkane

1c **B > D > A > C**

2

Halogenoalkane	S _N 1 or S _N 2	Explanation
CH ₃ CH ₂ Cl	S _N 2	CH ₃ CH ₂ Cl is a primary halogenoalkane. There is little steric hindrance around the electron-deficient carbon atom for backside attack by the nucleophile. Hence S _N 2 mechanism is favoured.
(CH ₃) ₃ CCl	S _N 1	(CH ₃) ₃ CCl is a tertiary halogenoalkane and hence able to form a tertiary carbocation which is stabilised by electronic effect. Hence S _N 1 mechanism is favoured.
(+)-CH ₃ CHBrCH ₂ CH ₃ (Product does not rotate plane polarised light)	S _N 1	Reactant is optically active but product solution is a racemic mixture which is optically inactive. Hence the reaction has occurred with racemisation. Thus, the mechanism is S _N 1. The reaction involves the formation of a carbocation with a trigonal planar geometry around the positively charged carbon. The OH ⁻ nucleophile attacks the positively charged carbon from both sides of the trigonal plane with equal likelihood, giving rise to equal amounts of a pair of enantiomers as products.
CH ₃ CHCl/CH ₂ CH ₃ (Reaction is overall 2 nd order)	S _N 2	Overall second order ⇒ the reaction proceeds via S _N 2 mechanism as one CH ₃ CHCl/CH ₂ CH ₃ molecule and one OH ⁻ ion are involved in the one-step mechanism.
C ₆ H ₅ CHCl/CH ₃ (Rate of reaction is independent of [NaOH])	S _N 1	Rate is independent of [NaOH] ⇒ NaOH is not involved in rate determining step, hence the mechanism is S _N 1. Note: The C ₆ H ₅ CH(CH ₃) ⁺ carbocation is resonance-stabilised by dispersal of positive charge due to delocalisation of π-electrons to the positively charged carbon.

Answers to Tutorial 14 MCQ:

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
B	D	C	D	D	C	D	A	A	D	D	D	D	D	D	B	C	B	C	C	A	B	B	D	A	B

27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
B	C	A	D	C	B	C	B	C	B	D	C	B	C	A	C	C	D