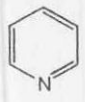
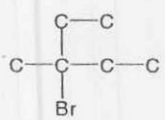
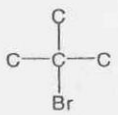
※ 注意：請於答案卷上標明題號，並依序作答。

第一大題 單選題 (30%)

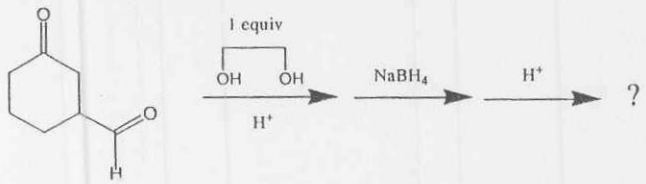
1. The strongest acid is
   (A) *p*-nitrobenzoic acid (B) *p*-bromobenzoic acid (C) *p*-methylbenzoic acid
   (D) *p*-methoxybenzoic acid
2. Arrange the following compounds in order of basicity

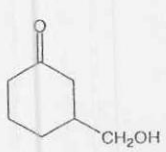
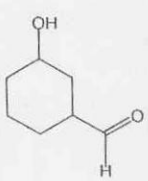
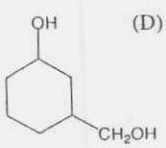
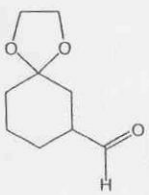
   (a)  (b) $CH_3CH_2NH_2$ (c)  (d) $(CH_3)_3N$

   (A) a>c>b>d (B) d>b>a>c (C) c>a>d>b (D)b>d>a>c
3. Arrange the following compounds in order of reactivity toward S_N2 displacement
   (a) 1-bromo-2,2-dimethylpropane (b)1-bromobutane (c) 1-bromo-2-methylbutane
   (d) 1-bromo-3-methylbutane
   (A) a>b>c>d (B) b>d>c>a (C) c>b>d>a (D) b>c>d>a
4. Arrange the following compounds in order of reactivity toward dehydrohalogenation by strong base
   (a) 1-bromo-3-methylbutane (b) 2-bromo-2-methylbutane (c) 3-bromo-2-methylbutane
   (A) c>b>a (B) b>a>c (C) b>c>a (D) a>b>c
5. Which can be used as aprotic polar solvent
   (A) ethanol (B) benzene (C) hexane (D) acetone
6. Which of the following compounds is not a suitable starting material for S_N1 reaction?

   (A)  (B)  (C)  (D) 
7. Which of these compounds is *not* aromatic?

   (A)  (B)  (C)  (D) 
8. Which of the following compounds can be reduced by $LiAlH_4$ to form *primary* alcohol? (a) aldehyde, (b) ketone, (c) alkene, (d) acid, (e) ester
   (A) **a, b** (B) **a, c** (C) **a, c, d** (D) **a, d, e** (E) **a, b, e**
9. What is the major product of the following reaction?

   (A)  (B)  (C)  (D) 

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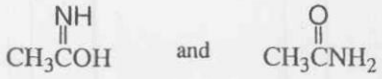
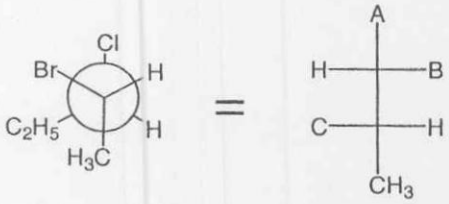
10. The two compounds below are best described as



(A) diastereomers (B) cis, trans isomers (C) tautomers (D) enantiomers

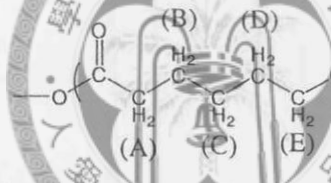
11. Which of the following alkyl halides would be suitable for formation of a Grignard reagent?
(A)$CH_3C(O)CH_2CH_2Br$ (B) $(CH_3)_2NCH_2CH_2Br$ (C) $H_2NCH_2CH_2Br$ (D)$BrCH_2CH_2CH_2CN$

12. Which is the correct correlation for A, B, C below



(A) A=C_2H_5, B=Cl, C=Br
(B) A=Cl, B= C_2H_5, C=Br
(C) A= C_2H_5, B=Br, C=Cl
(D) A=Cl, B=Br, C= C_2H_5

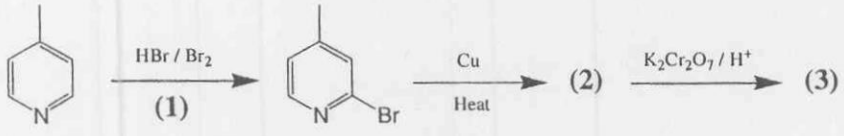
13. Which proton in the following polymer backbone will appear at the most down field position in its NMR spectrum?

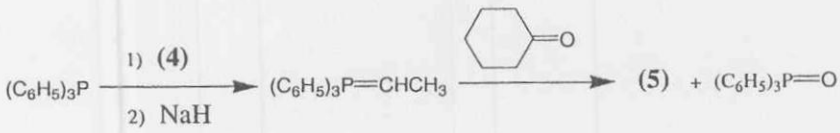


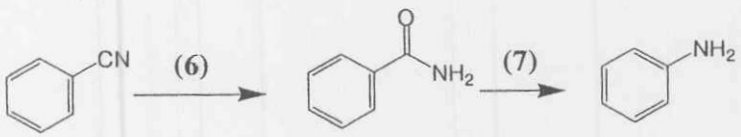
14. The IR absorption at 2200cm^{-1} indicates the presence of
(A) hydroxyl group (B) amino group (C) cyano group (D) carbonyl group

15. The favorable product obtained from a radical reaction of 1-pentene with N-bromosuccinimide is
(A) 1-bromo-2-pentene (B) 2-bromo-1-pentene (C) 2-bromo-2-pentene (D) 1-bromo-1-pentene

第二大題 填入產物及試劑以完成下列反應 (1)~(15) (30%)







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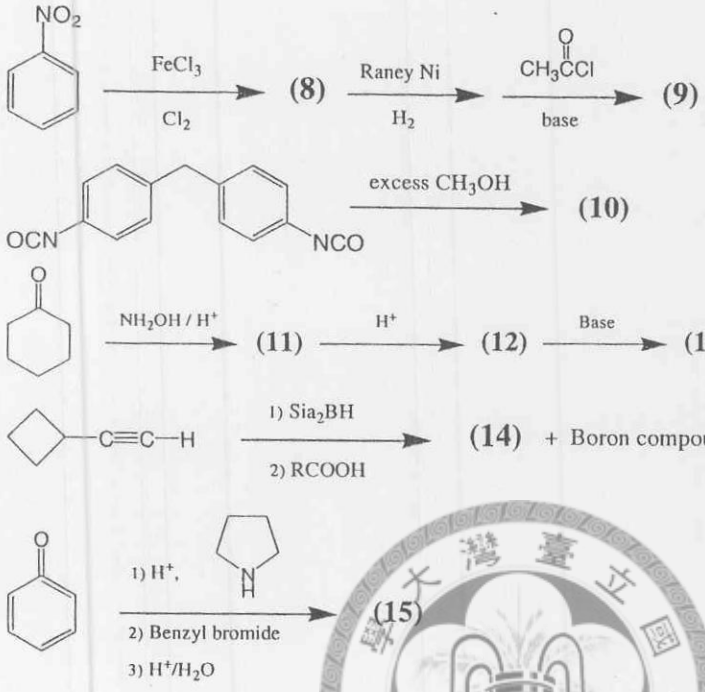
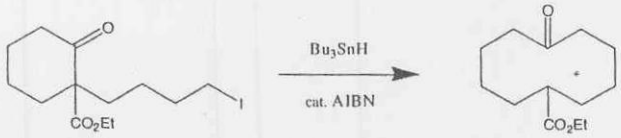


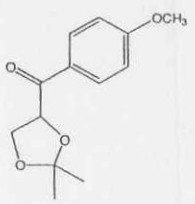
第三大題

(a) Write reasonable mechanisms for the following conversion (5%)

(b) Draw a free-radical mechanism for the following reaction (5%)

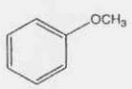


(c) Propose reasonable synthetic routes for compound **B** from **A** (10%)



B

from



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第四大題

Propose a structure that is consistent with the following data. (10%)

(a)

	^{1}H-NMR spectrum	IR spectrum
C_7H_8O	δ 2.43 (1H, s)	broad peak in
	δ 4.58 (2H, s)	3200~3550 cm^{-1}
	δ 7.28 (5H, m)	

(b)

	^{1}H-NMR spectrum	IR spectrum
$C_4H_7BrO_2$	δ 1.08 (3H, t)	broad peak in
	δ 2.07 (2H, m)	2500~3000 cm^{-1}
	δ 4.23 (1H, t)	and a peak at
	δ 10.97(1H, s)	1715 cm^{-1}

第五大題

Describe the main characteristic in chemical structure for conducting polymers. Explain it and give an example. (10%)

試題隨卷繳回