107DP01

國立臺北科技大學 107 學年度碩士班招生考試

系所組別：3710

分子科學與工程系有機高分子碩士班甲組

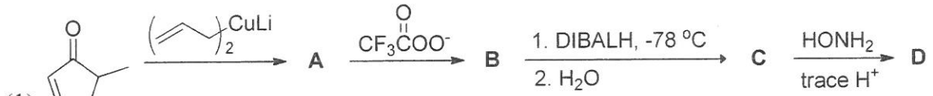
第一節　有機化學　試題

注意事項：

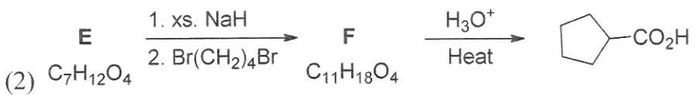
1. 本試題共 3 大題，共 100 分。
2. 請標明大題、子題編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

1. Predict the missing compounds for **A**–**T**. (4 pts each, 80 pts)

(1)



(2)



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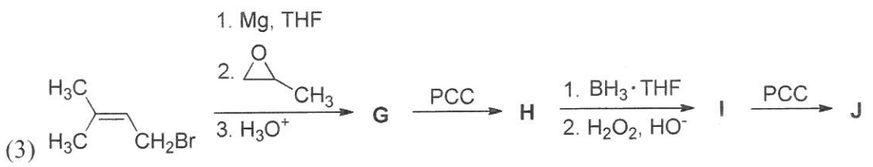

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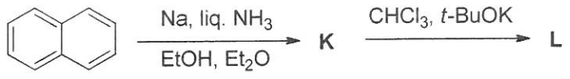

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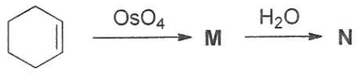

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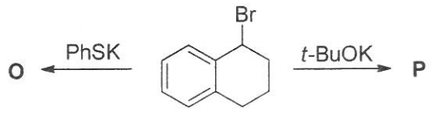

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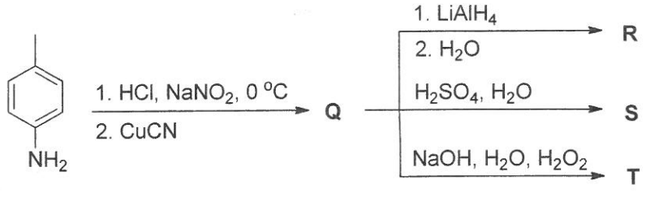
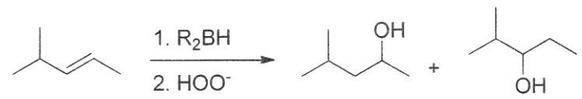


2. Three isomeric compounds, **X**, **Y**, and **Z**, have the formula $C_9H_{10}O_2$, and all show a molecular ion, M^+, at *m/z* 150. The main fragment ions of mass, key band of IR, and ^1H NMR spectra are as follows:

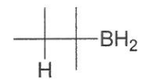
Compound	Mass	IR (cm^{-1})	^1H NMR (δ)
X	135, 107	1680	8.00 (d, 2H, *J* = 7 Hz) 6.95 (d, 2H, *J* = 7 Hz) 3.90 (s, 3H) 2.55 (s, 3H)
Y	108, 107	1760	7.20 (d, 2H, *J* = 7 Hz) 7.00 (d, 2H, *J* = 7 Hz) 2.46 (s, 3H) 2.35 (s, 3H)
Z	119, 91	1724	7.95 (d, 2H, *J* = 7 Hz) 7.26 (d, 2H, *J* = 7 Hz) 3.92 (s, 3H) 2.47 (s, 3H)

Please deduce the structures for **X**, **Y**, and **Z**. (5 pts each, 15 pts)

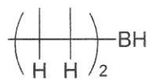
3. Hydroboration-oxidation of (*E*)-4-methyl-2-pentene using various boranes are shown in the table. Please explain the trend of regioselectivity when different boranes are employed. (5 pts)



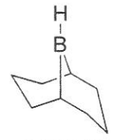
BH_3/THF	57	43
Thexylborane	66	34
Sia_2BH	97	3
9-BBNH	99.8	0.2



Thexylborane



Sia_2BH



9-BBNH