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淡江大學 107 學年度日間部轉學生招生考試試題

系別：理學院尖端材料科學學士學位
學程三年級

科目：材料科學(含材料的合成與設計)

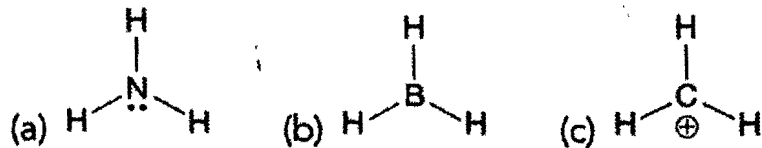
考試日期：7月27日(星期五) 第2節

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1. Draw a Lewis dot structure for each of the following compounds: (10%)

(a) $\text{CH}_3\text{CH}_2\text{OH}$ (b) CH_3CN

2. Identify the expected hybridization state and geometry for the central atom in each of the following compounds: (15%)



3. Draw each of the following compounds: (20%)

(a) 2,2,4-trimethylpentane (b) 1,2,3,4-tetramethylcycloheptane
(c) 2,2'-bithiophene (d) 9-ethylcarbazole

4. Classify each of the following solvents as protic or aprotic: (12%)

(a) DMF (b) $\text{CH}_3\text{CH}_2\text{OH}$ (c) NH_3 (d) H_2O

5. Draw crystal structure and identify the bond types of diamond, graphite and graphene. (18%)

6. Indicate any two types of materials that require organic synthesis to obtain the materials. (8%)

7. What is the working principle of organic light-emitting diodes (OLEDs)? What kinds of molecules are ideal to be applied as the emitting materials in OLEDs? (12%)

8. What is bulk-heterojunction (BHJ) solar cell? (5%)