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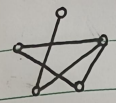
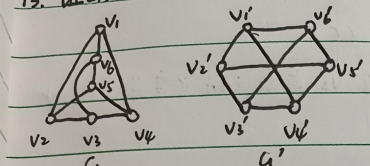
T2.



T3. 证明：存在双射函数 $\varphi: V \to V'$ 及 $f: E \to E'$ 如下：



$\varphi(v_1)=v_1'$，$\varphi(v_2)=v_2'$，$\varphi(v_3)=v_3'$，

$\varphi(v_4)=v_4'$，$\varphi(v_5)=v_5'$，$\varphi(v_6)=v_6'$.

$f(v_1,v_2)=(v_1',v_2')$，$f(v_2,v_3)=(v_2',v_3')$，

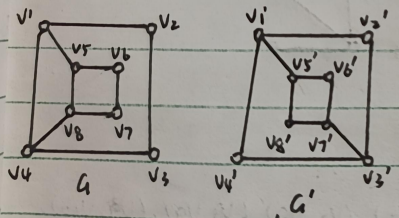
$f(v_3,v_4)=(v_3',v_4')$，$f(v_4,v_5)=(v_4',v_5')$，$f(v_5,v_6)=(v_5',v_6')$，

$f(v_6,v_1)=(v_6',v_1')$，$f(v_1,v_4)=(v_1',v_4')$，$f(v_2,v_5)=(v_2',v_5')$，

$f(v_3,v_6)=(v_3',v_6')$，使得 $f(v_i,v_j)=(\varphi(v_i),\varphi(v_j))$ $(1\le i,j\le 6)$

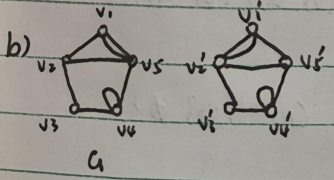
故 G 与 G' 同构.

T4. 证明：(a.)



G' 中，v_2'，v_4'，v_6'，v_8' 四个2度结点均与2个3度结点相邻，G 中则无2度结点与2个3度结点相邻。

(b)



G 中仅有的2个4度结点 v_4、v_5 相邻，

G' 中仅有的2个4度结点 v_2'，v_4' 不相邻.

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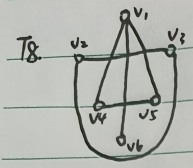
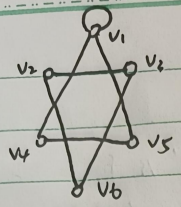
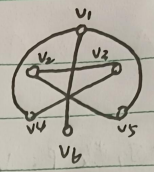
T8.



(a)



(b)

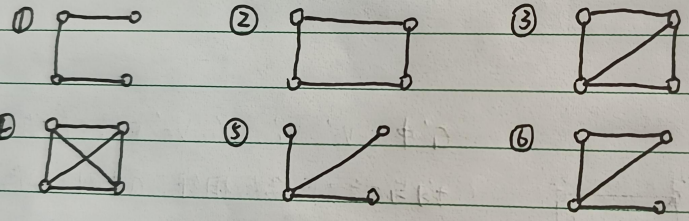


(c)

(1) (c)是连通图，(a)(b)均不是连通图。(a)中v_3、v_2与v_6之间不连通，(b)中(v_2, v_3, v_6)与(v_1, v_4, v_5)之间互不连通。

(2) (c)是简单图，(a)中有平行边，(b)中有自环。

T9. 四个结点的不同构的简单无向连通图有6个。



T14. (1) 弱连通支：

$G_1 = (\{v_1, v_2, v_3, v_9, v_{10}\}, \{(v_1, v_2), (v_2, v_3), (v_2, v_9), (v_3, v_9), (v_9, v_{10}), (v_{10}, v_1)\})$

$G_2 = (\{v_4\}, \phi)$，$G_3 = (\{v_5\}, \{(v_5, v_5)\})$，$G_4 = (\{v_6\}, \phi)$，$G_5 = (\{v_7\}, \phi)$，$G_6 = (\{v_8\}, \phi)$

(2) 单向连通支：

$G_1 = (\{v_1, v_2, v_3, v_4, v_9, v_{10}\}, \{(v_1, v_2), (v_2, v_3), (v_2, v_9), (v_3, v_9), (v_9, v_{10}), (v_{10}, v_1)\})$

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$(V_{10}, V_1), (V_3, V_4)\}$,

$G_2 = (\{V_4, V_7, V_8\}, \{(V_7, V_8), (V_8, V_4)\})$, $G_3 = (\{V_5\}, \{(V_5, V_5)\}$,

$G_4 = \{V_6\}, \phi)$

(3) 强连通支：

$G_1 = (\{V_1, V_2, V_3, V_4, V_7, V_8, V_9, V_{10}\}, \{(V_1, V_2), (V_2, V_3), (V_3, V_4), (V_2, V_9),$

$(V_3, V_9), (V_9, V_{10}), (V_{10}, V_1), (V_7, V_8), (V_8, V_4)\})$

$G_2 = (\{V_5\}, \{(V_5, V_5)\})$, $G_3 = (\{V_6\}, \phi)$.