

- 1) 滿分 100 分，考試時間 2 小時。
- 2) 答案應有正確之數值與單位。
- 3) 可使用計算器，但不得使用電腦、行動電話等通訊器材。不得參閱任何書本及筆記。
- 4) 請確實遵守考試規則，違反考試規則者依本校校規處置。

1. The charge flowing through a point in a circuit is given as a function of time as

$$q(t) = -t^3 + 6t^2 - 10t, \text{ find the current } i(t) \text{ at } t=5s. \text{ (10\%)}$$

2. Find I_x in **Fig. 1** using *Tellegen's theorem*. (10%)

3. Find the current i_x in the circuit in **Fig. 2**. (10%)

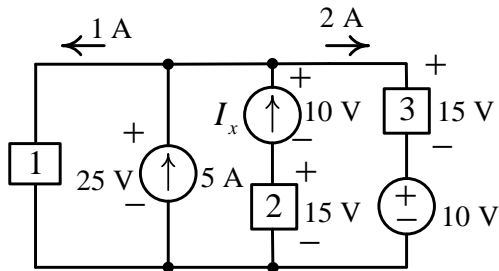


Fig. 1

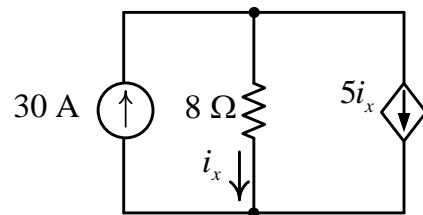


Fig. 2

4. Find the equivalent resistance R_{eq} looking into terminals α and β of the *bridge circuit* shown in **Fig. 3**. (10%)

5. A network is composed of resistors of R and $2R$ connected in series and parallel to construct a *semi-infinite ladder circuit* as shown in **Fig. 4**. Find the resistance looking into terminals a and b . (20%)

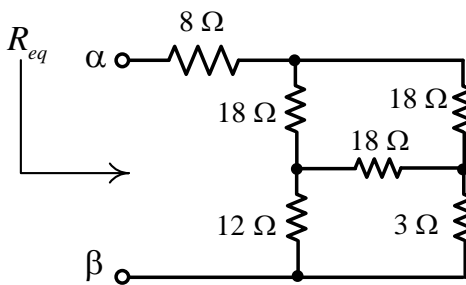


Fig. 3

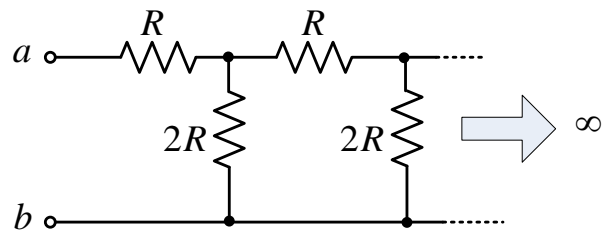


Fig. 4

6. In the circuit of **Fig. 5**, (a) let $V_x=10$ V, find I_x ; (b) let $I_x=50$ A, find V_x . (20%)

7. Find I and V_o in the circuit of **Fig. 6**. (20%)

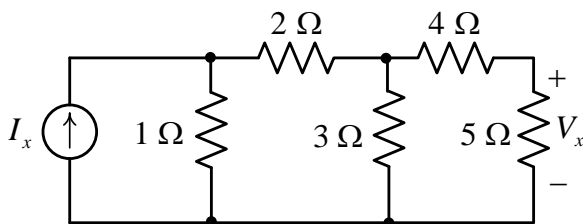


Fig. 5

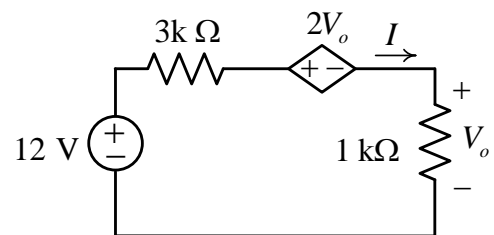


Fig. 6