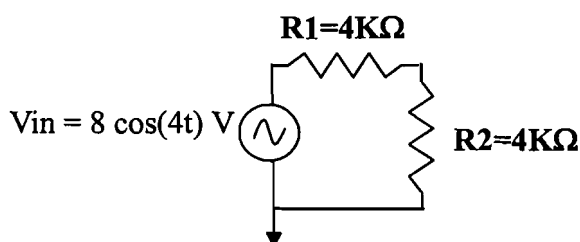【可使用計算機】＊作答前請先核對試題、答案卷(試卷)與准考證之所組別與考科是否相符！！

請從以下題目選擇五題作答，每題二十分。作答超過五題者，以最低分五題計算。

1. (a) How to define the energy band gap (Eg) values of materials from their HOMO (highest occupied molecular orbital in valence band) and LUMO (lowest unoccupied molecular orbital in conduction band) energy levels?
   (b) How to measure the previous Eg, HOMO level, and LUMO level values of materials?
   (c) Describe the relationship among Eg, conductivity, and transmittance of materials.

2. (a) Regarding the driving type of the electrodes in LCDs, what are the differences between simple matrix LCDs and active matrix LCDs?
   (b) Describe the requirements for the cathode (陰極) and anode (陽極) materials in organic light emitting diodes (OLEDs) in terms of work functions (功函數).
   (c) What are the major differences for the cathode (陰極) and anode (陽極) materials between OLEDs and LCDs.

3. 若想要知道薄膜中是否有多晶矽的晶粒或非晶矽或是兩種共存，說明可使用的分析方法及其原理。

4. 銦錫氧透明導電膜 (ITO)的膜厚為 100 nm，若要分析其中的化學組成，　說明可使用的分析方法及其原理。

5. Find the equivalent resistance **Req** of the ladder resistors with infinite stages shown in the figure.
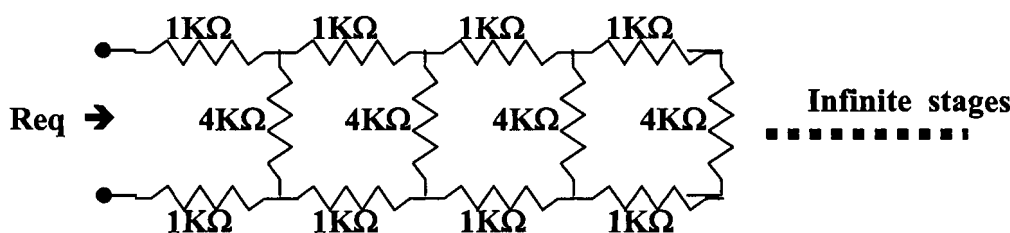
6. (a) Find the average power dissipation of R2 for the figure shown below.
   (b) Find the root mean square values of (1) the voltage across R2. (2) the current flowing through R2 for the figure shown below.

國立交通大學 98 學年度碩士班考試入學試題

科目：平面顯示技術相關概論(8121)　　　　　　　考試日期:98年3月14日　第 4 節
系所班別：工學院碩士在職專班　　　組別：平面顯示技術碩士學位學程　　第 2 頁,共 2 頁
【可使用計算機】＊作答前請先核對試題、答案卷(試卷)與准考證之所組別與考科是否相符！！

7. 在平面液晶顯示器中由薄膜電晶體(TFT)作爲驅動元件，此薄膜電晶體又有多晶矽
(poly-Silicon)與非晶矽(amorphous silicon)之特性。請說明:
(a)多晶矽 TFT 與非晶矽 TFT 的不同點。
(b)兩者在製程上的差異。
(c)低溫多晶矽(LTPS) TFT 爲什麼稱之爲”低溫”，請列舉其三項優點。

8. Organic semiconductors are used as the active materials in organic light-emitting diode (OLED) devices, please sketch a simple diagram to indicate the typical structure of OLED and describe its physical mechanism briefly.

9. According to the following figures, please use the following equation and electromagnetic theory to explain the working principle of the motor(馬達).

$$\vec{T} = \vec{m} \times \vec{B}$$
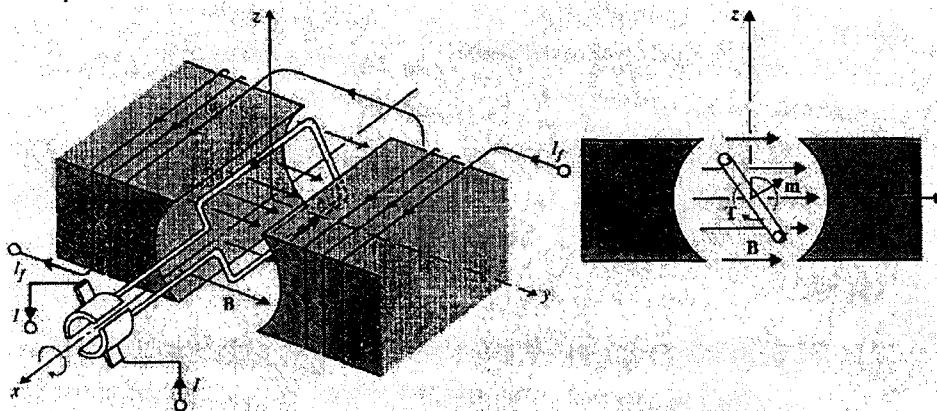
10. According to the following figure, please explain the "Hall effect(霍爾效應)".