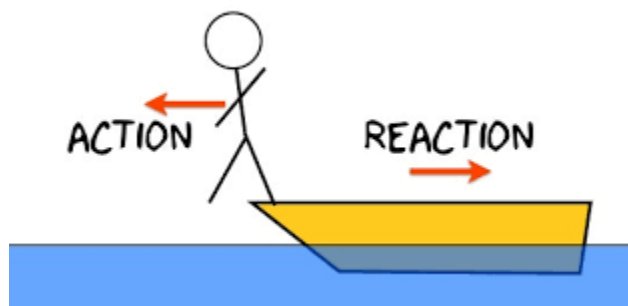


1. "For every action, there is an equal and opposite reaction".

“對於每個動作，都有一個相等和相反的反應”。



- A. First law 第一定律
- B. Second law 第二定律
- C. Third law 第三定律
- D. All of the above 以上皆是

2. This person bought coffee and put it on the seat next to them. If they stopped quickly and the coffee spilled which law would that represent?

這人買了咖啡放在旁邊的座位上。如果他們很急地停下來，咖啡灑了，那代表的是哪條定律？

- A. Newton's 1st Law 牛頓第一定律
- B. Newton's 2nd Law 牛頓第二定律
- C. Newton's 3rd Law 牛頓第三定律
- D. None of them 以上都不是

3. Photoelectric effect provides the evidence for the _____ nature of radiation.

光電效應為輻射的_____性質提供了證據。

- A. dual 雙重
- B. wave 波動
- C. particle 粒子
- D. electromagnetic 電磁

4. Light of a given wavelength is used to illuminate the surface of a metal. However, no photoelectrons are emitted. In order to cause electrons to be ejected, light of _____ should be used.

給定波長的光用於照亮金屬表面。然而，沒有光電子被發射。為了使電子射出，應使用_____的光。

- A. lower energy 更低能量
- B. higher intensity 強度更高
- C. shorter frequency 頻率較短
- D. higher frequency 頻率更高

5. Atomic number of a nucleus is Z and atomic mass is M . The number of neutrons is

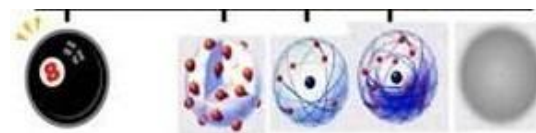
原子核的原子序數為 Z ，原子質量為 M 。中子數為

- A. $M - Z$
- B. M
- C. Z
- D. $M + Z$

6. Which is the correct sequence of the scientists who made major changes in the model of the atom?

對原子模型做出重大改變的科學家的正確順序是什麼？

- 1-JJ Thomson 約瑟夫·湯姆生
- 2-Erwin Schrodinger 歐文·薛丁格
- 3-John Dalton 約翰·道耳頓
- 4-Niels Bohr 尼爾斯·波耳
- 5-Ernest Rutherford 歐內斯特·拉塞福



- A. 2, 1, 4, 3, 5
- B. 3, 1, 5, 4, 2
- C. 5, 3, 2, 1, 4
- D. 4, 3, 2, 1, 5

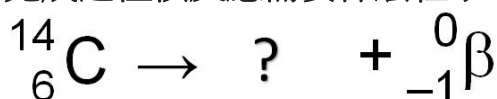
7. What is the change in atomic mass when an atom emits alpha radiation?

當原子發射阿爾法輻射時，原子質量會發生什麼變化？

- A.decreases by 4 減少 4
- B.decreases by 1 減少 1
- C.remains the same 保持不變
- D.increases by 1 增加 1

8. What particle is needed to complete this nuclear reaction?

完成這種核反應需要什麼粒子？



9. Magnetic poles that are unlike _____ and magnetic poles that are alike _____.

不同的磁極 _____，相同的磁極 _____。

- A.run; stay 運行; 保持不變
- B.attract; repel 相吸; 相斥
- C.stay; repel 保持不變; 相斥
- D.repel; attract 相斥; 相吸

10. The SI unit of magnetic field is _____.

- A.weber 韋伯
- B.guass 高斯
- C.tesla 特斯拉
- D.farad 法拉

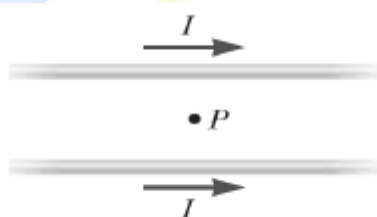
11. There are several modern uses of magnets. Magnets allow high speed trains to _____ above the track. They go faster because without touching the tracks there is no friction to slow them down.

磁鐵有幾種現代用途。磁鐵允許高速列車在軌道上方 _____。它們走得更快，因為如果不接觸軌道，就沒有摩擦力來減慢它們的速度。

- A.collide 碰撞
- B.levitate 懸浮
- C.attract 吸引
- D.repair 維修

12. Two long, parallel wires each carry the same current I in the same direction. What is the total magnetic field at the point P midway between the wires?

兩條平行的長導線各自承載相同方向的相同電流 I 。導線中間點 P 處的總磁場是多少？



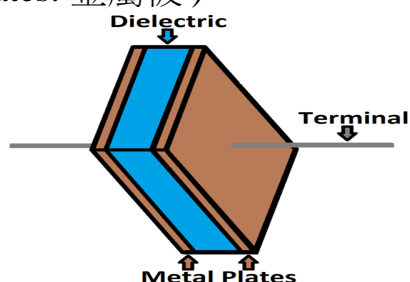
- A.Zero 零
- BDirected into the page 定向到頁面
- CDirected out of the page 指向頁面外
- DDirected to the left 向左方向

13. The figure to the right represents:

右圖代表：

(Dielectric: 電介質 ; Terminal: 終端 ;

Metal Plates: 金屬板)



- A.Capacitor 電容器
- B.Diode 二極體
- C.Inductor 電感器
- D.Resistor 電阻器

14. If C is the capacitance in Farads, ϵ permittivity of the dielectric, A area of plate overlap in square meters and d distance between plates in meters, then:

如果 C 是以法拉為單位的電容，電介質的 ϵ 介電常數，以平方米為單位的板重疊面積和以米為單位的板之間的 d 距離，則：

- A. $C = \epsilon d/A$
- B. $C = A/\epsilon d$
- C. $C = \epsilon A/d$
- D. $C = d/\epsilon A$

15. Rate of flow of electric charge is

電荷的流速是

- A.electric current 電流
- B.conventional current only 僅常規電流
- C.electronic current only 僅電子電流
- D.potential difference 電位差

16. Current in a circuit if resistance of $15\ \Omega$ and potential difference of 3.0 V is applied across it's ends is

如果在電路兩端施加 $15\ \Omega$ 的電阻和 3.0 V 的電位差，電路中的電流為

- A.1 A
- B.2 A
- C.0.5 A
- D.0.20 A

17. $1\ \Omega$ is equal to

$1\ \Omega$ 等於

- A.1 V A-2
- B.1 V A-1
- C.1 V-1 A
- D.2 V A-1

18. In the diagram below, P is a point near a negatively charged sphere. Which direction best represents the direction of the electric field at point P ?

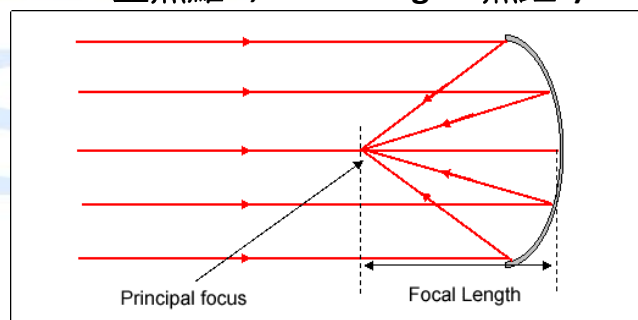
在下圖中， P 是帶負電球體附近的一個點。哪個方向最能代表 P 點的電場方向？



- A.Right 右
- B.Left 左
- C.Up 向上
- D.Down 向下

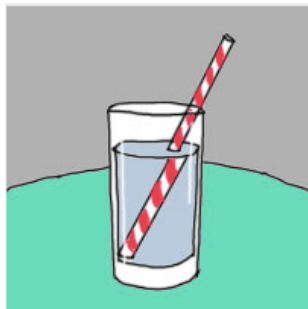
19. This is an example of a _____ mirror.

這是 _____ 鏡像的示例。(Principal focus: 主焦點 ; Focal Length: 焦距)



- A.Concave 凹面
- B.Convex 凸面
- C.Plane 平面
- D.Magnifying 放大

20. Why does the straw appear to be bent?
為什麼吸管看起來是彎曲的？



- A. light is reflected 光線被反射
B. light is absorbed 光被吸收
C. light is turned 光被轉
D. light is refracted 光被折射

21. What is the energy, in eV, of a photon that has a wavelength of 620 nm? Write answer just in numbers.

波長為 620 nm 的光子的能量是多少 (以 eV 為單位)？只用數字寫答案。

Answer (in number): _____
答案 (數字)

22. What is the voltage across the plates of the capacitor if the capacitance is 10 F and the Charge stored is 30 C?

Write answer just in numbers.

如果電容為 10 F，存儲的電荷為 30 C，則電容器極板上的電壓是多少？只用數字寫答案。

Answer (in number): _____
答案 (數字)

23. The plates of a parallel-plate capacitor are 2.50mm apart, and each carries a charge of magnitude 80.0nC. The plates are in vacuum. The electric field between the plates has a magnitude of $4.00 \times 10^6 \text{ V/m}$ in picofarad(pF). Write answer just in numbers.

平行板電容器的極板相距 2.50mm，每個極板攜帶 80.0nC 的電荷。板處於真空狀態。

板之間的電場大小為 $4.00 \times 10^6 \text{ V/m}$ ，單位為皮法 (pF)。只用數字寫答案。



Answer (in number): _____
答案 (數字)

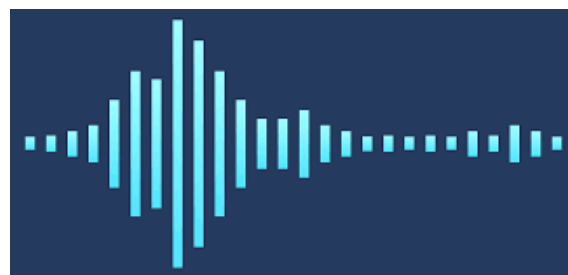
24. Current in a 660 W light bulb when it is connected to a 330 V power supply is A. Write answer just in numbers.
連接到 330 V 電源時，660 W 燈泡中的電流為..... A。只用數字寫答案。



Answer (in number): _____
答案 (數字)

25. A sound wave travels through water at a speed of 1300m/s for 4 seconds. What distance does it travel IN meter? Write answer just in numbers.

聲波以 1300m/s 的速度在水中傳播 4 秒。它以米為單位行進了多遠？只用數位寫答案。



Answer (in number): _____
答案 (數字)