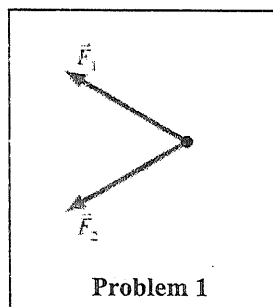


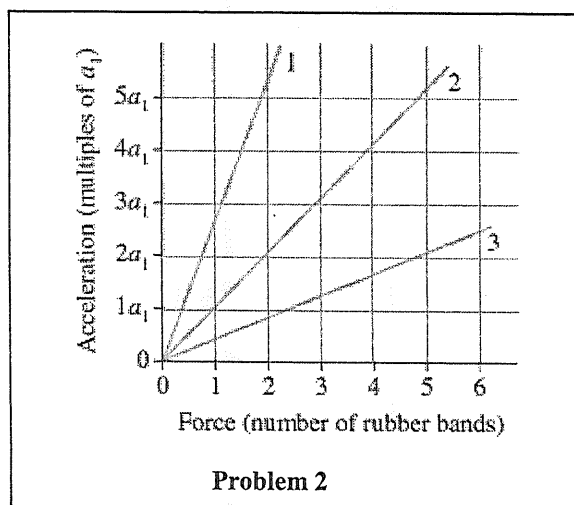
## 暑假轉學生招生考試試題紙

每題 5 分 科目： 普通物理 第      頁共      頁

- 1) The figure shows two forces, each of magnitude 4.6 N, acting on an object. The angle between these forces is  $40^\circ$ , and they make equal angles above and below the horizontal. What third force will cause the object to be in equilibrium (acceleration equals zero)?  
 A) 4.3 N pointing to the right    B) 7.0 N pointing to the right    C) 9.2 N pointing to the right    D) 3.5 N pointing to the right  
 E) 8.6 N pointing to the right

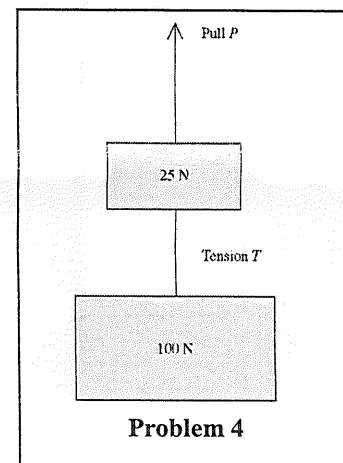


- 2) The figure shows an acceleration-versus-force graph for three objects pulled by rubber bands. The mass of object 2 is 36 kg. What are the masses of objects 1 and 3?  
 A) 14 kg and 90 kg    B) 72 kg and 18 kg    C) 90 kg and 18 kg  
 D) 14 kg and 72 kg    E) 90 kg and 14 kg



- 3) A 7.0-kg object is acted on by two forces. One of the forces is 10.0 N acting toward the east. Which of the following forces is the other force if the acceleration of the object is  $1.0 \text{ m/s}^2$  toward the east?  
 A) 6.0 N east    B) 3.0 N west    C) 12 N east    D) 9.0 N west    E) 7.0 N west

- 4) Two weights are connected by a massless wire and pulled upward with a constant speed of  $1.50 \text{ m/s}$  by a vertical pull  $P$ . The tension in the wire is  $T$  (see figure).  $P$  is closest to  
 A) 1225 N.    B) 187.5 N.    C) 245 N.    D) 125 N.    E) 25 N.



- 5) A stationary 1.67-kg object is struck by a stick. The object experiences a horizontal force given by  $F = at - bt^2$ , where  $t$  is the time in milliseconds from the instant the stick first contacts the object. If  $a = 1500 \text{ N/(ms)}$  and  $b = 20 \text{ N/(ms)}^2$ , what is the speed of the object just after it comes away from the stick at  $t = 2.74 \text{ ms}$ ?  
 A) 22 m/s    B) 3.9 m/s    C) 3.3 m/s    D) 25 m/s    E) 2.5 m/s

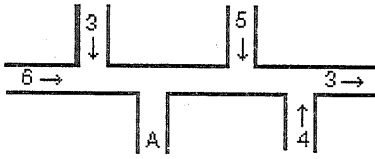
- 6) One revolution is the same as:  
 A)  $2\pi \text{ rad}$     B)  $\pi \text{ rad}$     C)  $\pi/2 \text{ rad}$     D) 57 rad    E) 1 rad

- 7) The displacement of an object oscillating on a spring is given by  $x(t) = x_m \cos(\omega t + \phi)$ . If the initial displacement is zero and the initial velocity is in the negative  $x$  direction, then the phase constant  $\phi$  is:  
 A) 0    B)  $\pi/2 \text{ radians}$     C)  $\pi \text{ radians}$     D)  $3\pi/2 \text{ radians}$     E)  $2\pi \text{ radians}$

- 8) A man, with his arms at his sides, is spinning on a light frictionless turntable. When he extends his arms:  
 (A) his angular velocity increases    (B) his angular velocity remains the same  
 (C) his rotational inertia decreases    (D) his rotational kinetic energy increases  
 (E) his angular momentum remains the same

- 9) Heat is:  
 A) energy transferred by macroscopic work    B) a temperature difference    C) energy content of an object  
 D) energy transferred by virtue of a temperature difference    E) None of the above.

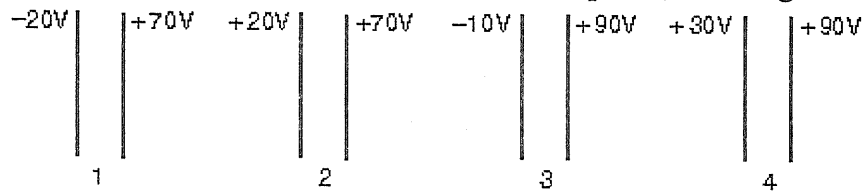
- 10) The diagram shows a pipe of uniform cross section in which water is flowing. The directions of flow and the volume flow rates (in  $\text{cm}^3/\text{s}$ ) are shown for various portions of the pipe. The direction of flow and the volume flow rate in the portion marked A are:



共 2 頁  
第 2 頁

- A) down and  $15 \text{ cm}^3/\text{s}$     B) down and  $11 \text{ cm}^3/\text{s}$     C) down and  $9 \text{ cm}^3/\text{s}$     D) up and  $11 \text{ cm}^3/\text{s}$     E) up and  $15 \text{ cm}^3/\text{s}$
- 11) A certain heat engine draws  $400 \text{ cal/s}$  from a water bath at  $25^\circ\text{C}$  and transfers  $200 \text{ cal/s}$  to a reservoir at a lower temperature. The efficiency of this engine is:
- A) 80%    B) 75%    C) 50%    D) 25%    E) 20%

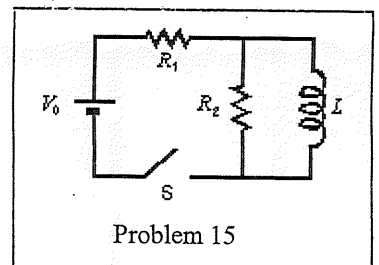
- 12) The diagram shows four pairs of large parallel conducting plates. The value of the electric potential is given for each plate. Rank the pairs according to the magnitude of the electric field between the plates, least to greatest.



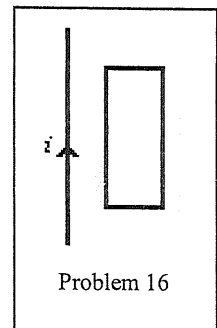
- A) 1, 2, 3, 4    B) 4, 3, 2, 1    C) 2, 3, 1, 4    D) 2, 4, 1, 3    E) 3, 2, 4, 1
- 13) 質量為  $m$  的子彈以速度  $v$  水平射入一靜置於光滑水平面上的木塊，之後子彈留在木塊中，木塊質量為  $M$ ，則碰撞後木塊的速度為何？
- A)  $v$     B)  $(m+M)v/m$     C)  $mv/(m+M)$     D)  $(m+M)v/M$     E) None of the above.

- 14) An electron moves in the negative  $x$  direction, through a uniform magnetic field in the negative  $y$  direction. The magnetic force on the electron is: A) in the positive  $y$  direction. B) in the negative  $y$  direction. C) in the positive  $z$  direction. D) in the negative  $z$  direction. E) in the negative  $x$  direction.

- 15) Immediately after switch  $S$  in the circuit shown is closed, the current through the battery is:
- A)  $V_0/R_1$     B)  $V_0/(R_1 + R_2)$     C) 0    D)  $V_0/R_2$     E)  $V_0(R_1 + R_2)/(R_1R_2)$



- 16) A long straight wire is in the plane of a rectangular conducting loop. The straight wire carries an increasing current in the direction shown. The current in the rectangle is:
- A) zero    B) counterclockwise in the left side and clockwise in the right side  
C) clockwise    D) clockwise in the left side and counterclockwise in the right side  
E) counterclockwise



- 17) 下列有關熱量的敘述，何者正確？

- A) 熱量由能量多的物體流向能量少的物體    B) 熱量由比熱大的物體流向比熱小的物體  
C) 熱量由位置高的物體流向位置低的物體    D) 熱量由高溫物體流向低溫物體    E) 以上皆非

- 18) 1 庫倫的電量相當於多少個電子？ A)  $6.25 \times 10^{18}$     B)  $1.6 \times 10^{-19}$     C)  $6.02 \times 10^{23}$     D)  $1.6 \times 10^{23}$     E)  $6.02 \times 10^{25}$

- 19) 一電池與四個電燈泡連接使用，下列哪一種接法可讓電池能量維持最久？

- A) 四個燈泡串聯在一起    B) 四個燈泡並聯在一起    C) 兩個燈泡並聯後與另外兩個燈泡串聯  
D) 三個燈泡並聯後與另一燈泡串聯    E) 三個燈泡串聯後與另一燈泡並聯

- 20) 一密度為  $0.6 \text{ g/cm}^3$ 、體積為  $10 \text{ cm}^3$  的木塊浮在水面上，水的密度為  $1 \text{ g/cm}^3$ ，則木塊露出水面的體積有多少？
- A)  $2 \text{ cm}^3$     B)  $3 \text{ cm}^3$     C)  $4 \text{ cm}^3$     D)  $6 \text{ cm}^3$     E)  $8 \text{ cm}^3$