國立聯合大學 105 學年度

寒假轉學生招生考試試題紙

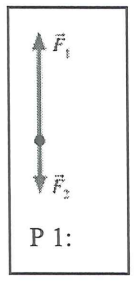
共 2 頁
第 1 頁

科目：普通物理　第＿＿頁共 3 頁

1.) The figure P1 shows two forces acting on an object, with magnitudes F with F_1 = 84 N and F with F_2 = 28 N. What third force will cause the object to be in equilibrium?

(A) 56 N pointing up　(B) 56 N pointing down

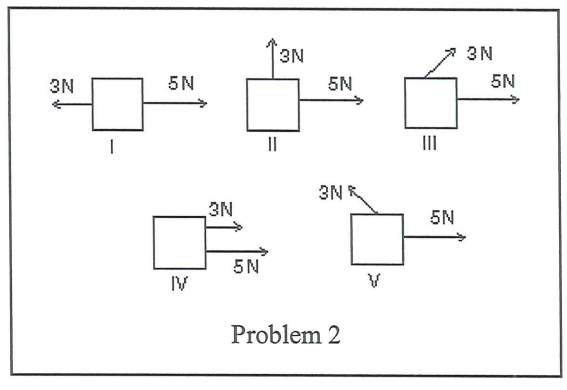
(C) 88 N pointing down　(D) 88 N pointing up　(E) 28 N down



P 1:

2.) Two forces, one with a magnitude of 3 N and the other with a magnitude of 5 N, are applied to an object. For which orientations of the forces shown in the diagrams is the magnitude of the acceleration of the object the least?

(A) I (B) II (C) III (D) IV (E) V

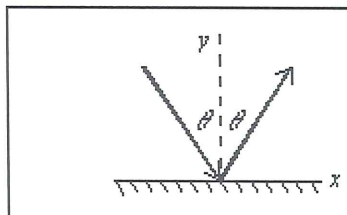


Problem 2

3.) A ball hits a wall and rebounds with the same speed, as diagrammed below. The changes in the components of the momentum of the ball are:

(A) $\triangle p_x > 0,\ \triangle p_y > 0$　(B) $\triangle p_x < 0,\ \triangle p_y > 0$

(C) $\triangle p_x = 0,\ \triangle p_y > 0$　(D) $\triangle p_x = 0,\ \triangle p_y < 0$　(E) none of above



Problem 3

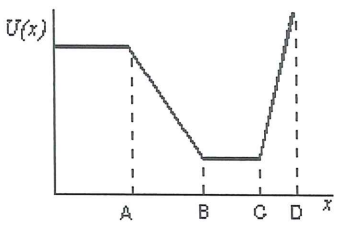
4.) 4.00 x 10^5 J of work are done on a 1228 kg car while it accelerates from 10.0 m/s to some final velocity. Find this final velocity.

(A) 30.1 m/s (B) 33.7 m/s (C) 24.7 m/s (D) 21.9 m/s (E) 27.4 m/s

5.) As a particle moves along the x axis it is acted by a conservative force. The potential energy is shown below as a function of the coordinate x of the particle. Rank the labeled regions according to the magnitude of the force, greatest to least.

(A) BC, CD, AB (B) BC, AB, CD (C) AB, CD, BC (D) CD, AB, BC

(E) none of above



Problem 5

6.) A 0.20-kg particle moves along the x axis under the influence of a stationary object. The potential energy is given by $U(x) = 8x^2 + 2x^4$, where U is in joules and x is in meters. If the particle has a speed of 5.0 m/s when it is at x = 1.0 m, its speed when it is at the origin is:

(A) 7.9 m/s (B) 5.7 m/s (C) 11 m/s (D) 2.5 m/s (E) 3.8 m/s

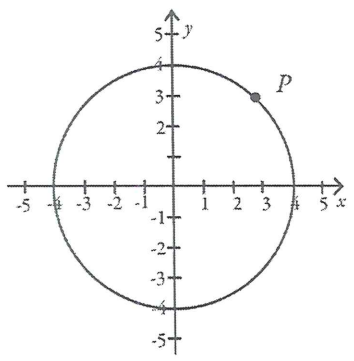
7.) You walk 55 m to the north, then turn 60° to your right and walk another 45 m. How far are you from where you originally started?

(A) 50 m (B) 94 m (C) 46 m (D) 65 m (E) 87 m

8.) Vector $\vec{A} = -3.00\ \hat{i} + 3.00\ \hat{j}$ and vector $\vec{B} = 3.00\ \hat{i} + 4.00\ \hat{j}$. What is vector $\vec{C} = \vec{A} + \vec{B}$?

(A) $0.00\ \hat{i} + 3.00\ \hat{j}$ (B) $0.00\ \hat{i} + 7.00\ \hat{j}$ (C) $7.00\ \hat{i} + 7.00\ \hat{j}$ (D) $-3.00\ \hat{i} + 7.00\ \hat{j}$ (E) $-3.00\ \hat{i} - 3.00\ \hat{j}$

9.) Point P in the figure indicates the position of an object traveling at constant speed clockwise around the circle. Which arrow best represents the direction of the acceleration of the object at point P?



(A) (B) (C) (D) (E)

10.) A stalled car is being pushed up a hill at constant velocity by three people. The net force on the car is
(A) zero. (B) up the hill and equal to the weight of the car. (C) down the hill and equal to the weight of the car.
(D) up the hill and greater than the weight of the car. (E) down the hill and greater than the weight of the car.

11.) A ball is tossed vertically upward. When it reaches its highest point (before falling back downward
(A) the velocity is zero, the acceleration is directed downward, and the force of gravity acting on the ball is directed downward.
(B) the velocity is zero, the acceleration is zero, and the force of gravity acting on the ball is zero.
(C) the velocity is zero, the acceleration is zero, and the force of gravity acting on the ball is directed downward.
(D) the velocity and acceleration reverse direction, but the force of gravity on the ball remains downward.
(E) the velocity, acceleration, and the force of gravity on the ball all reverse direction.

12.) A fish weighing 16 N is weighed using two spring scales, each of negligible weight, as shown in the figure. What will be the readings of the scales?

(A) The bottom scale will read 16 N, and the top scale will read zero.
(B) Each scale will read 16 N.
(C) The top scale will read 16 N, and the bottom scale will read zero.
(D) The scales will have different readings, but the sum of the two readings will be 16 N.
(E) Each scale will read 8 N.

13.) 0.0001776 can also be expressed as
(A) 1.776×10^{-3}. (B) 17.72×10^{4}. (C) 1772×10^{5}. (D) 177.2×10^{7}. (E) 1.776×10^{-4}.

14.) 0.00325×10^{-8} cm can also be expressed in mm as
(A) 3.25×10^{-12} mm. (B) 3.25×10^{-11} mm. (C) 3.25×10^{-10} mm. (D) 3.25×10^{-9} mm. (E) 3.25×10^{-8} mm.

15.) The number 0.003010 has

(A) 7 significant figures. (B) 6 significant figures. (C) 2 significant figures. (D) 4 significant figures. (E) none

16.) What is the sum of 1123 and 10.3 written with the correct number of significant figures?

(A) 1.13×10^3 (B) 1133.3000 (C) 1.1×10^3 (D) 1133.3 (E) 1133

17.) The shortest wavelength of visible light is approximately 400 nm. Express this wavelength in centimeters.

(A) 4×10^{-5} cm (B) 4×10^{-7} cm (C) 4×10^{-9} cm (D) 4×10^{-11} cm (E) 400×10^{-11} cm

18.) A certain CD-ROM disk can store approximately 6.0×10^2 megabytes of information, where 10^6 bytes = 1 megabyte. If an average word requires 9.0 bytes of storage, how many words can be stored on one disk?

(A) 5.4×10^9 words (B) 2.1×10^7 words (C) 6.7×10^7 words (D) 2.0×10^9 words (E) none of the above

19.) A spring with a spring constant of 11 N/m is stretched from equilibrium to 2.9 m. How much work is done in the process?

(A) 23 J (B) 46 J (C) 60 J (D) 72 J (E) 92 J

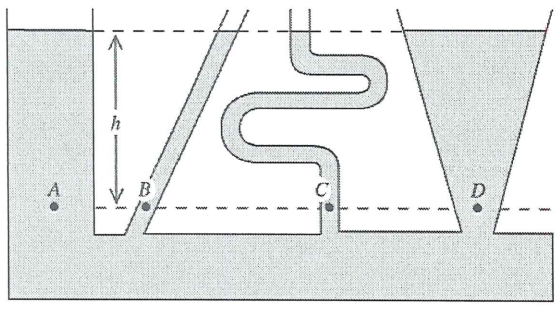
20.) 4.00×10^5 J of work are done on a 1228 kg car while it accelerates from 10.0 m/s to some final velocity. Find this final velocity.

(A) 21.9 m/s (B) 24.7 m/s (C) 30.1 m/s (D) 27.4 m/s (E) none of the above

21.) An object is undergoing simple harmonic motion. Throughout a complete cycle it:

(A) has constant speed. (B) has varying amplitude. (C) has varying acceleration.
(D) has varying mass. (E) has constant speed.

22.) Fluid fills the container shown in the figure. At which of the indicated points is the pressure greatest?



(A) A (B) B (C) C (D) D (E) The pressure is the same at each of the labeled points.

23.) Salt water is more dense than fresh water. A ship floats in both fresh water and salt water. Compared to the fresh water, the volume of salt water displaced by the ship is

(A) greater than the volume of fresh water. (B) less than the volume of fresh water. (C) the same as the volume of fresh water.

24.) A piece of wood is floating in a bathtub. A second piece of wood sits on top of the first piece, and does not touch the water. If the top piece is taken off and placed in the water, what happens to the water level in the tub?

(A) It goes up. (B) It goes down. (C) It does not change. (D) This cannot be determined without knowing the volume of the top piece of wood. (E) None of the above.

25.) 下列有關熱量的敘述，何者正確?

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