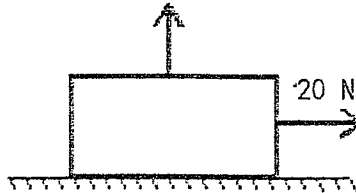


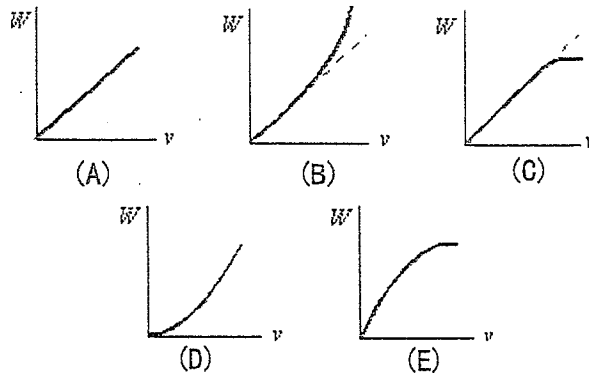
考試時間：八十分鐘

答題須知：請詳細閱讀下列試題，並請標明題號依試題順序將答案書寫於答案卷上。

1. A box with a weight of 80 N rests on a horizontal surface. A person pulls horizontally on it with a force of 20 N and it does not move. To start it moving, a second person pulls vertically upward on the box. If the coefficient of static friction is 0.4, what is the smallest vertical force for which the box moves? (14 %)

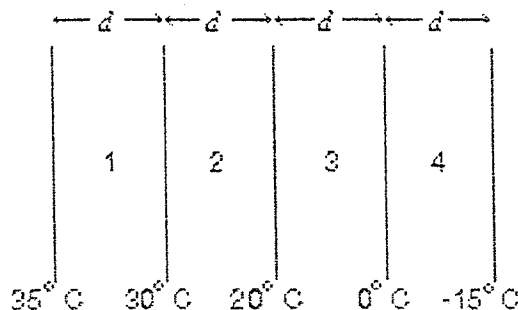


2. A crate is initially at rest on a horizontal frictionless table. A constant horizontal force F is applied. Which of the following five graphs is a correct plot of work W as a function of crate speed v ? (14 %)



3. When a certain string is clamped at both ends, the lowest four resonant frequencies are 40, 80, 120, and 160 Hz. When the string is also clamped at its midpoint, what is the lowest resonant frequency? (14 %)

4. The diagram shows four slabs of different materials with equal thickness, placed side by side. Heat flows from left to right and the steady-state temperatures of the interfaces are given. Rank the materials according to their thermal conductivities, smallest to largest. (14 %)

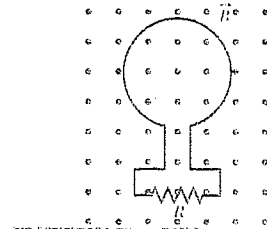


考試時間：八十分鐘

答題須知：請詳細閱讀下列試題，並請標明題號依試題順序將答案書寫於答案卷上。

5. What is the electric field vector at point $(3.00\hat{i} - 1.00\hat{j} + 4.00\hat{k})$ m if the electric potential is given by $V = 2.00xy^2z^3$ (unit in volt)? (14 %)

6. In the figure, the magnetic flux through the loop increases according to the relation $\Phi_B = 6.0t^2 + 7.0t$, where Φ_B is in milliwebers and t is in seconds. (a) What is the magnitude of the emf induced in the loop when $t = 2.0$ s? (b) Is the direction of the current through R to the right or left? (16 %)



7. Three polarizing sheets are placed in a stack with the polarizing directions of the first and third perpendicular to each other. What angle should the polarizing direction of the middle sheet make with the polarizing direction of the first sheet to obtain maximum transmitted intensity when unpolarized light is incident on the stack? (14 %)

- A) 0
- B) 30
- C) 45
- D) 60
- E) 90

