103 學年度四年制二、三年級轉學生招生考試

四技二年級 光電工程系

第二節 普通物理 試題

注意事項：

1.本試題共 6 題，配分共 100 分。
2.請標明大題、子題編號作答，不必抄題。
3.全部答案均須在答案卷之答案欄內作答，否則不予計分。

1.On level ground a ball is thrown with an initial velocity of $50\ m/s$ at 60^0 above the horizontal and feels no air resistance. Find the magnitude of tangential acceleration of this ball when it is in the height of $50\ m$ above the ground. 20%

2.As shown in Fig.1, a block with mass $m = 5\ kg$, slides down a surface inclined 36.9^0 to the horizontal. The coefficient of kinetic friction is 0.2. A string attached to the block is wrapped around a pulley on a fixed axis at O. The pulley has mass $2\ kg$ and radius $0.1\ m$. The string pulls the block without slipping. What is the acceleration of the block down the plane? 15%

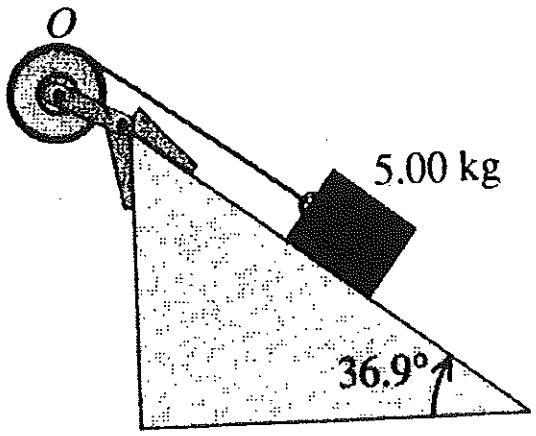

Fig.1

3.As shown in Fig.2, in the thermal process $i \to a \to f$, $\Delta Q = +50\ cal$ and $W = +20\ cal$; in the process $i \to b \to f$, $\Delta Q = +36\ cal$; then (a) in the process $i \to b \to f$, $W = ?$ (b) if from the curve $f \to i$, $W = -13\ cal$, then $\Delta Q = ?$ (c) if $U_i = 10\ cal$, then $U_f = ?$ (d) if $U_b = +22\ cal$, then in the process $i \to b$, $\Delta Q = ?$ 20%

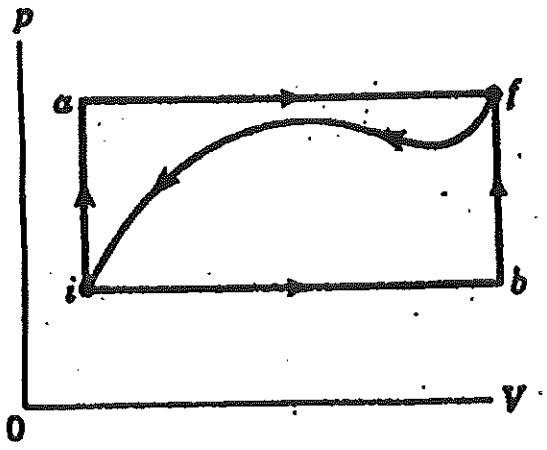

Fig.2

4.The equation of a transverse wave is giving by $y(x,t) = 2\cos[20x - 600t]\ mm$; the angle is in radians and the units of x and t are m and s respectively. Find the amplitude, frequency, wavelength, and phase velocity of this wave. 20%

5.A nonuniform, but spherically symmetric, distribution of charge has a charge density given as $\rho(r) = 3(1 - \frac{r}{R})$ for $r \le R$. Obtain the electric field at $r = \frac{R}{2}$. 15%

6.For thin lens shown in Fig.3, calculate the location of the image of an object that is 18 cm to the left of the lens. The lens material has a refractive index of 1.5. 10%

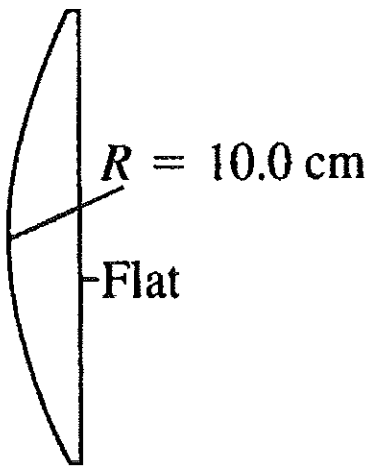

Fig.3