

國立高雄應用科技大學
九十七學年度碩士班招生考試
光電與通訊工程研究所

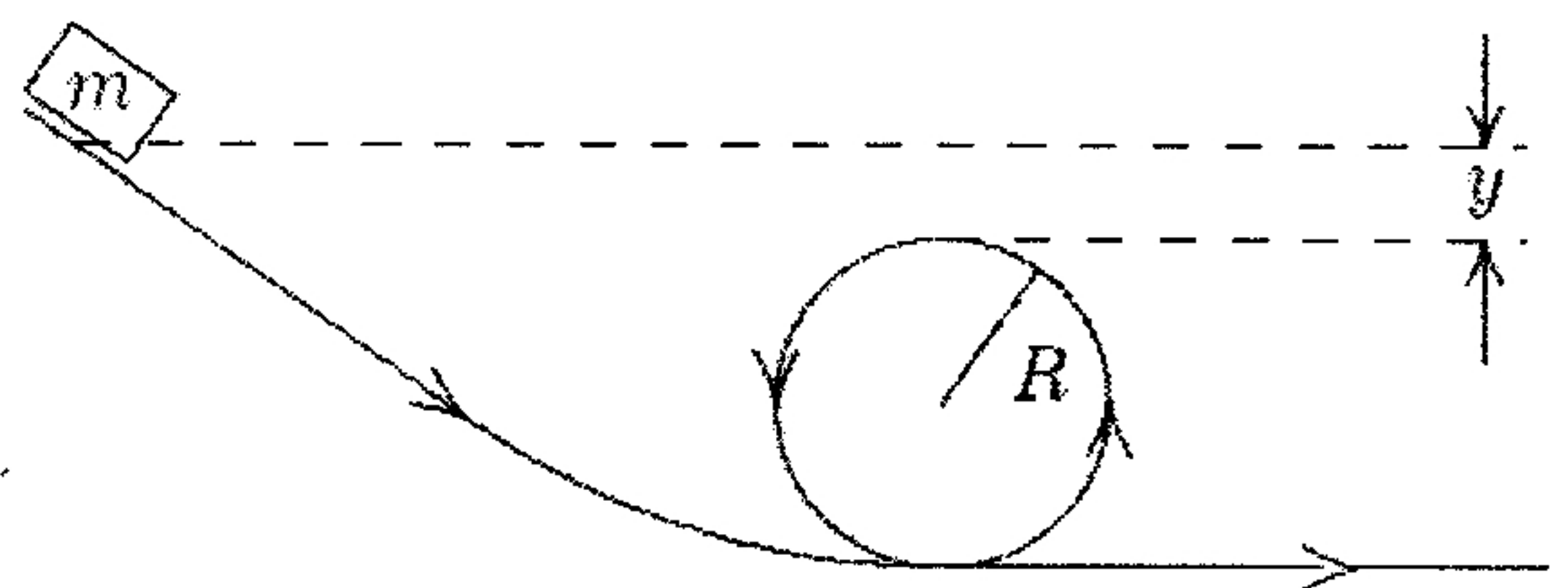
准考證號碼 (考生必須填寫)

普通物理

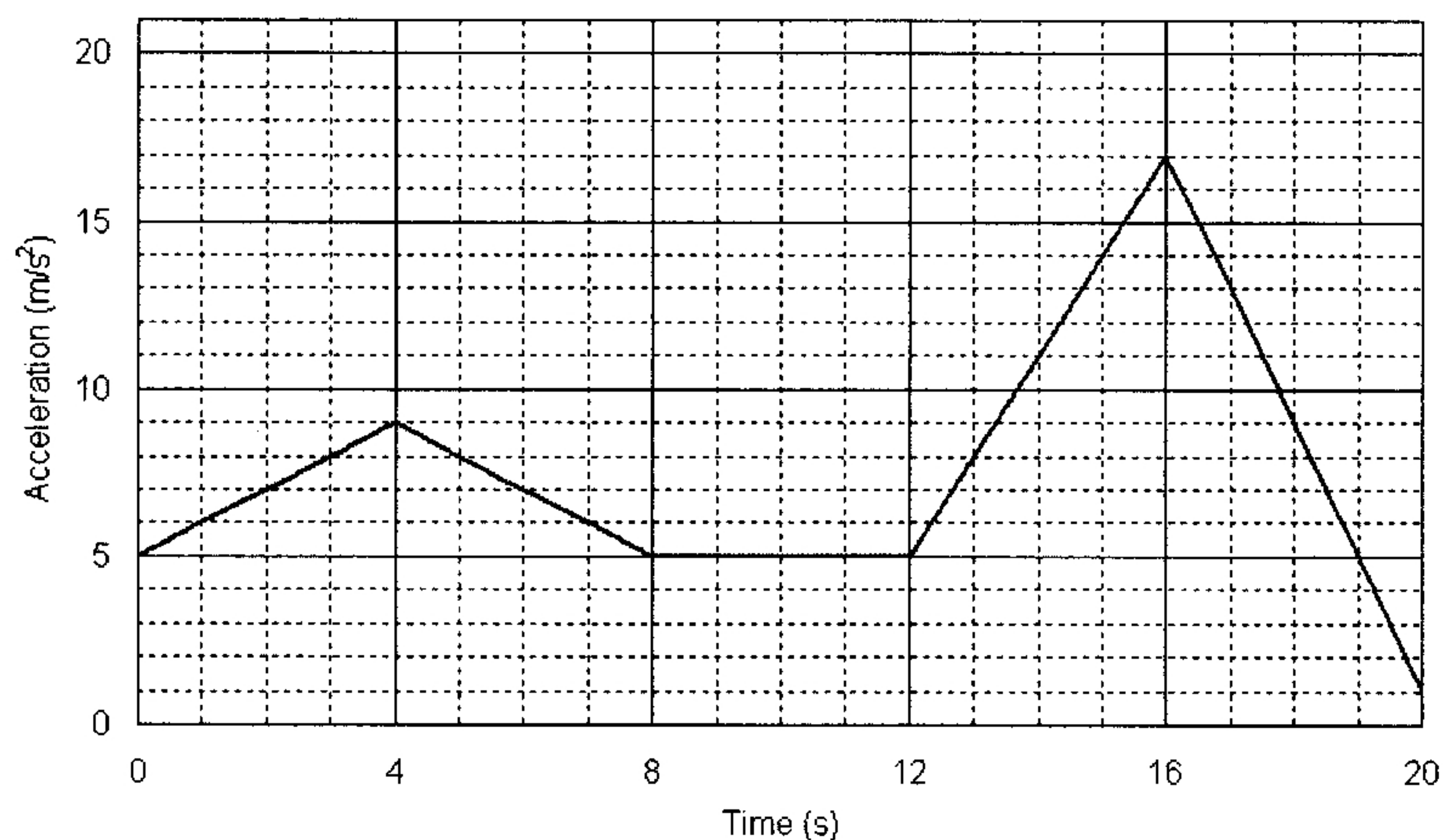
試題 共 2 頁，第 1 頁

- 注意：a. 本試題共 6 題，1~4 題每題 16 分，5~6 題每題 18 分，共 100 分。
b. 作答時不必抄題。
c. 考生作答前請詳閱答案卷之考生注意事項。
d. 請詳述計算過程。

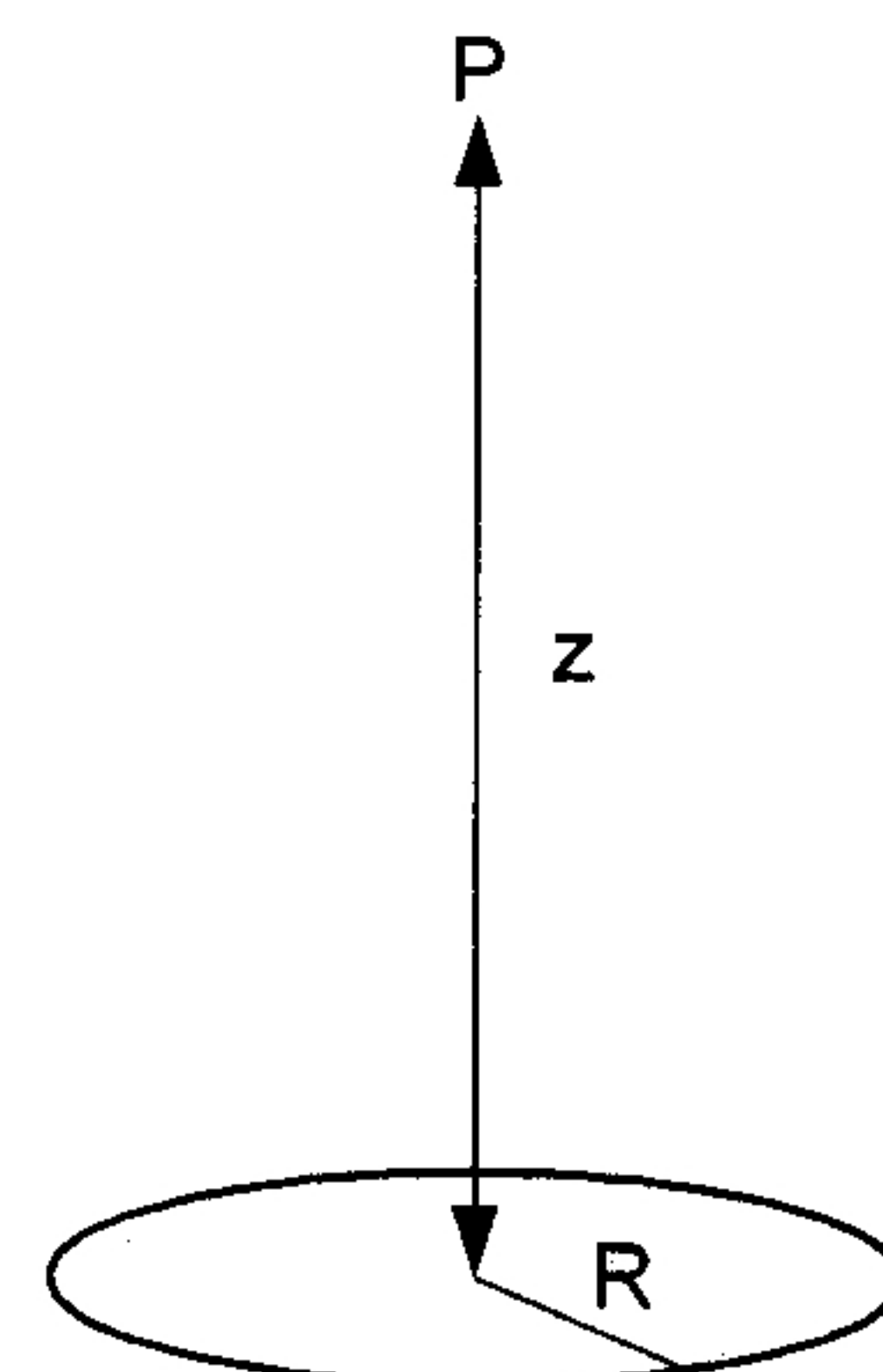
1. A small object of mass m starts from rest at the position shown as the left of the following figure and slides along the frictionless loop-the-loop track of radius R . What is the smallest value of y such that the object will slide without losing contact with the track?
(16 points)



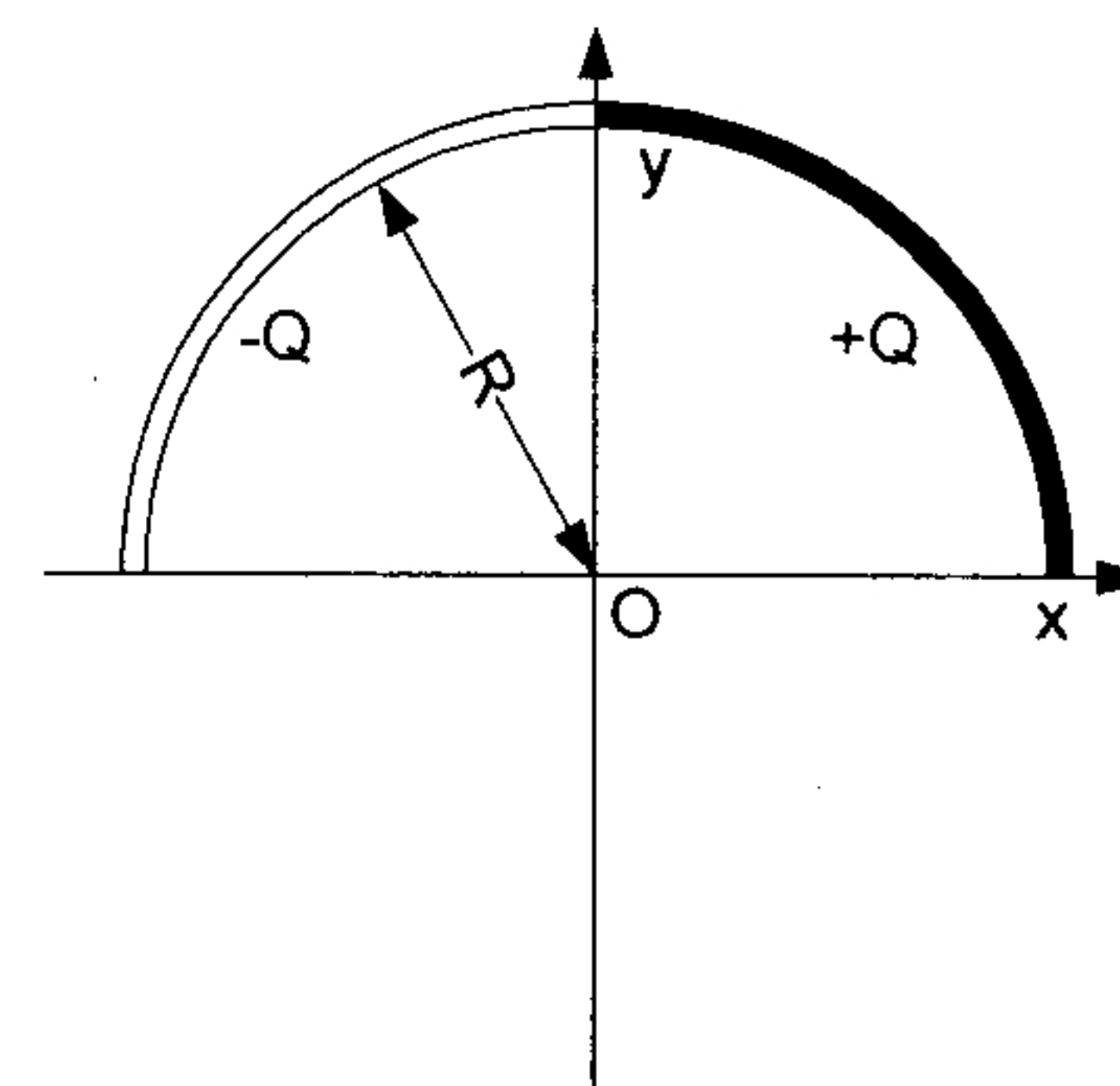
2. In the following figure, the speed at $t=4$ s is 2 m/s, find the displacement from $t=8$ s to $t=12$ s. (16 points)



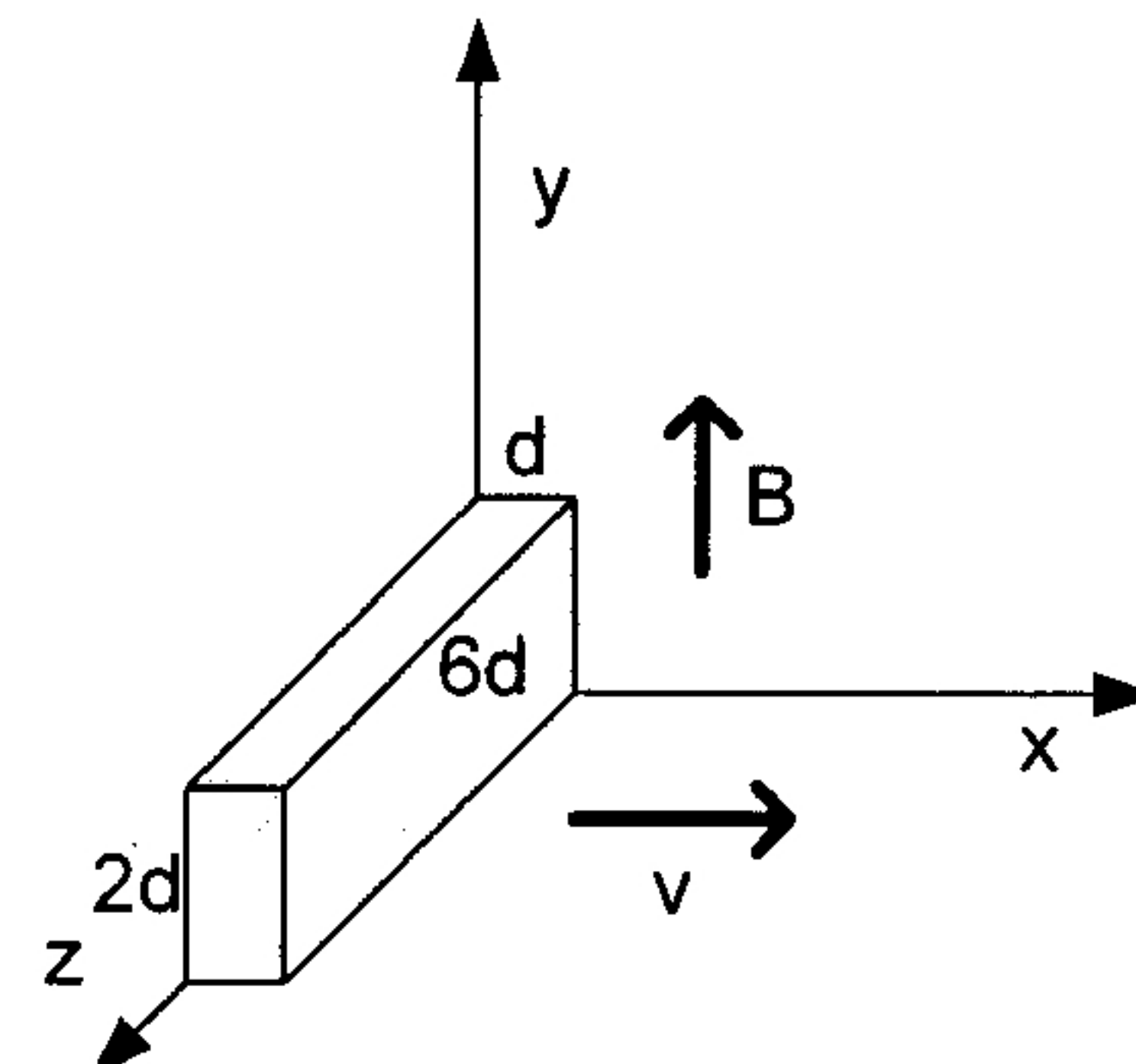
3. A plastic disk of radius R that has a uniform charge density σ on its top surface. Find the electric potential at point P on the central axis of the disk. The distance between P and the center of the disk is z . (16 points)



4. 右圖有兩個均勻帶電且半徑為 R 之絕緣弧形薄物體，若其總帶電量分別為 $-Q$ 及 $+Q$ ，求在圓心 O 處之總電場大小(12 points)及方向(4 points)。



5. A conducting rectangular solid of dimensions d , $2d$, and $6d$ moves at constant velocity $\vec{v} = v\hat{i}$ through a uniform magnetic field $\vec{B} = B\hat{j}$. What are the resulting (a) electric field within the solid, in unit-vector notation (12 points), and (b) potential difference across the solid (6 points)?



6. A closed loop carries current i . The loop consists of two radial straight wires and two concentric circular arcs of radii R and $2R$. The angle θ is $\pi/2$ rad. What are the (a) magnitude (12 points) and (b) direction (into or out of the page) of the net magnetic field at the center of curvature P (6 points)?

