



### PROBLEM 14.40

A 40-lb block  $B$  is suspended from a 6-ft cord attached to a 60-lb cart  $A$ , which may roll freely on a frictionless, horizontal track. If the system is released from rest in the position shown, determine the velocities of  $A$  and  $B$  as  $B$  passes directly under  $A$ .

### SOLUTION

Conservation of linear momentum:

Since block and cart are initially at rest,

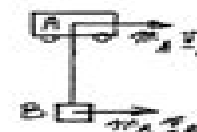
$$\mathbf{L}_0 = 0$$

Thus, as  $B$  passes under  $A$ ,

$$\mathbf{L} = m_A \mathbf{v}_A + m_B \mathbf{v}_B = 0$$

$$\rightarrow +, m_A v_A + m_B v_B = 0$$

$$v_A = -\frac{m_B}{m_A} v_B$$



Conservation of energy:

Initially,

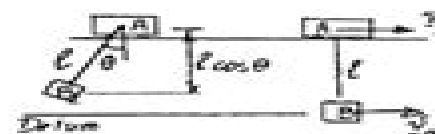
$$T_0 = 0$$

$$V_0 = m_B g l (1 - \cos \theta)$$

As  $B$  passes under  $A$ ,

$$T = \frac{1}{2} m_A v_A^2 + \frac{1}{2} m_B v_B^2$$

$$V = 0$$



Thus,

$$T_0 + V_0 = T + V; \quad m_B g l (1 - \cos \theta) = \frac{1}{2} m_A v_A^2 + \frac{1}{2} m_B v_B^2$$

Substituting for  $v_A$  from (1) and multiplying by 2:

$$\begin{aligned} 2m_B g l (1 - \cos \theta) &= m_A \left( \frac{m_B^2}{m_A^2} v_B^2 \right) + m_B v_B^2 \\ &= \left( \frac{m_B^2}{m_A} + m_B \right) v_B^2 = m_B \frac{m_B + m_A}{m_A} v_B^2 \\ v_B &= \sqrt{\frac{2m_A}{m_A + m_B} g l (1 - \cos \theta)} \end{aligned} \quad (2)$$

# Vector Mechanics Solution Manual 9th

**K.J Bathe**



## **Vector Mechanics Solution Manual 9th:**

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to obtain maximum value from the new powerful tools of analysis

**The Publishers' Trade List Annual** ,1980

**Technical Books in Print** ,1966

**Applied Mechanics Reviews** ,1948

Books in Print Supplement ,1994

*The*

*Shock and Vibration Digest* ,1995

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*Journal of Engineering Mechanics* ,1999

**Rider Papers on Euclid (books I. and II.)** Rupert Deakin,1891

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*Books in Print* ,1997

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Bulb ! [AMANDA laughs nervously. LEGEND: 'SUSPENSION ... The Glass Menagerie: Acting Edition: Tennessee Williams A new introduction by the editor of The Tennessee Williams Annual Review, Robert Bray, reappraises the play more than half a century after it won the New York ... The Daily Bible by Smith, F. LaGard The Daily Bible® makes it simple by organizing the whole of Scripture in chronological order, as well as presenting Proverbs topically and the Psalms by themes. The Daily Bible® - In Chronological Order (NIV®) As this unique, chronological presentation of God's story daily unfolds before you, you will begin to appreciate God's plan for your life as never before. The Daily Bible (NIV) As this unique, chronological presentation of God's story daily unfolds before you, you will begin to appreciate God's plan for your life as never before. The Daily Bible - In Chronological Order (NIV) - eBook ... - enable you to focus on specific aspects of God's wisdom. The Daily Bible - In Chronological Order (NIV) - eBook (9780736983211) by F. LaGard Smith. The Daily Bible - F. LaGard Smith The Daily Bible® in chronological order with 365 daily readings with devotional insights by F. LaGard Smith to guide you through God's Word (NIV). Check It Out ... The Daily Bible (NIV) by F. LaGard Smith, Paperback As this unique, chronological presentation of God's story daily unfolds before you, you will begin to appreciate God's plan for your life as never before. The Daily Bible® - In Chronological Order (NIV®) As this unique, chronological presentation of God's story daily unfolds before you, you will begin to appreciate God's plan for your life as never before. 365 Daily Readings In Chronological Order, Paperback New International Version Bible (NIV) arranged chronologically for 365 daily readings ... LaGard Smith is the author of more than 30 books and is the compiler and ... The Daily Bible: In Chronological Order 365 Daily Readings In the hardcover edition of the bestselling and much-loved chronological presentation of the Bible, God's story unfolds before readers each new day, ... The Daily Bible (niv) - By F Lagard Smith (hardcover) As this unique, chronological presentation of God's story daily unfolds ... It's also in chronological order so it's more interesting how it all went in order.