



Antal blad /  
Number of sheets

03



# TENTAMEN / EXAMINATION

## Anvisningar:

Skriv din anonymitetskod på varje blad.  
Endast en uppgift får lösas på varje blad.  
Var vänlig skriv tydligt!

## Instructions:

Write your anonymous code on each sheet.  
Answer only one question on each sheet.  
Please write clearly!

Vänligen texta anonymitetskoden i textboxen enligt exempel nedan!  
Please write the Anonymous Code clearly in the textbox like example below!

### Bokstäver/Letters:

A-B-C-D-E-F-G-H-I-J-K-L-M-N-O  
P-Q-R-S-T-U-V-W-X-Y-Z-Å-Ä-Ö

### Siffror/Numbers:

Ø-1-2-3-4-5-6-7-8-9

Exempel:

A B C 1 7 Ø - Ø 1 7

Mekanik

MSG1321

Kurskod + Kurs / Course Code + Course:

Delkurs / Part course:

Anonymitetskod / Anonymous code =  
Kurskod + kodnr / course code + code number

MSG1321 - Ø12



Tentamensdatum /  
Examination date:

26/8-2017

## Behandlade uppgifter / Solved problems

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
X	X	X												
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

## Ifylles av lärare / To be completed by the examiner

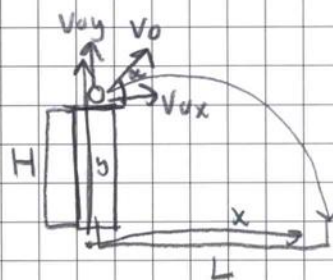
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
10	8	0												
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

Poäng / Marks gained: 18

Betyg / Grade: Examin. lärare / Kursansvarig signatur / Signature of the examiner

Max poäng / Total marks gained: Namnförtydligande / Clarification of the signature

För Gk poäng / Marks gained to be passed:



1 a,

Vid konstant acc.

$$S = S_0 + V_0 t + \frac{a t^2}{2}$$

$$V = V_0 + a t$$

$$y = H + (V_0 \sin \alpha) \cdot t - \frac{g t^2}{2}$$

$$0 = H + V_0 \sin \alpha \cdot t - \frac{g t^2}{2}$$

$$H = -V_0 \sin \alpha \cdot t + \frac{g t^2}{2} \quad R$$

b,

$$x = x_0 + V_0 \cos \alpha \cdot t + \frac{a t^2}{2}$$

$$x = V_0 \cos \alpha \cdot t$$

$$L = V_0 \cos \alpha \cdot t$$

$$t = \frac{L}{V_0 \cos \alpha} \quad R$$

c,

$$V_x = V_0 + \frac{a t^2}{2}$$

$$V_x = V_0 \cos \alpha + \frac{a t^2}{2}$$

$$V_x = V_0 \cos \alpha$$

$$V_y = V_0 \sin \alpha + \frac{a t^2}{2}$$

$$V_y = V_0 \sin \alpha - \frac{g t^2}{2}$$

$$V_y = V_0 \sin \alpha - \frac{g \left( \frac{L}{V_0 \cos \alpha} \right)^2}{2} \quad R$$

$$V = \sqrt{V_x^2 + V_y^2}$$

$$V = \sqrt{(V_0 \cos \alpha)^2 + \left( V_0 \sin \alpha - \frac{g \left( \frac{L}{V_0 \cos \alpha} \right)^2}{2} \right)^2} \quad R$$

The speed is V



2

$$k = 4 \text{ kN/m}$$

$$E_A = E_B$$

$$T + V = T + V$$

$$U_{12} = \Delta T + \Delta V$$

$$U_{12} = -\frac{1}{2} \cdot 4000 (0,05)^2 - (0)^2 = -50$$

$$\frac{mv^2}{2} + m g \Delta x + \frac{k \Delta x^2}{2} = -50$$

$$8 \cdot 9,81 \cdot \Delta x + \frac{4 \Delta x^2}{2} = -50$$

$$8 \cdot 9,81 \cdot \Delta x + \frac{4000 \cdot \Delta x^2}{2} = -50$$

$$8 \cdot 9,81 \cdot (s_2 - 0,05) + \frac{4000 \cdot (s_2 - 0,05)^2}{2} = -50$$

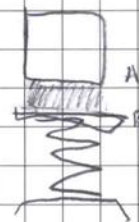
$$78,48 s_2 - 3,924 + \frac{4000 s_2^2 - 10}{2} = -5$$

$$78,48 s_2 + 2000 s_2^2 = 3,924$$

$$s_2^2 + 0,03924 s_2 - 0,001962 = 0$$

$$s_2 = -0,01962 \pm \sqrt{0,0003849 + 0,001962}$$

$$s_2 = 0,020 = 20 \text{ mm}$$



$$\frac{1}{2} k [y_2^2 - y_1^2]$$





Ange anonymitetskod / Write your anonymity code  
(Vid icke anonym tentamen ange kurskod + namn + personnummer)  
(For non-anonymous exams write the course code + name + civic registration number)

MSGB21-012

Löpande sidnr  
Consecutive no:

3

Uppgift nr /  
Question no:

3

Poäng / Points  
awarded:

0

Lärarens  
anteckning  
Examiner's remarks:

$$m = 20 \text{ kg}$$

$$L = 1,6 \text{ m}$$

$$F = m \cdot a$$

$$I = \text{Moment} \cdot \alpha$$

$$I = (20 \cdot 0,8) \cdot \alpha$$

$$F = m \cdot a$$

$$I = 20 \cdot 0,8$$

X