

**E046 Online Test**

Ref67

A rolling object has linear velocity 342.5 m/s radius =3 m mass =170 kg Calculate total kinetic energy.

A	$1.5 \times 10^7 \text{ J}$	B	$3 \times 10^7 \text{ J}$
C	$4.5 \times 10^7 \text{ J}$	D	$6 \times 10^7 \text{ J}$
Answer			

Ref70

On a hot day in Las Vegas, an oil tanker loaded 37000 L of diesel fuel. It encounters cold weather on Utah where temperature was 23 Degree K lower than in Las Vegas. How many litres did it deliver?

Volume expansion for diesel fuel is  $9.5 \times 10^{-4} / \text{Deg C}$  coefficient of linear expansion is  $11 \times 10^{-6} / \text{deg c}$

A	18380 L	B	36190 L
C	20000 L	D	10000 L
Answer			

Ref73

A cylinder contains 12 L of oxygen at 20 deg C and 15 atm. The temperature is raised to 35 deg C and the volume is reduced to 8.5L . What is the final pressure of the gas in atmosphere.?

A	22 atm	B	33 atm
C	11 atm	D	44 atm
Answer			

Ref76

Three Carnot engines operate between reservoir temperatures of (a) 400 deg K and 500 deg K (b) 600 and 800 deg K (c) 400 and 600 deg K. rank the engines according to thermal efficiencies. Greatest first.

A	c, b, a	B	a, b, c
C	b, c, a	D	Equal
Answer			

Ref80

A wave travelling along a string is described by  $Y(x,t) = 0.00328 \sin(97.1x - 2.92t)$

- What is the amplitude of this wave?
- What are the wave length, period and frequency of this wave?
- What is the velocity of this wave?
- What is the displacement  $Y$  at  $X = 22.5$  cm and  $t = 18.9$  sec?

A	7 mm, 0.01m, 7 rad/s, 4 sec, 0.5HZ, 0.04 m/s	B	2.27 mm, 0.0871m, 2.72 rad/s, 2.31sec, 0.432HZ, 0.0377 m/s
C	1 mm, 0.015m, 10 rad/s, 7 sec, 0.7HZ, 0.02 m/s	D	
Answer			

Ref83

A pitcher tosses a base ball up along  $Y$  axis with initial velocity 14 m/s. (a) How long does the ball take to reach it's maximum height? (b) What is the maximum height above it's release point? (c) How long does the ball take to reach a point 5 m above it's release point?

A	4 sec, 10m, 3 sec, 1.5 sec	B	8 sec, 20m, 4 sec, 2 sec
C	1.2 sec, 10m, 1.9 sec, 0.5 sec	D	1.2 sec, 7.3m, 1.9 sec, 0.53 sec
Answer			

Ref86

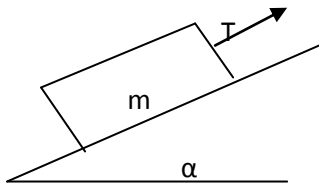
$a = 4i + 5j + 7k$   $b = 3i + j + 4k$  Find  $a \cdot b$

A	75	B	25
C	15	D	5
Answer			

Ref89

$m = 5 \text{ kg}$   $\alpha = 30 \text{ deg}$

Cord A cord pulls on a box up along a frictionless plane



inclined at  $\alpha = 30 \text{ degree}$ . The box has mass  $m = 5 \text{ kg}$

The speed from the cord has magnitude  $T = 30\text{N}$ . What is acceleration of the box?

A	$0.1 \text{ m/s}^2$	B	$1 \text{ m/s}^2$
C	$0.01 \text{ m/s}^2$	D	$2 \text{ m/s}^2$
Answer			

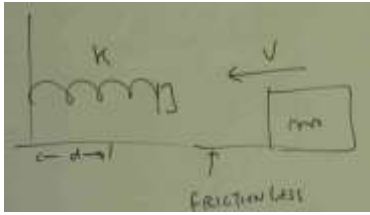
Ref92

If a falling cat reaches a first terminal speed of  $97 \text{ Km/hr}$  while it is tucked in and then stretches out, doubling  $A$ , how fast is it falling when it reaches a new terminal speed?

A	$3.4 \text{ m/s}$	B	$1.7 \text{ m/s}$
C	$13.6 \text{ m/s}$	D	$6.8 \text{ m/s}$
Answer			

Ref95

A mass  $0.4 \text{ Kg}$  slides across a horizontal frictionless counter with speed  $V = 0.5 \text{ m/s}$ . It then runs and compresses a spring of spring constant  $K = 750 \text{ N/m}$ . Calculate the distance the spring compressed.



A	1.2 cm	B	2.4 cm
C	3.6 cm	D	4.8 cm
<b>Answer</b>			

Ref98

The angular position  $\Theta(t)$  of a reference line on the disk is given by  $\Theta = -1 - 0.6t + 0.25 t^2$

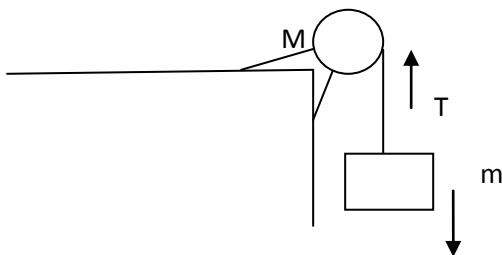
(a) Graph the angular position of the disk versus time ( -3 to 5.4 sec)

(b) At what time does  $\Theta(t)$  reach minimum value? What is the minimum value?

A	1.2 sec, 77 Deg	B	2.4 sec, 97 Deg
C	1.2 sec, 30 Deg	D	3 sec, 45 Deg
<b>Answer</b>			

Ref101

Figure shows a uniform disk with mass  $M = 2.5$  kg,  $R = 20$  cm. A block of  $m = 1.2$  kg hangs from a massless cord. Find acceleration of falling block.



A	$9.3 \text{ m/s}^2$	B	$4 \text{ m/s}^2$
C	$18 \text{ m/s}^2$	D	$3.8 \text{ m/s}^2$
<b>Answer</b>			

Ref97

The figure shows a uniform metal plate "P" of radius "2R" from which a disk of radius "R" has been stamped out. Using the X-Y co-ordinate system shown, locate the centre of mass of the plate.



A	$X_t = R/4, Y_t = R$	B	$X_t = R, Y_t = R$
C	$X_t = R/2, Y_t = R/2$	D	$X_t = R/3, Y_t = 0$
<b>Answer</b>			

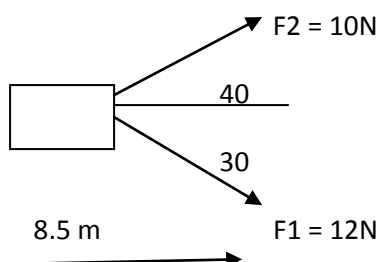
Ref99

A grind stone rotates at a constant angular acceleration  $\alpha = 0.85 \text{ rad/s}^2$ . At time  $t = 0$ , it has angular velocity  $\omega_0 = -4.6 \text{ rad/s}$  and a reference line on it is horizontal at the angular position  $\theta = 0$

- At what time after  $t = 0$  is the reference line at angular position  $\theta = 5 \text{ rev}$
- Describe the rotation between  $t = 0$  and  $t = 32 \text{ sec}$ .
- At what time  $t$ , does the grind stone momentarily stop?

A	16 sec, $0.1 \text{ rad/s}^2$ , 13 sec	B	32 sec, $-0.35 \text{ rad/s}^2$ , 13 sec
C	48 sec, $-0.7 \text{ rad/s}^2$ , 20 sec	D	16 sec, $0 \text{ rad/s}^2$ , 13 sec
<b>Answer</b>			

Ref94



Find total work done of the forces.

A	306J	B	153J
C	469J	D	73J
Answer			