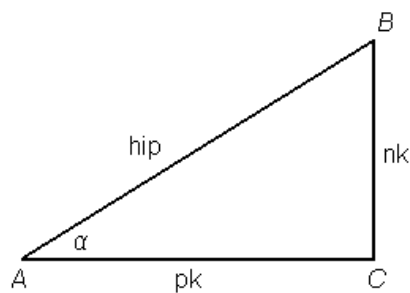


UČNI LIST ZA KOTNE FUNKCIJE (UPORABA MATEMATIKE V FIZIKI):

a) Definicija kotnih funkcij v pravokotnem trikotniku:



hip = hipotenuza
nk = nasprotna kateta
pk = priležna kateta

Sinus: $\sin \alpha = \frac{nk}{hip}$

Kosinus: $\cos \alpha = \frac{pk}{hip}$

Tangens: $\tan \alpha = \frac{nk}{pk}$

Kotangens: $\cot \alpha = \frac{pk}{nk}$

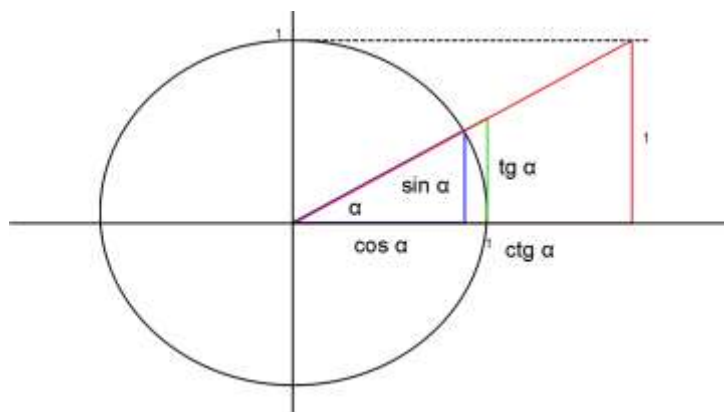
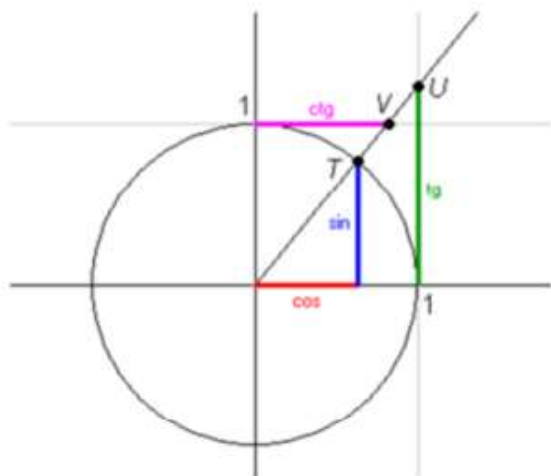
Sekans: $\sec \alpha = \frac{hip}{pk}$

Kosekans: $\csc \alpha = \frac{hip}{nk}$

b) Vrednosti kotnih funkcij kotov 30° , 45° , 60° , 90° :

	0°	30°	45°	60°	90°
$\sin \alpha$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
$\cos \alpha$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0
$\tan \alpha$	0	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	/
$\cot \alpha$	/	$\sqrt{3}$	1	$\frac{\sqrt{3}}{3}$	0

c) Definicija kotnih funkcij v enotskem krogu:



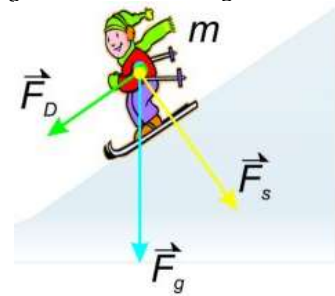
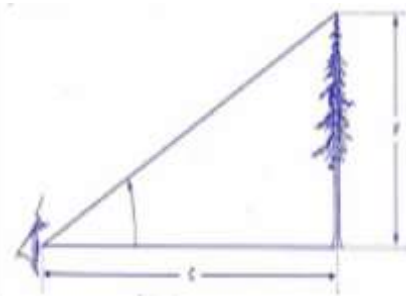
d) Uporaba kotnih funkcij v fiziki:

1. Klanec: $\tan \alpha = \frac{y}{x} \cdot 100\%$

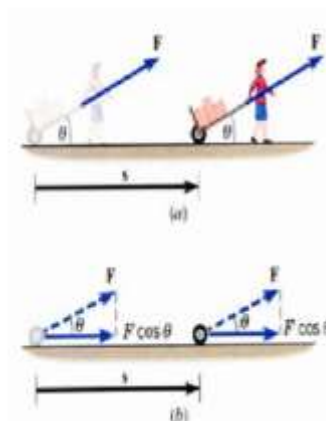
2. Višina objekta: $\tan \alpha = \frac{y}{x}$

3. Razstavljanje sil:

$$F_s = F_g \cdot \cos \alpha; F_d = F_g \cdot \sin \alpha$$



4. Delo sile na dani poti:



Delo sile F je definirano kot komponenta sile v smeri gibanja pomnožena s premikom:

$$A = F_x s = F s \cos \theta = \vec{F} \cdot \vec{s}$$

Enota za delo je Joule:

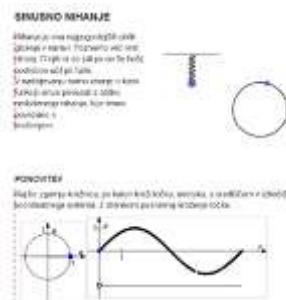
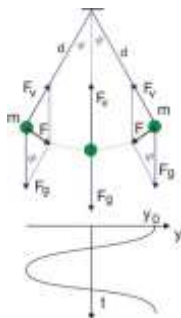
$$1 \text{ J} = 1 \text{ Nm} = 1 \text{ kg m}^2/\text{s}^2$$

1. primer: $\varphi = 0^\circ$: $A =$

2. primer: $\varphi = 90^\circ$: $A =$

3. primer: $\varphi = 180^\circ$: $A =$

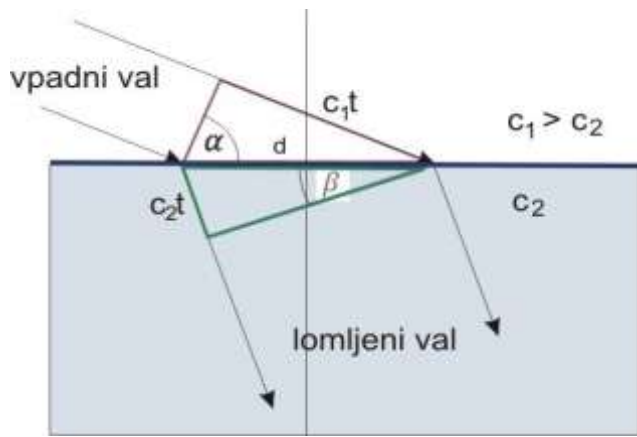
5. Nihanje: $s(t) = s_0 \sin(\omega t)$



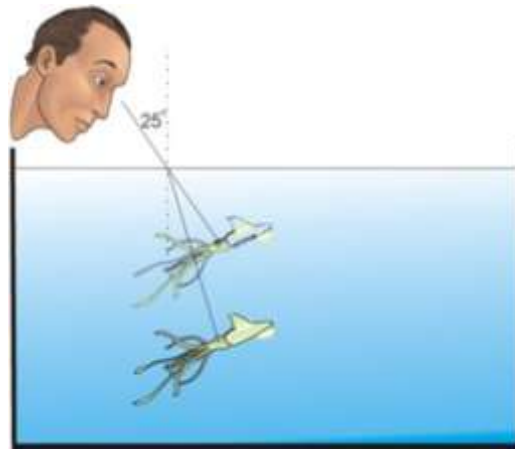
6. Valovanje: $s(x,t) = s_0 \sin(kx - \omega t)$



6. Lom valovanja: $\frac{\sin \alpha}{\sin \beta} = \frac{c_1}{c_2} = \frac{\lambda_1}{\lambda_2} = \frac{n_2}{n_1}$



7. Preslikovanje z lomom: $b \cdot \tan \alpha = a \cdot \tan \beta$

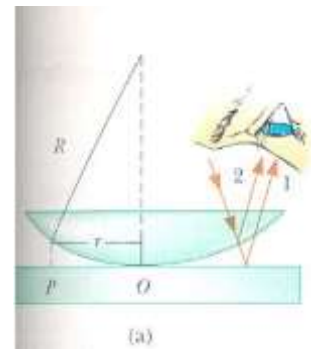


7. Interferenca valovanja: OJAČITEV: $d \cdot \sin \alpha_N = \pm N \lambda$ OSLABITEV: $d \cdot \sin \alpha_N = \pm (2N + 1) \frac{\lambda}{2}$

NA VODNI GLADINI

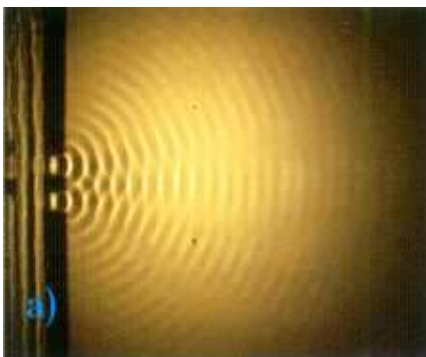


SVETLOBE NA TANKIH PLASTEH



8. Uklon valovanja

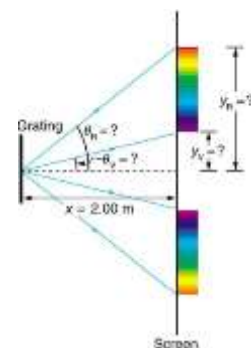
Na dveh ozkih režah



Svetlobe na uklonski mrežici



Merjenje valovne dolžine svetlobe

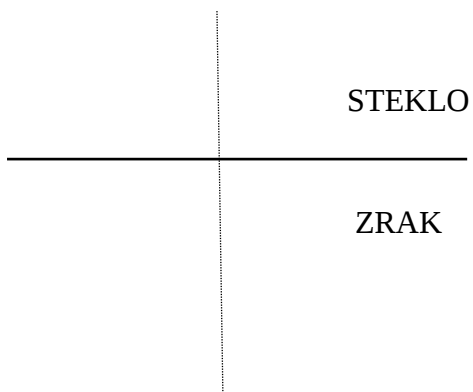


OJAČITEV:
 $d \cdot \sin \alpha_N = \pm N \lambda$

Naloge:

1. Svetloba se lomi na prehodu iz stekla v zrak.

a) Nariši prehod žarka iz stekla v zrak. Kako imenujemo ta lom svetlobe?



b) Koliko je vpadni kot, če se v zraku lomi pod kotom 60° ? Lomni količnik stekla je 1,45.

c) Kolikšen je vpadni kot, pri katerim nastopi popolni odboj? Nariši prehod žarka iz stekla v zrak v tem primeru.

A $33,6^\circ$

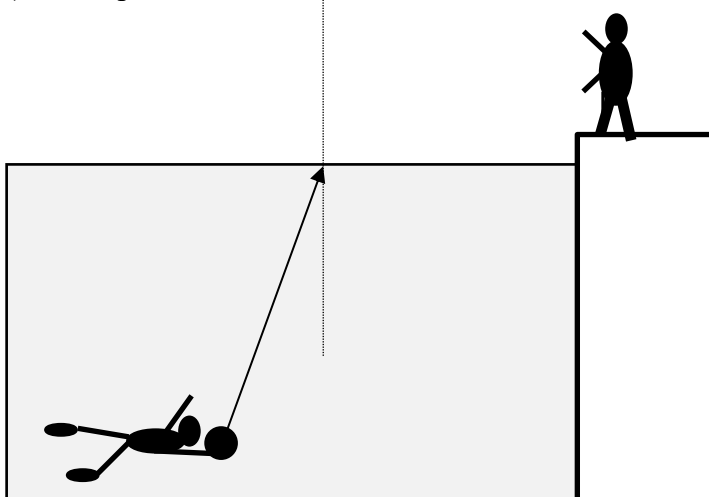
B $43,6^\circ$

C $45,6^\circ$

D $48,6^\circ$

2. Potapljač posveti z baterijo pod kotom 30° glede na navpičnico proti gladini vode. Lomni količnik vode je 1,33.

a) Nariši potek žarka iz vode v zrak in označi kote. Pod kakšnim kotom vidi svetlobo opazovalec na bregu?



b) Potapljač se nahaja 20m pod gladino. Na kakšni globini vidi potapljača opazovalec na bregu? Nariši in izračunaj navidezno globino potapljača!