EXAM6

class2013						
R#	exam1	exam2	exam3	exam4	exam5	exam6
R00037897	50	34	34	100	100	75
R00223777	50	67	84	100	84	100
R00287049	67	100	84	100	84	100
R00715213	83	67	50	100	100	75
R00761392	83	67	100	100	100	
R00785134	17	50	50	100	100	75
R00838484	17	67	84	100	84	75
R00859969	17	66	34	100	100	75
R00870071	50	17	100	100	100	100
R00894889	50	67	100	100	100	100
R00895168	83	50	34	100	100	75
R00895511	100	84	100	100	100	
R00897586	34	34	17	100	100	100
R00900602	100	84	70	100	100	100
R00903220	100	84	34	100	100	75
R00906938	100	100	100	100	100	
R00915262	83	50	50	100	100	75
R00921430	100	100	100	100	100	
R00921736	100	100	100	100	100	
R00923038	100	50	100	100	100	75
R00928851	50	34	100	100	84	75
R00940836	83	66		100	84	100
R00943226	50	84	100	100	100	100
R00976816	100	84	100	100	100	
R00981453	83	100	100	100	100	100
R00982692	17	66	34	100	100	100
R00997132	83	50	100	100	100	75
R01006514	34	50	100	100	100	75
R01011603	67	100	100	100	100	
R01023637	84	67	100	100	100	100
R01025726	34	67	100	100	100	100
R01066687	67	50	100	100	100	75
R01073358	83	100	100	100	100	
R01298882	100	100	100	100	100	

Phys. 2140. Summer 2012. Exam 6

1. Light of wavelength 624 nm is incident perpendicularly on a polymer film (refraction index n=2) suspended in air. What is the thickness of the film, for which the light transmission is a maximum?

$$2L = \left(m + \frac{1}{2}\right)\lambda - \frac{\lambda}{2} \Rightarrow L = \frac{\lambda}{2n} = 156nm$$

We have taken into account that the reflection from the optically dense material adds $\lambda/2$.

2. A slit 1 mm wide is illuminated by light of wavelength 600 nm. We see a diffraction pattern on a screen 2 m away. What is the distance between two first diffraction minima on the same side of the central diffraction maximum?

$$\Delta y = \frac{L\lambda}{a} = 0.6mm$$

3. In a certain two-slit interference pattern, 10 bright fringes lie within the second peak of the diffraction envelope and diffraction minima coincide with two slit interference maxima. What is the ratio of the slit separation to the slit width?

$$\frac{d}{a} = \frac{10+2}{2} = 6$$

4. How much work must be done to increase the speed of a **proton** from 0.98c to 0.99c?

$$Mc^2\left(\frac{1}{\sqrt{1-0.99^2}} - \frac{1}{\sqrt{1-0.98^2}}\right) \approx 2\,\text{GeV}$$