Simple exercises for Wednesday

A proton beam is injected in a synchrotton with the energy of 700keV, accelerated and extracted at the energy of 100 MeV. The dipolar magnetic field in the synchrotron during the acceleration

A) Increases quadratically with the magnetic rigidity
B) Is kept constant
C) Increases linearly with the magnetic rigidity

The revolution frecuency of a 600 MeV in a synchrotron with a 100 m circumference is

A) Higher than 100 kHz
B) Equal to 100 kHz
C) Lower than 100 kHz

$\gamma = 1.64$, $\beta = 0.79$, v = 2.38e8 m/sec, To = 4.2e-07 sec, fo = 2.38 MHz

During the acceleration at the LHC from 400 GeV to 6.5 TeV the transverse emittance

A) Is kept constant
B) Increases
C) Decreases

Simple exercises for Wednesday

A synchrotron for electrons at 2 GeV with a circumference of 408 m has a rf system with the frecuency of 500 MHz. The maximum number of bunches which can be stored is

A - > 500

B - = 500

C - < 500

$\gamma = 3915$, $\beta = 1$, v = 3e8 m/sec, $T_o = 1.36e\text{-}06$ sec, $f_o = 0.735$ MHz, $h = f_{rf}/f_o = 680$

At LHC the luminosity per bunch is $L_{bunch} = 10^{32}$ $cm^{-2}seg^{-1}$. To increase it is more effective:

A – decreasing by 10% the β^* value in both transverse plane

B – increase by 10% the n. of particles per bunch

C – they are two equivalent effects

In a target used for diagnostics along a Linac the beam spot appears as in the figure.

If you have a single image, and don't know the emittances, can you deduce:

A – $\beta_x = \beta_y$

B – $\beta_x > \beta_y$

C – the relationship between β_x and β_y cannot be deduced