

EGA Sample Exam 2008 – Solutions

1a) Imagine a naïve model of the Big Bang wherein galaxies move with constant velocity, v away from the point of an explosion. If a galaxy has velocity, v , then at the present time, t_o after the explosion it would have travelled a distance, d_o given by:

$$d_o = vt_o$$

so that,

$$v = \frac{1}{t_o} d_o$$

Comparing this with Hubble's Law,

$$v = H_o d_o$$

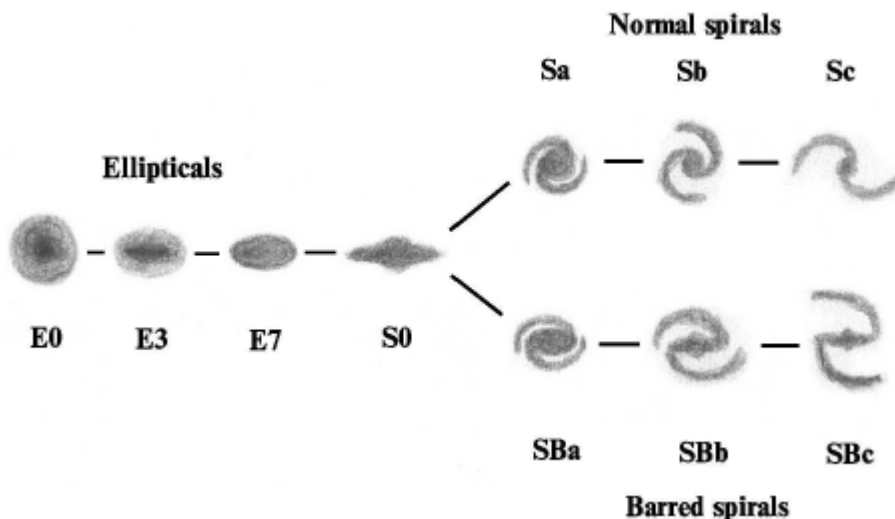
We see that

$$t_o = H_o^{-1}$$

Using current estimates we obtain,

$$H_o^{-1} = \frac{10^6 \times 3.085 \times 10^{16} \text{ m}}{70 \times 10^3 \text{ ms}^{-1}} = 4.4 \times 10^{17} \text{ m} = 14 \text{ My}$$

1b) On the basis of their appearance, Hubble splits galaxies into two groups, regular and Irregular (Irr).



(Hubble Tuning Fork diagram)

He subdivided the regular galaxies into two basic types, elliptical (E) and spiral (S). The spiral galaxies were further divided into ordinary (SA or just S) and barred (SB)

Ellipticals are classified as E_n , where

$n = \text{ROUND} [10e, 0]$ where e is the ellipticity of the galaxy's image.