Solution 4(c)

$$N_{det} = 4\pi \int_{\frac{1}{2}\nu_*}^{\frac{1}{2}\nu_{**}} d\nu \int_0^\infty dM \int_0^M dm \int_0^{R_{max}(\nu)} R^2 dR \; n(R,\nu,M,m),$$

where by ν_* and ν_{**} we understand the range of frequencies in which sensitivity of the detector is h_*. As follows from 4(a)

$$R_{max}(\nu) = Ah_*^{-1}M^{5/3}T^{-2/3} = Ch_*^{-1}M^{5/3}\nu^{2/3},$$

where

$$C = \frac{A}{(2\pi)^{2/3}}.$$

Hence,

$$N_{det} = 4\pi \int_{\frac{1}{2}\nu_*}^{\frac{1}{2}\nu_{**}} d\nu \int_0^\infty dM \int_0^M dm \int_0^{Ch_*^{-1}M^{5/3}\nu^{2/3}} R^2 dR \; n(R,\nu,M,m).$$