

⑧

② a) Avg residence time of water in land phase : $\frac{Vol}{rate}$

$$= \frac{42.1 \times 10^6 \text{ km}^3}{(113 \times 10^3) \text{ km}^3 \text{ yr}^{-1}} = \underline{\underline{372.57 \text{ yr}}}$$

b) Avg residence time of water in rivers & lakes : $\frac{Vol}{rate}$

$$= \frac{178 \times 10^3 \text{ km}^3}{40 \times 10^3 \text{ km}^3 \text{ yr}^{-1}} = \underline{\underline{4.45 \text{ yr}}}$$

③ a) Continuity

$$A = 20370 \text{ km}^2, \mu_p = 1100 \text{ mm/yr}, \epsilon_p = 11\%, \mu_d = 386 \text{ m}^3/\text{s}, c_d = 5\%$$

$$\mu_{ET} = \mu_p - \mu_d$$

$$\mu_p = 1100 \text{ mm/yr}$$

$$1100 \times \frac{1 \text{ km}}{1000} \times \frac{1}{365 \times 24 \times 60 \times 60} \text{ s}$$

$$1100 \times 3.17 \times 10^{-11} \text{ km/s}$$

$$\mu_d = \frac{386 \text{ m}^3/\text{s}}{20370 \text{ km}^2} = \frac{386 \times 10^9 \text{ mm}^3/\text{s}}{20370 \times (10^6)^2 \text{ mm}^2 \left(\frac{1}{365 \times 60 \times 24 \times 60} \right) \text{ s}}$$