1.

Apply the equilibrium condition

$$S = I(r) + F(r) \tag{1}$$
$$X(\varepsilon) = F(r) \tag{2}$$

and analyze with the $\varepsilon - r$ figure.

(1).

A business-friendly party taking power means the national saving will decrease. To satisfy (1), r has to increase. Then ε increases, according to (2). To conclude, both the real interest rate and the real exchange rate will increase.

(2).

Increasing tariffs on goods from a major trading partner results in that for any given ε, $X(\varepsilon)$ increases. To satisfy (2), r has to decreases. That is, the curve of $X(\varepsilon) = F(r)$ shifts to the left. Since there is nothing to do with the vertical curve of $S = I(r) + F(r)$, the result is a higher real exchange rate and an unchanged real interest rate.

(3).

Country's going to war leads to a higher government expenditure, decreasing the national saving S. To satisfy (1), r has to rise. According to (2), ε rises as well. In conclusion, going to war results in both higher real interest rate and real exchange rate.

2.

(a).

Using the constant return-to-scale assumption, define the per capita production function

$$f(k) \equiv y = \frac{Y}{L} = \left(\frac{K}{L}\right)^{\alpha} = k^{\alpha}.$$

When the economy reaches the steady state, we have

$$\dot{k} = \left.\frac{\mathrm{d}k}{\mathrm{d}t}\right|_{k=k^*} = sf(k^*) - (n+\delta)k^* = sk^{*\alpha} - (n+\delta)k^* = 0 \implies k^* = \left(\frac{n+\delta}{s}\right)^{\frac{1}{\alpha-1}}.$$

Thus, we can also compute that

$$y^* = k^{*\alpha} = \left(\frac{n+\delta}{s}\right)^{\frac{\alpha}{\alpha-1}},$$
$$c^* = y^* - i^* = (1-s)y^* = (1-s)\left(\frac{n+\delta}{s}\right)^{\frac{\alpha}{\alpha-1}}.$$

(b).

To maximize the consumption, take the derivative of $c^* = y^* - sy^* = f(k^*) - (n+\delta)k^*$,

$$\frac{\mathrm{d}c^*}{\mathrm{d}k^*} = f'(k^*) - (n+\delta) = \alpha {k^*}^{\alpha-1} - (n+\delta).$$

Apply the first-order condition,

$$\left.\frac{\mathrm{d}c^*}{\mathrm{d}k^*}\right|_{k^*=k_g^*} = 0 \implies k_g^* = \left(\frac{n+\delta}{\alpha}\right)^{\frac{1}{\alpha-1}},$$

which is the golden-rule level for k^*.

(c).

To find the the golden-rule saving rate, just let $k^* = k_g^*$ and solve it. Since $\partial k^*/\partial s > 0$,

$$s_g^* = \alpha.$$

3.

Since h is differentiable and k^* is a stable point, there exists a neighbourhood of k^*, denoted by I, in which there is only one stable point k^*. Forall $\epsilon > 0$ satisfying $k_1 = k^* - \epsilon \in I$ and $k_2 = k^* + \epsilon \in I$,

$$h(k_1) > 0, \qquad h(k_2) < 0.$$

According to the mean value theorem, $\exists \xi \in (k_1, k_2)$, s.t.

$$h'(\xi) = \frac{h(k_2) - h(k_1)}{k_2 - k_1} < 0.$$

Therefore,

$$h'(k^*) = \lim_{\epsilon \to 0^+} h'(\xi) < 0.$$