Notes: Answer all the questions on the separate answer sheets provided in Chinese or English. Please label question numbers clearly, and write Legibly.

1. Assume that an economy only has two good producers: one for wheat and one for bread, and that the economy does not have a government. In a given year, the wheat producer grows 30 bushels of wheat (without using intermediate goods), of which 25 bushels are sold to the bread producer at $3 per bushel as intermediate goods, and 5 bushels are stored as inventory to use as seed for next year's crop. The bread producer produces and sells 100 loaves of bread to consumers for $3.5 per loaf. In addition to the bread purchased from the domestic bread producer, the consumer imports 50 loaves of bread at $2.0 per loaf.

   a. What does GDP measure for an economy? Is GDP a stock or flow variable? [8 points]

   b. Use the expenditure approach to calculate the GDP for the year. Be specific about the quantities of C (consumption), I (investment), NX (net exports), and G (government purchases). [12 points]

2. Consider a Solow growth model. The aggregate production function, $Y = zF(K, N)$, exhibits a constant return to scale, where z is total factor productivity, K is aggregate capital, and N is the total number of workers. The production per worker is $y = \frac{Y}{N} = f(k) = zk^{\alpha}$, where $k \equiv \frac{K}{N}$ is per-worker capital and $0 < \alpha < 1$. The economy has a constant worker growth rate of n (i.e., the number of workers next period is $N' = (1 + n)N$), a constant saving rate s, and a constant capital depreciation rate of d. The law of motion for K is $K' = I + (1 - d)K$, where I is aggregate investment and K' indicates aggregate capital next period.

   a. Derive the marginal product of capital per worker (MPK). Is MPK per worker an increasing or decreasing function of capital per worker? Also, is MPK per worker an increasing or decreasing function with respect to the number of workers (N)? Draw a graph with MPK on the y-axis and k on the x-axis and explain its economic meaning. Justify your answers with mathematical derivation. [20 points]

   b. In equilibrium, aggregate investment equal aggregate saving (i.e., $I=sY$). Solve for the steady-state capital per worker as a function of exogenous parameters. Explain the economic meaning of the steady state in the context of the Solow model. [20 points]

3. Capital control has been practiced by many countries to cope with "hot money" inflows from quantitative easing adopted in several advanced economies. What are the economic rationales underlying capital control? [10 points]

4. If you were a U.K. citizen, would you vote *for* or *against* Brexit? Please defend your answer from the aspects of trade, immigration, or other macroeconomic considerations. [15 points]

5. The theme of the World Economic Forum last November is the fourth industrial revolution. What does the fourth industrial revolution refer to? What are the potential major macroeconomic impact of this revolution? [15 points]