東京工業大学2019年度第4クォーター Economics A Final Exam 2020．1．
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Test time ： 1 hour

1．If the price of a commodity goes down from 2000 yen to 1500 yen，the demand rises from 200 units to 300 units．What is the price elasticity of this commodity？
a． 0.1
b．-0.1
c． 0.5
d．-0.5
e． 0.7
f． 2
g．None of the above

2．Concerning the shape of the indifference curve，which of the following can better explain the law of diminishing marginal rate of substitution？
a．It is a convex function．
b．Indifference curve is downward－sloping．
c．Indifference curves do not intersect．
d．The further it is from the origin，the higher utility it represents．
e．None of the above

Q．The following is a producer＇s problem．Suppose the demand function for a commodity is $q=20-p$ ，and the supply function is $0.5 q=p-8$ ．We assume a perfectly competitive market．Please answer questions 3－8．
3．Please derive the equilibrium price．
a． 8
b． 10
c． 12
d． 16
e．None of the above

4．Please derive the producer surplus at the equilibrium．
a． 30
b． 10
c. 12
d. 16
e. None of the above
5. Please derive the consumer surplus at the equilibrium.
a. 8
b. 10
c. 12
d. 16
e. 32
f. None of the above
6. Suppose the government decides to impose a specific duty on the commodity, where the rate is $t=3$. Please derive the quantity of production at the new equilibrium.
a. 4
b. 6
c. 8
d. 10
e. 12
f. None of the above
7. The settings are the same as question 6 . Pleas derive the total surplus of the economy.
a. 45
b. 30
c. 12
d. 48
e. 32
f. None of the above
8. The settings are the same as question 6. Pleas derive the deadweight loss of the economy.
a. 4
b. 6
c. 8
d. 12
e. 2
f. 1.5
g. None of the above
Q. The utility function of a family is $\mathrm{U}=X^{\frac{1}{3}} \cdot Y^{\frac{2}{3}}$. Suppose the total income is 120 , the price of commodity X is 4 and the price of commodity Y is 1 .
9. Please derive the quantity of consumption on commodity X , when the utility is maximized.
a. 5
b. 10
c. 20
d. 30
e. 40
f. 80
g. None of the above
10. Please derive the quantity of consumption on commodity Y , when the utility is maximized.
a. 5
b. 10
c. 20
d. 30
e. 40
f. 80
g. None of the above
11. Please calculate the maximized utility.
a. 10
b. 120
c. 20
d. 30
e. 40
f. 80
g. None of the above
12. The production quantity and price of apple in Country A is given in the following table. Suppose 2012 is the base year, please calculate the GDP deflator in 2013.

|  | 2012 |  | 2013 |  |
| :--- | :---: | :---: | :---: | :---: |
|  | Price (yen) | Quantity | Price (yen) | Quantity |
| Apples | 100 | 10 | 200 | 10 |

a. 1000
b. 2000
c. $100 \%$
d. $200 \%$
e. 200
f. 100
g. None of the above
Q. Suppose you are in the position to evaluate the impact of a job training program on improving the productivity of the employees. The productivity of an employee is measured by the output per worker, y. Please answer questions 13-16 (choose all possible options).
13. There are observable and unobservable attributes for each employee. Can you name some of the unobservable attributes from the following?
a. education level
b. salary
c. learning capability
d. education level of the parents
e. cooperativeness of the spouse
f. length of service
14. Which of the following attributes of employees can help the company to decide whether to provide the job training program or not?
a. education level
b. salary
c. learning capability
d. average productivity
e. salary of the spouse
f. the working experience in the previous job
g. GPA in the university
i. nationality
15. Apart from personal attributes, which of the following do you think can directly affect the employees' productivity?
a. working environment
b. the number of computers in the office
c. the education level of the supervisor
d. the level of automation in the company
e. capital-labor ratio of the company
f. the company's investment in R\&D
16. Now let's use the following linear function to estimate the job training program's effect. i stands for each employee, training is a dummy variable to show whether the employee participates in the program or not. (if participated, the value is 1 , otherwise 0 ), $\varepsilon$ is the error term.

When we use OLS to estimate, $\beta=3.6$ 。

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y_{i}=\alpha+\beta \cdot \text { training }_{i}+\varepsilon_{i}
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Based on this result, can you make the conclusion that the job training program can definitely improve the productivity of the employees?
a. Yes
b. No
c. It is hard to say

