FINAL

A total of 100 points is possible.

Last Name:_____   First Name:_____

Your Student ID Number: __ __ __ - __ __ - __ __ __ __

Part A: Multiple Choice Questions

(25 questions, each worth 2 points)

1. How many years was the gap between the Neolithic and the Industrial Revolutions?

A	1,800
B	8,000
C	25,000
D	250,000
E	500,000

2. What happened in the Neolithic Revolution?

A	Development of settled agriculture
B	Emergence of iron working
C	Discovery of stone tools
D	First democratic governments
E	First control of human fertility

3. What facts do we need to know to estimate the long run rate of technological advance in the Malthusian era?

A	Rate of population growth
B	Rate of real wage growth, and the share of wages in national income
C	Rate of real wage growth
D	Rate of population growth, and the share of land in national income
E	Rate of real wage growth, and the share of land in national income

4. World Population rose from 7 m circa 10,000 BC to 770 million by 1750. That implied an average population growth rate over this interval of 0.04%. What, roughly was the implied rate of technological advance per year over these 12,000 years.

A	1.0%
B	0.2%
C	0.02%
D	0.01%
E	0.001%

5. Wildebeest graze on the African Savannah. The amount of grass per square mile depends positively on the amount of rain. Suppose it became wetter on the African Savannah because of climate change. What would be the long run effect on the amount of grass each wildebeest got to eat?

A	No change
B	Increase in grass per Wildebeest
C	Decrease in grass per Wildebeest
D	Increase in grass per Wildebeest only if the Lion stock stays the same (Lions eat Wildebeest)
E	Decrease in grass per Wildebeest only if the Lion stock stays the same

6. Suppose an additional 10% of the Wildebeest population is culled by hunters each year. What would be the long run effect on the amount of grass each wildebeest got to eat?

A	No change
B	Increase in grass per Wildebeest
C	Decrease in grass per Wildebeest
D	Increase in grass per Wildebeest only if the Lion stock stays the same
E	Decrease in grass per Wildebeest only if the Lion stock stays the same

7. Suppose there are equal numbers of male and female Wildebeest, and each female gives birth to a calf each year. What is life expectancy at birth for Wildebeest, in years?

A	1
B	2
C	10
D	20
E	50

8. Which pre-industrial society was notable for both its low real income levels, and its high levels of personal hygiene?

A	India
B	Ancient Egypt
C	Ancient Greece
D	England
E	Japan

9. Suppose 50% of adults in a pre-industrial society do not know their age. What percent of reported ages in a census will likely end with a 0 or a 5?

A	50
B	55
C	60
D	65
E	70

10. Suppose a modern economy experiences real wage growth rates of 2% a year. What is a rough estimate of the rate of technological advance in the economy?

A	1.4%
B	3%
C	0.14%
D	0.3%
E	2%

11. Life expectancy for women at birth is now typically 6 years more than that for men. In pre-industrial Europe men and women at birth had the same life expectancy. What likely accounts for this difference?

A	Infanticide of girls in early Europe
B	Male deaths through violence in warfare
C	Killings of women accused of being witches
D	Deaths of women in pregnancy
E	Less ability of women to withstand periodic famines

12. In the Malthusian world the average women had 2 children who survived until adulthood. The Total Fertility Rate in pre-industrial Europe, the average number of births a woman would have if she lived to 50, was 4.9. 3 of these 4.9 children survived until adulthood. What explains this apparent contradiction?

A	Pre-Industrial Europe was not a Malthusian economy
B	Not all women in Europe married
C	Many women did not survive until age 50
D	The average woman did not marry till age 25
E	There were few births outside marriage

13. Malthus published his *Essay on a Principle of Population* in 1798. By this time the Industrial Revolution was already well under way in England. Why were his doctrines not immediately rejected?

A	No-one in England in 1798 knew the Industrial Revolution had begun
B	His theory appealed to political conservatives
C	Malthus declared his theory to apply only to earlier societies
D	Malthus declared his theory applied only to India and China
E	King George III favored Malthus's theory

14. Who was Samuel Pepys?

A	Clergyman, inventor of power loom
B	Invented steam engine
C	Engineer, creator of famous steam locomotive "the Rocket"
D	Public servant in London, kept diary 1660s
E	Intellectual opponent of Malthus

15. Which of the following was typically a significant economic failure of pre-industrial societies?

A	High inflation rates
B	High levels of government debt
C	High rates of taxation
D	Restrictive regulations on the labor market
E	Absence of property rights in knowledge

16. Suppose a surname Neville was held only by rich people in England in 1300. Suppose it was held by 0.1% of the population. Based on the Malthusian model, what fraction of the population would we expect now to have the surname Neville?

A	0.1%
B	More than 0.1%
C	Less than 0.1%
D	Could be more or less than 0.1%
E	0%

17. Suppose there was complete long run social mobility in England. What would we expect the average economic status of the "Nevilles" to be now?

A	Still above the mean
B	At the mean
C	Below the mean
D	Cannot predict
E	Among the wealthiest people

18. Which of the following sectors of the economy contributed most to productivity growth in England in the Industrial Revolution?

A	Textile production
B	Iron and Steel
C	Steam engines
D	Railways
E	Coal mining

19. What was the relative wage of a carpenter compared to a laborer in England in 1300?

A	5
B	3.5
C	2.25
D	1.6
E	1.3

20. What was the relative wage of a carpenter compared to a laborer in England in 2000?

A	5
B	3.5
C	2.25
D	1.6
E	1.3

21. Why does it seem that if an Industrial Revolution had not occurred in Europe in 1800 it would have eventually occurred elsewhere?

A	Other places than England had coal deposits
B	India had lots of cotton
C	Asian societies such as Japan were changing in similar ways to pre-industrial England in the years 1600-1850
D	Japan in 1800 was economically identical to England in 1800
E	China was experiencing rapid technological change in the years 1750-1850

22. Suppose that the share of capital rentals in an economy is 0.3, and the share of wages 0.7. Suppose also that output prices are increasing at 2% a year, while capital rental costs are increasing at 2%, and wage as 5%. What is the implied rate of efficiency advance in the economy?

A	2.1%
B	2%
C	1.8%
D	1.4%
E	1.2%

23. Suppose the rate of growth of real income per person in a modern economy is 4%. What is the likely rate of growth of the real capital stock per person?

A	0%
B	1%
C	2%
D	3%
E	4%

24. Who has gained most from technological advances since the Industrial Revolution?

A	Unskilled labor
B	Skilled labor
C	Capital owners
D	Farmland owners
E	Innovators

25. How many years (roughly) after the onset of the Industrial Revolution did the Demographic Transition appear?

A	0
B	20
C	40
D	120
E	200

Part B: LONGER ANSWERS (50 points)

1. The Fundamental Equation of Growth for all societies is

$$g_y = a g_k + c g_z + g_A$$

(a) (10 points) Show why since the Industrial Revolution this expression has reduced to the approximate formula,

$$g_y \approx \frac{g_A}{(1-a)}$$

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(b) (10 points) Show why before the Industrial Revolution this expression reduced to the approximate formula,

$$g_A = c g_N$$

2. (15 points) Explain the connection between Malthus and Darwin. Is there any evidence of Darwinian selection in the pre-industrial world?

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3. (15 points) Is is plausible that low rates of technological advance before 1800 were explained by poor economic institutions?

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