

Centre for Development Studies
Thiruvananthapuram

MA Applied Economics
ADMISSION EXAMINATION 2014

Register Number:

Question Booklet Series:

Read the instructions carefully before answering the questions

- **This booklet consists of two parts.** Part one contains 25 objective questions with multiple choices in answers. Part two contains five passages/tables and a set of questions below each passage/table. Questions are to be answered on the basis of the information given the respective passage/table. The allowed time is two hours.
- Each correct answer for the objective questions in part one carries **two marks** and for each wrong answer **one mark will be deducted**. Non-attempted questions carry **zero mark**.
- In part one, answer the questions by writing the alphabet (A,B,C, or D in capital letters), corresponding to your answer, on the answer line given below right side of each question. If you mistakenly write a wrong choice, you can strike it out using “multiplicative sign” (×), and then write the correct choice in the remaining space.
- In part two, answer to a question should not exceed the given space provided below the question. **Write your answers legibly**. Maximum marks that a question carries is given on its right side in parenthesis.
- Write your **Register Number** in the space provided on the top of this booklet.
- Please do not make any stray marks on this booklet.
- Return this booklet to the invigilator at the end of the examination.
- **Last page** of this booklet can be used for doing **rough work**.

✂ Break this seal only at 10.30 a.m.

Part One

1. Suppose there are two goods x_1 and x_2 and the utility function of individual is $U(x_1, x_2) = \max\{x_1, x_2\}$. The budget constraint of the individual is $3x_1 + 4x_2 = 12$. What is the optimal bundle (x_1, x_2) chosen by the individual?

- A. (4,0)
- B. (0,3)
- C. (2,1.5)
- D. (3,1)

1. _____

2. If the demand function of two goods 1 and 2 are $10 - 3p = q$, $15 - 6p = q$ respectively. Which good has higher demand elasticity at $p = \frac{5}{3}$?

- A. Elasticity of good 1 is higher than elasticity of good 2 .
- B. Elasticity of good 2 is higher than elasticity of good 1.
- C. Elasticity is same.
- D. None of the above

2. _____

3. There are 3 red balls and 3 blue balls in an urn. If two balls are drawn at random simultaneously from the urn, what is probability of getting one red ball and one blue ball?

- A. $\frac{3}{10}$
- B. $\frac{3}{5}$
- C. $\frac{1}{2}$
- D. $\frac{2}{5}$

3. _____

4. For the sequence $a_0 = 1$, $a_1 = -\frac{1}{2}$, $a_2 = \frac{1}{6}$, $a_3 = -\frac{1}{24}$, $a_4 = \frac{1}{120}$, what is a_5 ?

- A. $-\frac{1}{480}$
- B. $\frac{1}{480}$
- C. $\frac{1}{240}$
- D. $-\frac{1}{720}$

4. _____

5. Suppose the demand function is $12 - 3p = q$ and price falls from 3 to 1. How much is the change in consumer surplus?

- A. 12
- B. 10
- C. 13
- D. $\frac{27}{2}$

5. _____

6. Suppose the production function of a firm is $y = \min\{2l, k\}$, where y, l and k respectively denote output, labour and capital. The firm has to produce 10 units of output and the wage rate is 2 and price of capital is 3. What is optimal mix of labour and capital of the firm?

- A. $(l = 5, k = 10)$
- B. $(l = 4, k = 9)$
- C. $(l = 7, k = 8)$
- D. None of the above

6. _____

7. Suppose there is increase in the price of a Giffen good. How the income effect and substitution effect changes?

- A. Income effect is positive and substitution effect is negative.
- B. Income effect is negative and substitution effect is positive.
- C. Income effect is negative and substitution effect is negative.
- D. Income effect is positive and substitution effect is positive.

7. _____

8. Suppose the market demand function is $20 - 2p = q$ for $p > 7$, $q = 6$ for $7 \geq p \geq 5$ and $16 - 2p = q$ for $p < 5$. And the supply function is $2p - 6 = q$. What is the equilibrium price and quantity?

- A. $p = 8, q = 10$
- B. $p = 6, q = 6$
- C. $p = 4, q = 8$
- D. $p = 5, q = 4$

8. _____

9. Suppose $a = \{x : 3 \geq x \geq 1\}$, $b = \{y : 4 \geq y \geq 2\}$, $c = \{3, 4\}$. What is $a \cap b \cap c$?

- A. $\{3, 4\}$
- B. $3 \geq (a \cap b \cap c) \geq 2$
- C. $\{3\}$
- D. None of the above.

9. _____

10. Why are variance and standard deviation the most popular measures of variability?

- A. They are the most stable and are foundations for more advanced statistical analysis
- B. They are the most simple to calculate with large data sets
- C. They provide nominally scaled data
- D. None of the above

10. _____

11. Which of the following statements sounds like a null hypothesis?

- A. The coin is not fair
- B. There is a correlation in the population
- C. There is no difference between male and female incomes in the population
- D. The defendant is guilty

11. _____

12. The cutoff the researcher uses to decide whether to reject the null hypothesis is called the:

- A. Significance level
- B. Alpha level
- C. Probability value
- D. Both A and B are correct

12. _____

13. As sample size goes up, what tends to happen to 95% confidence intervals?
- A. They become more precise
 - B. They become more narrow
 - C. They become wider
 - D. Both A and B

13. _____

14. A _____ is a numerical characteristic of a sample and a _____ is a numerical characteristic of a population.
- A. Sample, population
 - B. Population, sample
 - C. Statistic, parameter
 - D. Parameter, statistic

14. _____

15. The value of a correlation is reported by a researcher to be $r = -0.5$. Which of the following statements is correct?
- A. The x -variable explains 25% of the variability in the y -variable.
 - B. The x -variable explains -25% of the variability in the y -variable.
 - C. The x -variable explains 50% of the variability in the y -variable.
 - D. The x -variable explains -50% of the variability in the y -variable

15. _____

16. The difference between Foreign Direct Investment (FDI) and Foreign Institutional Investment (FII) in a domestic company is based on:
- A. The share of expatriates employed in the company
 - B. Threshold level of voting stock (equity) held by the foreign investor
 - C. Both A and B
 - D. None of the above

16. _____

17. What is meant by head line inflation?
- A. A measure of price inflation in food prices
 - B. A measure of price inflation in agricultural prices
 - C. A measure of price inflation that takes into account all types of inflation an economy can experience.
 - D. None of the above

17. _____

18. What is the most important source of non-conventional energy production in India?
- A. Electricity (Hydro and Nuclear)
 - B. Coal and Lignite
 - C. Solar energy
 - D. Wind energy

18. _____

19. What are the criteria for getting a patent issued for a new invention in India?
- A. the new invention claimed should be novel
 - B. the new invention claimed should not be obvious to someone skilled in the art
 - C. the new invention should be capable of industrial application
 - D. All of the above

19. _____

20. Which of the following statements are true of India's Current Account and Trade Deficits over the last several years?
- A. The former is greater than the latter
 - B. The latter is less than the former
 - C. The former is less than the latter
 - D. The former is equal to the latter

20. _____

21. Which of the following does not affect the structure of Indian telecommunications services industry?

- A. Universal Service Obligation (USO)
- B. Spectrum Allocation
- C. Telecom Regulatory Authority of India
- D. Licensing policy

21. _____

22. Which of the following is not a policy rate of the Reserve Bank of India?

- A. Bank Rate
- B. Term Deposit Rate
- C. Marginal Standing Facility Rate
- D. Reverse repo rate

22. _____

23. Aggregate Savings Rate in India is _____ her Aggregate Investment Rate.

- A. less than
- B. more than
- C. equal to
- D. None of the above

23. _____

24. Withdrawals from Non Resident Indian (NRI) deposits in a specific year is part of India's _____.

- A. Capital Account
- B. Current Account
- C. Net Factor Income From Abroad
- D. Gross Domestic Investment

24. _____

25. What has been the main rationale for privatization in India?

- A. To improve performance of public sector enterprises
- B. To open all industrial sectors to private sector participation
- C. For using the divestiture proceeds to fill in the fiscal deficit
- D. To promote competition

25. _____

Part Two

A. Network Externalities, Consumer Expectation and Industry Lock-in

In presence of network externalities, the benefit accruing to a consumer increases when the number of consumers using that network increases. Demand curves for commodities having network externalities are different from those for other commodities - given network externalities, the size of the network matters. Telephone, email are very common examples of direct network externalities. Using windows in PC or Android in smart-phones are examples of indirect network externalities - more softwares and smart-apps will be developed for these common platforms.

Demand depends on the expected size of the network. Suppose there are 1 million potential buyers for a new technology (app, OS etc.). Each consumer's valuation is \$ n given there are n other buyers. Larger the value of n , greater will be the valuation by each potential buyer. Therefore if a consumer thinks that no one is going to join the network, then his valuation will be $n^e = 0$. Hence, given such situation, for any positive price, benefit will be negative and the NE will be no one joining the network. On the other extreme, each can expect that every other will join and hence may value the technology at \$1 million! This is a case of fulfilled-expectations equilibrium. As we have already seen, depending on what a potential consumer expects, for any positive price there can be two equilibria - one where everyone buying the technology and the one where no one is buying. Low-adoption equilibrium is more likely if the price is very high - if the price is \$0.5 mn., then it takes all the half-million consumers to believe that half a million users are there in the network. If the price is low, say \$500, then at least 500 consumers may believe that at least 499 consumers are there in the network apart from him. Once, these 500 consumers are there in the network, then it is optimal for other potential buyers to join the network - this initial set of buyers is known as the critical mass.

Suppose there are two competing technologies - A and B (like Windows and Linux, Vodafone and Airtel) and two types of consumers - fan A and fan B . Utility is given by

$$\begin{aligned} U_A &= u + n_A \quad \text{if he buys } A \\ &= n_B \quad \text{if he buys from } B \end{aligned}$$

where, u is known as the stand-alone utility.

Hence, if $n_A = n_B$ then fan A buys A and fan B buys B . If, $n_A + u < n_B$, then fan A will buy B and not A . That is, higher the base of a particular technology, both types will buy that technology. Stand-alone utilities are the absorbing barriers, once such barriers are crossed, the process becomes self-enforcing and the industry is locked-in.

26. How does the utility derived out of a commodity having network externalities differ from that derived from a normal good? (2)

27. What is a critical mass? (2)

28. Given a commodity exhibits network externalities, the number of equilibria depends on which factor? (2)

29. What is stand-alone utility? (2)

30. In which technology will the industry get locked in if $n_A > n_B + u$? (2)

B. Horticulture Crops – Area under Cultivation

Table 1: Area under major horticulture crops (in lakh hectares)

Year	Fruits	Vegetables	Flowers	Total Area
2005-2006	50	72	1	123
2006-2007	56	75	2	133
2007-2008	58	78	4	140
2008-2009	61	79	6	146
2009-2010	63	79	10	152

31. Which year has recorded the highest rate of increase in area under the total horticulture? (2.5)

32. Which of the categories has recorded the highest rate of increase in area during 2005-2006 to 2009-2010? (2.5)

33. What has been the share of area under fruits, vegetables and flowers in the area under total horticulture in 2007- 2008? (2.5)

34. In which year, area under fruits has recorded the highest rate of increase? (2.5)

C. Poverty and its three consequences

Poverty in underdeveloped countries is usually understood in terms of lack of resources to meet even the basic calorie requirements of individuals. This passage discusses three undesirable consequences of poverty in underdeveloped countries, which actually tend to perpetuate the state of poverty.

The first issue is related to the poor peoples' access to the credit market, particularly formal credit market. Because of the imperfect information on the part of the lender regarding the ability and willingness of the borrower to repay the loan, access to the credit market requires valuable collateral on the part of the borrower. So the market for credit naturally fails on the part of the poor. They are unable to obtain loans that can be used to better their lives. Microfinance, in which group liability is accepted, is suggested to help poor people access credit market.

The second consequence of the extreme poverty is the unequal division of household resources among its members. Unequal sharing arises from the fact that certain minimum level of nutrition, care and economic resources have to be devoted to each person in order for that person to be productive and healthy. In situations of extreme poverty, equal division of household resources might help no one, because average amounts are far too small. The potential merit of the unequal division is that it helps some individuals in the household to be minimally productive under extreme circumstances.

The third one is due to the prevalence of very low wage in underdeveloped countries. Very low wages combined with the condition that a certain minimum amount of resources are required to maintain the work capacity of a person can make poor people unable to participate in the labour market. The reason is that the low wages would not help them to reproduce the work capacity. However, poor people having some non-labour income would be able to participate in the labour market at low wages as the total income would enable them to reproduce the work capacity.

35. On the basis of the ideas given in the passage, what inference can you draw about the possible treatment of girl children in poor families? (2)

36. State one possible inference that you can draw from the passage about the impact of unequal distribution of income generating assets among poor. (2)

37. Why do poor people unable to access credit market? (2)

38. In country X, government has been providing nutritional supplements to pregnant and lactating women in poor families. Government is now planning to transfer cash to the beneficiaries accounts, instead of giving the benefits in kind, so that they can buy these supplements from the market. On the basis of the above passage, give one sentence comment on the effectiveness of the new strategy compared to the existing one. (2)

39. Rural areas in country Y is agriculture based and incidence of poverty is very high in these regions. Government now started a project of giving cereals and pulses at a highly subsidised rate to poor peoples in rural areas. This has led to an increase in agricultural output. On the basis of the ideas given in the passage, how do you explain this in one sentence? (2)

D. Innovation and Economic Growth

The proximate sources of economic growth are technological progress, physical and human capital formation. Technology consists of knowledge of how to mix raw materials to produce final output. This knowledge can be thought of as another form of capital - an intangible intellectual capital. What distinguishes technology from human capital or physical capital is its non-rival character, i.e. same piece of knowledge can be used by many individuals at the same time in different locations. Non-rival nature of the knowledge implies that society can accumulate knowledge without any bound, i.e. each piece of knowledge is adding to the existing stock of knowledge. But a piece of physical or human capital will depreciate and disappear after some time. Technological progress also increases the productivity/efficiency of physical and human capital and thereby the rate of return to these inputs. Human capital is nothing but the technological knowledge embedded in human beings, which enable them to perform many technology intensive tasks. Generally, higher the level of accumulated knowledge of the society, greater the skill sets of its members.

Given the non-rival nature of the technological knowledge, property rights are assigned on the new invention so that inventors are able to appropriate the benefits of their invention by charging a price for its use. This incentivises the private profit oriented firms to invest in R&D. Since the cost of developing a technology for producing a particular product is fixed, and given the non-rival nature of the technological knowledge, the per unit cost of innovation decreases with the scale of output.

Technological progress also happens through learning by doing in the production process. Learning by doing is nothing but accumulation of knowledge through production experience. Thus it is a by-product of the production process. Literature argues that in many industries technological progress through learning by doing is highly significant.

40. Do you think that technological progress stimulates the accumulation of physical and human capital? (2)

41. Do you think that innovation can generate increasing returns to scale in production? (2)

42. Why it is difficult for the inventor to appropriate the benefits of invention? (2)

43. An engineer working today is more productive than an engineer working 100 years ago. Why? (2)

44. Does technological knowledge generated through learning by doing need protection using patent right? (2)

E. A note on economies of X and Y

Countries X and Y are similar in many respects, people in both countries speak same language, share common cultural and social traditions, and also have a common currency, called rupee (Rs.). However, the two countries differ in terms of size of their economies and population. Table 2 presents some facts on the economies of X and Y for the year 2013. Country Y is bigger in terms of both population and size of its economy measured by the level of its Gross Domestic Product (GDP).

Country X has highest per capita GDP. Per capita GDP is understood as the average output per person in a country, which also gives us an idea about the average income of a person in that country. However, it is a reliable indicator of economic development of a society only if income is distributed more or less equally among its members. High income inequality suggests that a smaller section of the society receives a larger share of the national income, leaving the rest of the society with very low income. In 2013, the minimum annual income needed for a person to have a basket of commodities and services essential for a decent life is Rs. 100 in both X and Y. All those having income less than Rs. 100 belongs to the category of poor. A survey conducted in 2013 has shown that 3 per cent of population in X and 60 per cent in Y are poor.

Table 2: Highlights of Economies of X and Y in 2013

	X	Y
1 Gross Domestic Product (GDP) (in Rs)	200000	300000
2 Population (in number)	400	750
3 Labour force (in number)	240	525
4 Employment (in number)	200	500
5 Merchandise Export (in Rs)	40000	30000
6 Merchandise Import (in Rs)	30000	45000

The size of GDP of a country depends on the size of the available labour force, more hands to work means more production. Size of labour force is the number of persons in the age group 15-65 who are able and willing to work at the prevailing wage rate. The rest of the population belongs to the category of dependent, those who depend for their livelihood on other earning members/past savings/government transfers. In country X in 2013, 60 per cent of the people belong to the category of labour force, the corresponding figure for country Y is 70 per cent. Thus the dependency ratio, the ratio of depended population to the total population, is low in country Y. It is not sufficient to have a big labour force to produce more, but it is also important that all of them should be employed. Unemployment rate which is defined as the ratio of number of unemployed to the labour force, is higher in country X. Given the size of the labour force, a country can also increase its GDP by improving labour productivity through adopting better production technologies. Labour productivity means value of output per worker employed. We end this note by considering the trade openness of X and Y. Trade openness is usually defined as the ratio sum of import and export of commodities to GDP. In 2013, country X has higher trade openness. It also has a higher trade balance as a per cent of GDP. Trade balance is defined as the excess of export over import of commodities.

45. Which is the richer country?

(2)

46. What inference can you make regarding the income distribution in Y compared to X? (2)

47. What are the dependency ratios in X and Y? (2)

48. What inference can you draw on the price level, particularly of basic necessities, in both countries? (2)

49. Which country has higher trade openness? (2)

Place for rough work