Sample Question Paper for PhD Economics

Format of the PhD Entrance Test Paper

The duration of the Entrance Test is 2 hours and it will contain 40 multiple choice questions. Questions will cover the areas of Microeconomics, Macroeconomics, Mathematical Methods, Statistical & Econometric Methods, and Development Economics.

Negative Marks for Wrong Answers

If the answer given to any of the Multiple Choice Questions is wrong, ¼ of the marks assigned to that question will be deducted.

- This is only a sample paper and only meant to be indicative of the type of questions that will be asked.

1. The Lewis model is considered to be a "classical" model of development because:
   a. The productivity of labour in the modern sector is higher than that in the traditional sector.
   b. The supply of labour in the economy is determined by a labour-leisure choice.
   c. There is unlimited supply of labour available for the modern sector at a given wage rate.
   d. All of the above.

Answer questions 2 and 3 based on the following passage:

Markets are superb coordination mechanisms in harmonizing numerous non-cooperative interactions and in disciplining inefficiency and rewarding high value performance. But when incentives and control rights are misaligned (on account, say, of initial asset ownership differences constraining contractual opportunities), and there are important strategic complementarities in long-term investment decisions, markets fail to coordinate efficiently. The implications of 'imperfections' in, and sometimes the non-existence of, credit and insurance markets are severe for the poor, sharply reducing a society's potential for productive investment, innovation, and human resource development. The state can provide leadership for (and put selective incentives and pressure on) individuals interacting cooperatively in situations where non-cooperative interactions are inefficient. But the state officials may have neither the information nor the motivation to carry out this role; they may be inept or corrupt, and the political accountability mechanisms are often much too weak to discipline them. In the context of these pervasive market and government failures it is often pointed out that a local community organization, if it has stable membership and well-developed mechanisms of transmitting private information and enforcing social norms among its members, has the potential to provide sometimes more efficient coordination than either the state or the market. But community organizations 'fail' too when they are 'captured' by elite (or

sectarian) interests, or are hamstrung by the secession of the rich and the talented from local communities, and they may face covariate risks and costs of small scale. [from *Institutional Economics of Development: Some General Reflections* by Pranab Bardhan in in T. Besley and R. Jayaraman (eds.), *Institutional Microeconomics of Development*, MIT Press, 2010.]

2. According to the author, which allocative mechanism is free from the risk of coordination failure?

    a. Market
    b. State
    c. Community
    d. None of the above

3. Which of the following is <u>not</u> a source of government failure?

    a. Inadequate information
    b. Lack of private incentive for public action
    c. Externalities
    d. Weak accountability

4. In a country experiencing jobless growth:

    a. productivity and employment elasticity both fall
    b. productivity and employment elasticity both increase
    c. productivity increases but employment elasticity falls
    d. productivity decreases but employment elasticity increases

5. Consider a country whose savings rate is 30 percent, the capital-output ratio is 3, population growth rate is 1% and depreciation is zero. Due to frequent power outage, a quarter of the existing capital stock goes unused every year. Using the Harrod-Domar model, the growth rate of per capita output will be

    a. 7.5 per cent
    b. 6.5 per cent
    c. 9 per cent
    d. 12.33 per cent
    e.

6. Countries A and B have the same levels of income inequality according to the Gini Ratio. What does this imply about the share of total income accruing to the bottom 50 percent of the population in these two counties?

    a. The share will be the same in both the countries
    b. The share will be the same and equal to 50 percent for both the countries
    c. It cannot be determined without additional information

d. The share will be larger for the larger country

7. In the period 2010 to 2018, country X experienced 25 percent growth in income and 5 percent reduction in income poverty. In the same period, country Y experienced 20 percent growth in income and 4 percent reduction in income poverty. In which country was growth more efficient in reducing poverty?

   a. Country X
   b. Country Y
   c. It was equally efficient in both countries
   d. Cannot be determined

8. In a dual economy with a rural and an urban sector, workers migrate from the rural to the urban sector based on expected incomes. Workers are assured of a rural job. In the urban sector, the migrant may or may not get a job.
   $W(u)[L(u)/(L - L(r))] = W(r)$, where $W(u) > W(r)$

   L(u) and L(r) are urban and rural labourers and L is the total labour force. W(u) and W(r) are the urban and rural wage rates which stand at $60 and $40 respectively. If urban employment increases by one unit, urban unemployment

   a. decreases by 0.5 units
   b. increases by 0.5 units
   c. decreases by 0.33 units
   d. increases by 0.33 units

9. Consider an environment where an individual faces $(p_1, p_2) = (1,1)$. At these prices she is maximising her utility at $(x_1, x_2) = (7,7)$. Let the prices change to $(1,2)$. After the price change, the consumer is

   a. as well off as before
   b. worse off
   c. better off if she was a net buyer of good-1 & remained a net buyer after the price change
   d. none of the above

10. Given the payoff matrix below:

A's choice	B's choice	
	Low	High
Low	(1, 0)	(2, 1)
High	(3, 1)	(1, 0)

   a. There is a dominant strategy equilibrium in this game
   b. This is a unique pure strategy equilibrium in this game
   c. There are multiple pure strategy equilibria in this game
   d. This game has no pure strategy equilibria

11. Consider a competitive industry where the market demand is given by $P = 50-Q$. The marginal cost function is simply MC= Q. If the government imposes a tax of 10 rupees per unit of production on this good, the equilibrium market price will go up by:

    a. zero rupees
    b. 10 rupees
    c. 20 rupees
    d. 5 rupees

12. Two kinds of consumers exist for a product Z in a market: one kind of consumer has an intense liking for the product, with an inverse demand curve is $P=20-Q$, where P is price of Z and Q is the quantity of Z. The other type of consumer has a less intense liking for the product and has an inverse demand $P=5-(1/2)*Q$. Suppose that there are only two consumers in the market, one of each type. The market demand curve for Z will be:

    a. Q=p for all price levels p.
    b. Q=30-3P for all price levels $p > 5$ and Q=20-P for p≤5
    c. Q=15-3P for all price levels $p \le 5$ and Q=20-P for p>5.
    d. Q=30-3P for all price levels $p \le 5$ and Q=20-P for p>5

13. Consider a Leontief production function $Q = Min (K/2, L/3)$. Price of K is 3 and price of L is 2. If the firm intends to produce 40 units, the cost minimizing (K, L) combination will be:

    a. (30,40)
    b. (20,30)
    c. (80,120)
    d. (120,80)

14. In a Cournot duopoly, two firms with identical cost functions $C_i = 10 + 2q_i$, i=1,2 face the inverse demand curve: $P = 50 - 2Q$, where $Q=q_1+q_2$. Equilibrium quantity and profits for the two firms will be:

a. $q_1=q_2=10$; $\pi_1= \pi_2=120$
b. $q_1=q_2=8$; $\pi_1= \pi_2=118$
c. cannot say given this information
d. none of the above

15. An indirect utility function is given by $V = m^2 / (aP_1+bP_2)^2$. The direct utility function from which this can be derived is

    a. Leontief type
    b. Cobb Douglas
    c. Quasi Linear
    d. Linear

16. A consumer has a utility function $U = x_2 - (1/x_1)$. Consider two states 0 and 1 such that P_1 declines from P_1^0 to P_1^1, P_2 remains unchanged at 1 and income is m in both states. The Compensating Variation (CV) and Equivalent Variation (EV) for this price change are as follows:

    a. $CV = 2P_1^{1/2}$ and $EV = 2P_2^{1/2}$

b. CV > EV

    c. CV = EV = $2 (\sqrt{P_1^0} - \sqrt{P_1^1})$

    d. CV = EV = $2 (P_1^0 + P_1^1)^{1/2}$

17. Between 2002 and 2003, Afghanistan introduced a new currency, the new afghani, at an exchange rate of 43 afghani to the US dollar. This new afghani replaced its two previous versions at two different rates: the currency issued by the government of President Burhanuddin Rabbani was replaced at the rate of 1000 to the new afghani, whereas the currency issued by the government of Abdul Rashid Dostum was replaced at the rate of 2000 to the new afghani. The central bank issued instructions that the new currency should be used to make all domestic transactions, replacing all other currencies in use. All existing contracts were to be rewritten in terms of the new afghani at the specified exchange rates. Assuming that the government was successful in carrying out this exercise, what would have been the impact of this change on output and employment?

    a. Output and employment will fall, since fewer currencies are in circulation.
    b. Output and employment will rise, since production will benefit from a stable currency.
    c. Output and employment will remain unchanged, since the contracts are rewritten in terms of the new currency.
    d. Cannot be determined from the given information.

Next THREE questions are based on the following information

Consider an economy where the aggregate output is produced by using two factors, K and L, using a production function $Y = K^\alpha L^{1-\alpha}$. At every point of time, both factors are fully employed. A constant proportion s of total output is saved and automatically invested at each point in time, leading to augmentation of capital stock. However, capital is also subject to depreciation at a rate δ. Labor force grows at a constant rate n.

18. The steady-state level of per capita output is given by
    a. $s\left(\frac{K}{L}\right)^\alpha - \frac{(n+\delta)K}{L}$
    b. $\left(\frac{s}{n+\delta}\right)^{1/(1-\alpha)}$
    c. $\left(\frac{s}{n+\delta}\right)^{\alpha/(1-\alpha)}$
    d. cannot be determined from the given information

19. The optimal savings rate which will maximise the per capita consumption level at the steady-state is given by

    a. α
    b. $n+\delta$
    c. $\alpha (n+\delta)$
    d. $\left(\frac{s}{n+\delta}\right)^{1/(1-\alpha)}$

20. With $\alpha = 1/3$, rate of population growth = 1 percent and depreciation rate of capital = 5 percent, how long will this economy take to get halfway of its balanced growth path values within a Solow framework?

a. 15.5 years
b. 17.5 years
c. 21.5 years
d. 25.5 years

21. Given the following information, rate of inflation will be

Indicators/years	2012-13	2013-14
Nominal GDP	58998	61958
Real GDP	54821	57417

a. 0.27 percent
b. 1.70 percent
c. 2.1 percent
d. 0.50 percent
e.

22. Consider a decentralized market economy in a purely deterministic two-period overlapping generations framework. The accumulation of capital in steady state will be

a. socially optimal, by an application of the welfare theorems.
b. is unlikely to be socially optimal except by divine accident, and welfare theorems will fail.
c. either optimal or suboptimal, depending on the technology represented by the specific production function.
d. either optimal or suboptimal, depending on the level of unemployment in the economy.

23. Even though insider trading is illegal in most countries, inside information about a stock has often influenced its prices. This goes

a. against the strong form of efficient market hypothesis.
b. in favor of the strong form of efficient market hypothesis.
c. against the semi-strong form of efficient market hypothesis.
d. in favor of the semi-strong form of efficient market hypothesis.

24. Historically, the premium in the rate of return in stock markets over the less risky bond markets has been much higher than can be explained by standard economic theory with reasonable rate of risk aversion. Which of the following factors might explain a part of this unusually high risk premium?

a. Non-availability of adequate number of assets to diversify risk.
b. Presence of non-diversifiable risks like labor income risk.
c. Behavioral biases.
d. All of the above

25. The system of equations $2x + 3y = 5, 6x + 9y = a$ has infinitely many solutions if a is:

a. 2
b. 15
c. 6

d. 9

26. Which of the following points belongs to the feasible set of the optimization problem:
optimize $\quad x\sqrt{y} \ s.t.: x + y = 3$

    a. (1, 2)
    b. (−1, 2)
    c. (4, −1)
    d. (-1,-1)

27. The eigenvalues of a 4×4 matrix A are given as 2, -3, 13 and 7. The $|det\ (A)|$ then is
    a. 546
    b. 19
    c. 25
    d. cannot be determined

28. If two sub-sequences of a sequence converge to two different limits, then a sequence

    a. may converge
    b. may diverge
    c. is convergent
    d. is divergent

29. The maximum production of a firm is 500 units of a certain good and the shadow price of the available resource is 3. What will be the effect on the maximum production level if the resource were increased by one unit?

    a. The maximum production level would increase by 1500 units
    b. The maximum production level would reduce by 3 units
    c. The maximum production level would increase by 3 units
    d. The maximum production level would decrease by 1500 units.

30. A sequence $\{(-1)^n\}$ is

    a. convergent.
    b. unbounded.
    c. divergent.
    d. bounded.

31. Fill in the blanks for the following sentence:

If $\lim_{x \to c} f(x) = L$, then .... sequence $\{x_n \to c\}$ when $n \to \infty$, one has the limit $\lim_{n \to \infty} f(x_n) = L$.

    a. for some.
    b. for every
    c. for a few.
    d. None of the

32. If A is a square matrix of order n and λ is a scalar, then the characteristic polynomial of A is obtained by expanding the determinant:

a. $|\lambda A|$
b. $|\lambda A - I_n|$
c. $|A - \lambda I_n|$
d. $|\lambda A - I_n \times A|$

33. Which of the following would NOT be a potential remedy for the problem of multicollinearity between regressors?

    a. Removing one of the explanatory variables
    b. Transforming the data into logarithms
    c. Transforming two of the explanatory variables into ratios
    d. Collecting higher frequency data on all of the variables

34. If the residuals of a regression on a large sample are found to be heteroscedastic which of the following might be a likely consequence?

(i) The coefficient estimates are biased
(ii) The standard error estimates for the slope coefficients may be too small
(iii) Statistical inferences may be wrong

    a. (i) only
    b. (ii) and (iii) only
    c. (i), (ii) and (iii)
    d. (i) and (ii) only

35. Which of the following would probably NOT be a potential "cure" for non-normal residuals?

    a. Transforming two explanatory variables into a ratio
    b. Removing large positive residuals
    c. Using a procedure for estimation and inference which did not assume normality
    d. Removing large negative residuals

36. What would be the consequences for the OLS estimator if autocorrelation is present in a regression model but ignored?

    a. It will be biased
    b. It will be inconsistent
    c. It will be inefficient
    d. All of a., b. and c. will all be true

37. If OLS is used in the presence of heteroscedasticity, which of the following will be likely consequences?

    (i)   Coefficient estimates may be misleading
    (ii) Hypothesis tests could reach the wrong conclusions
    (iii) Forecasts made from the model could be biased
    (iv) Standard errors may be inappropriate
    a. (ii) and (iv) only
    b. (i) and (iii) only

c. (i), (ii), and (iii) only

d. (i), (ii), (iii), and (iv).

38.   If a residual series is negatively autocorrelated, which one of the following is the most likely value of the Durbin Watson statistic?

a. Close to zero
b. Close to two
c. Close to four
d. Close to one.

39. Which one of the following is NOT a symptom of near multicollinearity?

a. The R^2 value is high
b. The regression results change substantively when one particular variable is deleted
c. Confidence intervals on parameter estimates are narrow
d. Individual parameter estimates are insignificant

40.   If a regression equation contains an irrelevant variable, the parameter estimates will be

a. consistent and unbiased but inefficient
b. consistent and asymptotically efficient but biased
c. inconsistent
d. consistent, unbiased and efficient.