

ROLL NUMBER -----

Department of Humanities and Social Sciences
PhD Entrance Examination,
ECONOMICS

Max marks: 70

Time allowed: 3 hours

Instructions

- 1. The question paper has 3 sections. Answer all the three sections.*
- 2. Sections 1 and 2 should be answered on the Question paper (in the space provided) and Section 3 can be answered on additional supplement provided in the exam. Answer legibly.*
- 4. Any rough work should be done at the end of the additional answer script and you need to write the final answer.*
- 3. Return both of them separately (do not tie these together).*
- 4. Those shortlisted for interview should bring one page research proposal.*

Section 1 - Multiple Choice Questions/Fill in the blanks (10 Marks – MCQ – 0.5 mark each and fill in the blanks 1 mark)

1. Consider the consumer preferences over two goods, food (good) and labour (bad). If you draw the indifference curve for these two goods with food on X-axis and labour on Y-axis, it will be
 - a. Downward sloping and convex to the origin
 - b. Downward sloping and concave to the origin
 - c. Upward sloping and convex to the origin
 - d. Upward sloping and concave to the origin
2. If inflation this year is lower than expected, then
 - a. Lenders will gain at the expense of borrowers
 - b. Borrowers will gain at the expense of lenders
 - c. The government will gain if it has issued inflation index bonds
 - d. Wealth will be redistributed to achieve equality
3. In the Classical Linear Regression Model, to show that the estimators $\hat{\beta}_i$ s are BLUE we require following assumptions except:
 - a. Zero covariance between explanatory variables and disturbance term
 - b. Disturbance terms follows normal distribution
 - c. No autocorrelation among disturbances
 - d. Regression model is linear in parameters
4. A firm experiencing the Leontief technology, produces good X with two inputs; A and B. If the price of input A rises and the price of B remains the same, we would expect that the firm would (assuming other things constant):
 - a. Produce more X
 - b. Use more A and less B
 - c. Produce less X
 - d. Use more B and less A

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5. A statistician conducted a hypothesis test and found the p-value to be 0.04. Using a 5 percent level of significance, what conclusion should she make?
- Accept the null hypothesis
 - Do not reject the null hypothesis
 - Reject the alternative hypothesis
 - Reject the null hypothesis
6. A higher value of which of the following parameters contributes to a higher extent of crowding out?
- income sensitivity of money demand
 - interest sensitivity of money demand
 - interest sensitivity of investment demand
 - marginal propensity to consume
7. On any given day, the probability that it will rain is 0.32; the probability that there will be high wind is 0.2; and the probability that it will rain and high wind is 0.1. For a randomly selected day, what is the probability that it will rain or there will be high wind?

8. There are 10 firms in a competitive market. Each firm has a cost function $C = 16 + q^2$. The market demand function is $q = 24 - p$. The equilibrium price and quantity per firm is

9. A dependent variable whose values are not observable outside a certain range but where the corresponding values of the independent variables are still available would be most accurately described as what kind of variable? -----
10. You plan to go abroad for higher studies after working for the next five years and understand that an amount of Rs.2, 000,000 will be needed for this purpose at that time. You have decided to accumulate this amount by investing a fixed amount at the end of each year in a safe scheme offering a rate of interest at 10 percent. The amount you should invest every year to achieve the target amount is -----
11. The risk-free return is 8 percent and the return on market portfolio is 16 percent. Stock X's beta is 1.2. Its dividends and earnings are expected to grow at the constant rate of 10 percent. If the previous dividend per share of stock X was Rs.3.00, what should be the intrinsic value per share of stock X? -

12. Assume that you have a fair coin that you are going to toss 100 times. When *heads* come up you gain 1 Rupee and when *tails* come up you lose one Rupee. Your rational expectation regarding your total gains after 100 rounds of tossing when probability of heads is 0.45 is -----
13. Suppose that, in a closed economy, the central bank adjusts the money supply in such a manner that the interest rate, r , is constant. The slope of the AD curve would be ----- and the slope of the LM curve as a result of the central bank's policy would be -----

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ipated increase in the payroll tax (income tax of the labourers) causes an investment because employers want to replace workers by machines.”

nically inefficient if its citizens are short-sighted and save too little”. Savings
ne policy maker in a dynamically inefficient economy.

cooperative factors of production? Give an example

tial contribution to the growth of the economy

**Section III. Answer any three of the following
(To be answered on a supplementary sheet)**

(3 x 10 = 30 marks)

1. Suppose the inverse demand function for a monopolist's product is given by $P = 100 - 2Q$ and the cost function is given by $C(Q) = 10 + 2Q$.

- I) (Given the above scenario 1) If the firm is a single price profit maximizing monopolist then determine the equilibrium price, quantity and the maximum profit.
 II) (Given the above scenario 1) If the firm can exercise a two part tariff determine the
 (a) the constant price
 (b) the per-unit price

2. Consider an economy produces two types of goods, wheat and guns, using two types of input, labor and capital. The economy has an endowment of 400 units of labor and 140 unit of capital. To produce one unit of gun five unit of labor and one unit of capital is required and to produce one unit of wheat four unit of labor and two unit of capital is required. Determine all the cases of

- a. Welfare maximizing combination of guns and wheat
 b. The maximum welfare

When the welfare function is $U(x, y) = x^\alpha y^\beta$ where $\alpha + \beta = 1$. Check the second order condition at the welfare maximizing combinations of gun and wheat.

3. There are two firms in a market who are competing on quantities (like Cournot firms). Both the firms have same cost structure and they produce the Cournot equilibrium output which is the NE output. Suppose one firm has discovered a new untapped market and it has started to sell there.

- a. Draw the best response function of the firms prior to discovering the untapped market and determine the NE outcome
 b. Draw the best response function of the firms following the discovery of the untapped market.
 c. Determine the new NE position

4. Define a *homogenous* and *homothetic* utility function. Use the Euler's Theorem to prove that in case of Marshallian demand function the sum of (own) price elasticity, cross price elasticity and income elasticity is zero.

5. Briefly outline the *S-C-P* Paradigm. Prove that the *degree of market power* can be revealed by $\frac{s_i(1 + \lambda_i)}{\eta}$ where s_i is firm's output share and λ_i is conjectural variation of firm i , η is price elasticity of demand.

6. Consider the following potential outcome model:

$$Y_i(0) = \beta_0 + u_{0i} \text{ if } X_i = 0$$

$$Y_i(1) = \beta_0 + \beta_1 + \gamma W_i + u_{1i} \text{ if } X_i = 1$$

$$\text{where } E(u_{1i}) = E(u_{0i}) = 0$$

Answer the following questions

- a. Using the potential output model ($Y_i = X_i Y_i(1) + (1 - X_i) Y_i(0)$) show that Y_i can be expressed in terms of $X_i, W_i, X_i W_i$
 b. Show that $Cov(v_i, X_i) = 0$ where $(v_i = (u_{1i} - u_{0i})X_i + u_{0i})$
 c. Show that the coefficient of X from the regression of the relation that you had arrived in (a) estimates the treatment effect of X on Y consistently. (Assume: $E(W_i) = 0$; Hint regression coefficient of X in the regression is $\hat{\beta}^{OLS} = \frac{Cov(X, Y)}{Var(X)}$)