

SUBJECT: ECONOMICS

PAPER: ECONOMETRICS (FINAL)

TIME ALLOWED: 3 HOURS

MAX MARKS: 100

NOTE: Attempt any five Questions in all; Question No.1 in section-1 is compulsory. Time for section-1 is only 40 minutes. After expiry of the time, paper should be handed over to the supervisory staff.

SECTION-I

Question No.1 Write a short note on any 20 of the following.

(20 points)

1. Disturbance term.
2. Response variable.
3. Difference between pool and panel data.
4. What is ratio scale variable?
5. What is mean by linear regression model?
6. What is the difference between regression and causation?
7. Differentiate between DF and ADF test
8. Define Dummy variable.
9. What is multicollinearity?
10. What is heteroscedasticity?
11. What is Type-II error?
12. In the presence of autocorrelation which property of the regression estimator is missing?
13. Under specification error.
14. Difference between misspecification and under specification error.
15. Nested models.
16. Non-nested models.
17. What is hypothesis?
18. What is mean by inertia in econometrics?
19. What is 95% confidence interval?
20. What is power of a test?
21. In the presence of multicollinearity by which factor the variance of estimated coefficient changes.
22. Differentiate between trend and difference stationary process.
23. What is spurious regression?
24. Define cointegration?
25. What is data stationarity?
26. What is p-value?
27. What is random walk process with drift and deterministic trend?
28. Differentiate between actual and predicted value of response variable.
29. What is condition index?
30. Define autocorrelation

SECTION-II: ATTEMPT ANY FOUR QUESTIONS. (80 points)

Time allowed 2:20 Hours

Q.No.2 Given the data on units of quantity supplied=Q and Price=P in rupees, collected from 12 different markets of Pakistan.

Q	4	8	9	11	14	16	17	20	25	29	30	30
P	20	19	16	15	14	11	9	8	7	5	3	1

- a) Estimate the supply function $Q_i = \delta_0 + \delta_1 P_i$ of 'Q' on 'P'. (12 points)
- b) Interpret the regression results. Do the results make economic sense? Why and why not? (4 points)
- c) Graph the estimated regression line by taking 'Q' on Y-axis and 'P' on X-axis. (4 points)

Q.No.3 Using the data from 1970-2010, the researcher is testing the existence of cobweb phenomena in wheat production and obtained the following results.

$$QW_t = 20.25 + 1.238P_{t-1} - 0.846QW_{t-1} \quad R^2 = 0.734$$

$$S.E (12.4) (0.323) (0.151) \quad DW = 1.134$$

Where QW_t = Quantity of wheat produced in million bushels and P_{t-1} is the previous price of wheat in RS.

- Interpret the regression line. (5 points)
- Test for the unitary relationship between current production and previous prices of wheat. (6 points)
- Test at 5%, whether there exist a significant relationship between current and lag production of wheat. (6 points)
- Do the results justify the Cob-Web phenomena in wheat production? (3 points)

Q.No.4 using the data of manufacturing production of Pakistan from 1965-2012, the two research estimated the following functions. Where Y, L, K, E and T are the output produced, labor inputs, capital input, energy input and technology respectively.

<u>Researcher-1 Model</u>	<u>Researcher-2 Model</u>
$\hat{Y}_t = 50.1 + 0.65L_t + 0.043K_t$	$\hat{Y}_t = 9.12 + 0.91L_t + 1.12K_t + 0.151E_t + 0.51T_t$
DW=1.85	DW=1.72
S.E= (8.13) (0.217) (0.012)	S.E= (9.98) (0.23) (0.021) (0.012) (0.61)
$R^2 = 0.52$	$R^2 = 0.64$

- Interpret the regression results of both models. (5 points)
- Based on statistical test which model is a better? (10 points)
- What are the model diagnostic tests? (5 points)

No.5 using the data of 200 professors, the higher Education Commission of Pakistan set a monthly wage rate structure for the Public sector University Professor based on the following model.

$$wage = 50000 + 5000DMPHil + 10000DPhD - 3000Ds + 1900Xi + 500Xi * DPHD + 200Xi * DMphil$$

$$(S.E) = (9500) (0.000) (0.000) (1.054) (219.6) (430.1) (30.25)$$

Where X = years of teaching experience

$DMPHil$ = dummy for Professor with MPhil Degree [DMPHil=1 if Professor hold MPhil Degree, otherwise 0]

D_{phd} = dummy for PhD professor [D_{phd}=1 if professor hold PhD degree, otherwise 0]

D_s = dummy for Slum area [D_s = 1 if professor is living in slum area, otherwise 0]

- Interpret the given wage model and test for the statistical significance of the slope coefficients (years of experience coefficient) of MPhil and PhD professor. (10 points)
- Calculate mean monthly wage rate of each category of professors, holding Master, MPhil and PhD degree, with 10 years, 5 years and no experience respectively. (10 points)

Q.No.6 Based on annual data from 1901-2000, Keynes estimated the following consumption function:

$$C = 2.81 + 0.53Y + 0.91P + 0.52W \quad r_{PW} = 0.19 \quad r_{YP} = 0.93 \quad r_{YW} = 0.97$$

$$T\text{-values} = (2.28) (0.34) (0.15) (0.123) \quad R^2 = 0.91 \quad F = 350.8 \quad DW = 0.71$$

Where Y = Income, C = consumption, P = population, W = Wealth.

- Is there any evidence of multicollinearity in regression? How do you know? (8 points)
- Are the regression results valid? Why and why not? (4 points)
- How can you remove multicollinearity from the above regression model, if there exit. (8 points)

Q.No.7.a) what are the assumptions of classical ordinary least square method? Explain. (10 points)

b) Consider the regression results of regressing poverty on population growth and income of 40 countries. Test for the existence of heteroscedasticity in the given regression model. Where, δ^2 is the variance of regression. (10 points)

$$POV = 3.409 + 0.696INC - 0.014POP + v_i \quad R^2 = 0.89 \quad \hat{v}_i^2 / \delta^2 = 28.027 - 0.794INC + 0.87POP \quad R^2 = 0.378$$

$$(S.E) = (1.35) (0.016) (0.89) \quad TSS = 40.17 \quad (S.E) = (1.5) (0.014) (2.2) \quad TSS = 16.8$$

Q.No.8 Given the results of production function of wheat (Q_t), based on data from 1990-2015.

$$Q_t = 3000.52 + 5.716Pt - 2.516Q_{t-1} \quad R^2 = 0.9584 \quad d = 2.1229$$

- Test for the existence of autocorrelation in the regression. (8 points)
- Are the regression results valid? Why? (4 points)
- Given the following data of error term (u_i), test for the existence of autocorrelation. (8 points)

u_i 5 -1 -2 8 -7 -5 8 5 -2 -7 6 -8

Q.No.9 Consider the results of regressing sales (S) on advertisement (AD) of 100 firms.

$$S_i = 192.9 + 0.53AD_i + \mu_i \quad R^2 = 0.71 \quad \ln \mu_i^2 = -3.15 + 5.41AD_i \quad R^2 = 0.94$$

$$S.E = (30.1) (0.0152) \quad DW = 1.67 \quad (S.E) (2.95) (1.83) \quad DW = 1.78$$

- Test for hereoscedasticity in the given regression. (12 points)
- What are the properties of OLS estimators? Explain. (8 points)

Q.No.10a) Testing the existence of unit root in the GDP of Pakistan based on the data from 1973-2000, the results are given below. Test whether the data is stationary or not. (10 points)

$$\Delta GDP_t = 431 + 0.142 GDP_{t-1} - 0.523 \Delta GDP_{t-1} + 0.0831 \Delta GDP_{t-2} + 0.013 \Delta GDP_{t-3} + u_t \quad R^2 = 0.61 \quad R^2 = 0.84$$

$$(S.E) = (6.91) (0.015) (0.0173) (0.0027) (0.0051) \quad DW = 1.93$$

b) The results of regression of GDP on Consumption from 1980-2015 are given below, where GDP and Consumption are unit root non stationary process. Test whether the series are co-integrated or the regression is spurious in nature. (10 points)

$$GDP_t = 431 + 0.142 CONS_t + \epsilon_t \quad R^2 = 0.52 \quad \Delta \epsilon_t = -0.842 \epsilon_{t-1} \quad R^2 = 0.51$$

$$(S.E) = (6.91) (0.015) \quad DW = 0.43 \quad (S.E) = (0.137) \quad DW = 2.12$$

GOOD LUCK

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disqualified for the said paper .

Subject:-

ECONOMICS

Paper:- I(Prev:)

Time Allowed :- 3 Hours

MICRO ECONOMIC THEORY

Max : Marks : 100

Note :- Attempt Five Questions. in All But Question No. 1- in section -I is compulsory and the time for Section- I is only 40 Minutes. After Expiry of the Time paper should be handed over to the supervisory staff.

SECTION -I (OBJECTIVE PORTION 20 MARKS)

Q.No.1 Short Questions :- (Attempt Any 20)

1. What is Production Function?
2. Define concept of Marginal Utility.
3. Give one definition of Economics.
4. Explain surplus situation in the market?
5. Define Demand Curve?
6. MRS stands for what?
7. What is explicit cost?
8. What is an economic good?
9. Define indifference curve?
10. What is Market price?
11. What is scarcity of resources?
12. Differentiate between quantity demand and demand.
13. What is a budget line?
14. What is law of increasing returns?
15. Why indifference curve are negatively sloped?
16. Define inferior goods?
17. What is a product market?
18. What is perfect competition?
19. What is an economic profit?
20. What is price elasticity of demand?
21. What is a firm?
22. Define iso-quant?
23. Describe Economies of Scale?
24. What is monopsony?
25. What is interest rate?
26. What is opportunity cost?
27. What is Marginal Revenue?
28. What is optimal stage of production?
29. What are substitutes; give examples?..
30. Define public goods?

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Section-II (80 Marks)

Attempt any 4 questions each carrying equal marks i.e. 20 marks

- Q.No.2 What are the economic preferences of the consumers? Explain cardinal and ordinal approaches of utility maximization?
- Q.No.3 State and Explain Law of Demand. Explain various determinants of demand with the help of graphs.
- Q.No.4 What is price elasticity of demand? Explain all of its dimensions along with examples and graphs.
- Q.No.5 What is a production function? Make graphical derivation of total, average and marginal product.
- Q.No.6 What are the main features of pure competition? Explain profit maximization situation in the short run in pure competition.
- Q.No.7 What is difference between natural and artificial monopoly? What is price discrimination? Give examples.
- Q.No.8 Prove that price effect is a combination of substitution effect and income effect?
- Q.No.9 What is general equilibrium? Write a note on pareto optimality.
- Q.No.10 Differentiate between externalities and public good comprehensively along with examples

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Subject:- ECONOMICS. Paper:- II(Prev:)
Time Allowed :- 3 Hours Mathematical Economics . Max : Marks : 100

Note :- Attempt Five Questions. in All But Question No. 1- in section –I is compulsory and the time for Section- I is only 40 Minutes. After Expiry of the Time paper should be handed over to the supervisory staff.

SECTION –I (OBJECTIVE PORTION 20 MARKS)

Q.No.1 Short Questions :- (Attempt any 20)

- i. Define ordered pairs .
- ii. Give an example of cobb Douglas production function .
- iii. Define definite integration .
- iv. What is car tesion product .
- v. What is Laplace expansion .
- vi. Define Joc abian determinant .
- vii. What is repeated roots .
- viii. What is unconstrained optimization .
- ix. What is a relative minimum .
- x. What is concept of bordered Hessian determinant .
- xi. Write two laws of Matrix operation .
- xii. Define column vector .
- xiii. Define rectangular hyperbola .
- xiv. Define partial differentiation
- xv. Define slope of the curve .
- xvi. What is inner product .
- xvii. Differentiate between optimum values and extreme values .
- xviii. What is inflection point .
- xix. What is Logarithmic function .
- xx. What is a relative minimum .
- xxi. What is exact differential equation .
- xxii. Define parametric constant .
- xxiii. What is monotonic function .
- xxiv. Define inflection point .
- xxv. What is critical point .

SECTION –II(SUBJECTIVE PORTION 80- MARKS) TIME ALLOWED 2:20

Attempt any Four (04) questions.

Q.2. Given that .

$$Y = C + I_0 + G_0$$

$$C = a + b (y - T)$$

$$T = d + ty$$

Find \bar{Y} , \bar{T} & \bar{C} .

Q.3. a) Given $y = (x^2 + 3)^{-4}$ Use chain rule to find $\frac{dy}{dx}$ Then rewrite the function as

$$\text{as } y = \frac{1}{(x^2 + 3)^4} \text{ \& find } \frac{dy}{dx} \text{ using}$$

Quotient rule . Are the answers identical ?

b) Given utility function for two commodities x_1 & x_2 $U = (x_1 + 2)^2 (x_2 + 3)^3$

i) Find the marginal utility function of both commodities .

ii) Find the marginal utility when three units of each commodity are consumed .

- Q.4. a) Find total differential when :- $y = \frac{x_1 x_2}{x_1 + x_2}$
 b) Given the supply function of a certain commodity .
 $Q = a + bP^2 + R^{1/2}$
 Where P = Price & R = Rain fall .
 i) Find price elasticity of supply (EQP)
 ii) Find rain fall elasticity of supply (EQR)

- Q.5. Optimize :
 Whether the function is a relative maximum or a relative minimum .
 $Y = f(x) = \frac{1}{3} x^3 - 3x^2 + 5x + 3$

- Q.6. a) Integrate by parts $\int x(x+1)^{1/2} dx$
 b) Integrate $\int_0^1 (\frac{1}{4} x^2 - 20)^5 (x) dx$

- Q.7. Given $C = 25 + 6y^{1/2}$
 $I_0 = 16$
 $G_0 = 14$
 i) Find the equilibrium level of nation income (\bar{y})
 ii) Find the equilibrium level of consumption expenditure (\bar{C})
 iii) Prove that: $y = C + I + G$
 iv) Prove that: $S + T = I + G$.

- Q.8. a) Use Jacobian determinant to test the dependence or independence of the following:-
 $Y_1 = 1.5 x_1^2 + 12 x_1 x_2 + 24 x_2^2$
 $Y_2 = 2x_1 + 8x_2$
 b) Determine whether the following functions are homogeneous or not
 i) $z = xy$
 ii) $z = zx + y + 3xy$

- Q.9. a) Use the langrange multipliers method for fine stationary values of :-
 $Z = 2x^2 + 5xy - y^2$
 Subject to $x + 3y = 8$
 b) Solve the following linear programming problem using graphic method .
 $\Pi = 3x_1 + 4x_2$
 $2.5x_1 + x_2 \leq 20$
 $3x_1 + 3x_2 \leq 30$
 $x_1 + 2x_2 \geq 16$
 Given that
 $x_1 \text{ \& } x_2 \geq 0$

- Q.10. Given that .
 $x_1 + 3x_2 = 2$
 $-4x_2 + x_3 = 1$
 $2x_1 - 2x_2 - 3x_3 = 0$

Solve by inverse method .

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SUBJECT: ECONOMICS. PAPER: PREV:-III
ALLOWED: 3 HOURS TITLE: STATISTICS FOR ECONOMISTS Max Marks: 100

NOTE: ATTEMPT ANY FIVE QUESTION IN ALL INCLUDING QUESTION NO I. WHICH IS COMPULSORY. TIME FOR QUESTION NO I IS ONLY 40 MINUTES. AFTER 40 MINUTES PAPERS SHOULD BE HANDED OVER TO THE SUPERVISORY STAFF (CALCULATOR & TABLES ALLOWED)

Section-I (Objective Part)

Q.1. Attempt any 12 Questions.

1. Differentiate between descriptive and inferential statistics?
2. What is the difference between sample and population?
3. Define the Standard error.
4. Distinguish between random experiment and sample space?
5. Briefly describe various measures of relative and absolute dispersions.
6. Describe relationship among mean, median and mode in +vely and -vely skewed data?
7. Explain basic difference among cross section, time series and panel data?
8. Briefly interpret 1st and 2nd moment about mean in normal data.
9. Illustrate with venn diagram mutually and not mutually,exclusive events Z and P.
10. Define binomial experiment and its characteristics.
11. Differentiate between Type II error and power of a test with an example.
12. Explicitly differentiate between simple and composite hypothesis.
13. Define normal distribution.
14. What is -velybiased error?
15. What is meant by bell shaped curve?
16. When t test is used?
17. Define an estimator.
18. Define degrees of freedom.
19. Define confidence interval.
20. What is simple random sample?

Section-II (marks 80) Time Allowed 2:20

Attempt any four questions. All questions carry equal marks.

Q.2 a) Given the following marks distribution on an economics quiz.

Marks	96-100	91-95	86-90	81-85	76-80	71-75	66-70	61-65
Frequency	4	5	7	5	1	4	1	5

Calculate Mean and median and coefficient of variation. Interpret these measures and also comment on the shape of distribution.

b) Given $\Sigma f = 120$, $\Sigma fx = 296$, Mode = 2.94 standard Deviation is 6.82

Calculate coefficient of skewness.

Q.3 a) Discuss the importance of corrected moments in relation to skewness and Kurtosis.

b) Compute the index number for the following data taking 1997 as base year; average of first years as a base.

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
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Prices	9.25	9.8	10.12	9.50	9.25	0.62	0.75	0.75	0.50	0.75
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- Q.4 a) Define probability and its axioms.
 b) For not mutually exclusive events A and B establish the relation by using venn diagram

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

- c) Two drawing each of three balls form a bag containing 5 white and 8 black balls; the balls are not being replaced before the next trial. What are the probabilities that first drawing will give 3 white balls and the second 3 black balls?

- Q.5 a) differentiate between nominal and ordinal measurement scales with examples.
 b) A family has 6 children. Find the probability that there are (i) 3 boys and 3 girls and (ii) fewer boys than girls. The probability that any child being a boy = $\frac{1}{2}$.

- Q.6 a) Explain in detail the component of Time series data.
 b) Data on sales is provided in the table below from 2006-2014. The fitted equation is given by $Y = a + bt$, $t = 1, 2, 3 \dots 9$

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014
Sales(Y)	550	540	580	610	640	510	690	710	740

Compute the adjusted seasonal components for data. Interpret your results.

- Q.7 Two varieties of wheat are to be compared. The researcher planted each of two varieties in 15 different locations where soil and climatic conditions were expected to vary. At the harvest the yield recorded is:

Variety1	40	31	57	58	62	38	45	51	42	38	58	49	51	48	41
Variety2	48	34	59	60	64	44	49	53	46	41	56	51	53	47	44

Test the hypothesis that varieties have the same mean.

- Q.8 A study was made on the amount of converted sugar in a certain process at various temperatures. The data were coded and recoded as follows:

X(Temperature)	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2
Y(Converted Sugar)	8.1	7.8	8.5	9.8	9.5	8.9	8.6	10.2	9.3	9.2	10.5

- a) Estimate the linear regression line, correlation coefficient and r^2 . Also interpret these measures.
 b) Assess the relationship between X and Y with the help of scatter plot.

- Q.9 Explain the methodology of econometrics and considering an example from your own area or economic theory

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Subject:-

Time Allowed :- 3 Hours

Economics

Paper:- VI (Final)

Agricultural Economics

Max : Marks : 100

(For only Private Fresh Candidates)

Note :- Attempt Five Questions. in All But No. 1- in section –I is compulsory and the time for Section- I is only 40 Minutes. After Expiry of the Time paper should be handed over to the supervisory staff.

SECTION –I (OBJECTIVE PORTION 20 MARKS)

Q.No. 1 Write short answer of the following questions (Attempt any 20)

1. What is an agricultural economics?
2. define subsistence farming?
3. Agriculture development?
4. Green revolution?
5. Extensive cultivation?
6. Disguised unemployment?
7. Water logging and salinity?
8. Define land reforms?
9. What is productivity?
10. Commercial forming?
11. Primary products?
12. Karez system?
13. Biological technology?
14. Barren land?
15. Labor intensive technology?
16. Surplus labor?
17. Appropriate technology?
18. Define Usher?
19. Food autarky?
20. Economic holding?
21. Informal credit?
22. Social forestry?
23. Royyatwari system?
24. Agriculture policy?
25. Frictional technology?
26. Diminishing return?
27. Farm mechanization?
28. Fragmentation of land?
29. Problems of rural credit?
30. Nature of land revenue ?

Section-ii (80 marks)

Note: attempt four questions. All questions carry equal marks.

Qno.2. What is the role of agriculture in economic development of a country? Why agriculture is essential for economic development?

Qno.3. Discuss the concept of farm mechanization? Give arguments against and favor of farm mechanization.

Qno.4. It is said that agricultural production process ends at efficient marketing of its production. What are the main problems in the marketing of agricultural production in your own region?

Qno.5. What is the difference between rural credit and agricultural credit? Discuss the main sources of rural credit in Pakistan?

Qno.6. Define green revolution? What are the main factors responsible for green revolution in Pakistan's economy?

Qno.7. What are the main reasons of failure of government policies of agriculture in your country? Give suggestions to improve policy measures.

Qno.8. What is meant by a unit of farming? What solution do you suggest for coordinating the scattered units of cultivation in Pakistan?

Qno.9. Agricultural prices are guideline for consumers and producers, explain how stability in prices can be helpful for economic development?

Qno.10. Write short note on any two of the following

1. Agricultural taxation
2. Biochemical technology
3. Commercialized agriculture