RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College under University of Calcutta)

SECOND YEAR

B.A./B.Sc. FOURTH SEMESTER (January – June) 2015

Mid-Semester Examination, March 2015

Date : 18/03/2015 **ECONOMICS (Honours)**

Time : 11 am – 1 pm Paper : IV Full Marks : 50

[Use a separate answer book for each group]

Group – A

1. Describe how a Pareto optimal solution is reached in the consumption sector when two individuals A and B consume two commodities 1 and 2. [10]

2. Distinguish between Short Run and Long Run derivation of Labor Demand curve for perfectly competitive factor market and perfectly competitive product market. [10]

3. Answer **any one** question : [1×5]
   a) Consider a gamble where a fair coin is tossed until first head comes. One gets Rs. 2^n if first head comes in n^{th} toss.
      i) Construct the lottery [2]
      ii) Calculate expected payoff from the lottery. What does it signify? [3]
   b) Let L be the gamble which gives prizes Rs. 10 and Rs. –10 with equal probabilites and L^* be the gamble which gives prizes Rs. 20 and Rs. –20 with equal probabilities respectively. Show that any risk-averse person will prefer L to L^*. You can consider an initial wealth, $W \geq 20$. [5]

Group – B

4. A random sample of 12 observations is used to estimate a simple linear regression relationship between two variables. Here is a partial ANOVA table

Source	SS	df	Ms	F
Regression				
Error			10	
Total	350			

What percentage of the variation in the dependent variable is explained by the variation in the independent variable (to the nearest integer)? [5]

Answer any two questions :

5. In the context of the simple linear regression with intercept (between y & x, where y : dependent & x : independent), show that the coefficient of determination coincides with the squared coefficient of correlation between y and x. [10]

6. Consider the following model :

   $\Pi_t = \alpha_0 + \alpha_1 \text{UNEMPl}_t + u_t$, where Π_t is the inflation & UNEMPL_t is unemployment. An econometrician, using 42 observations, estimates this model as (Estimated standard errors are in the parentheses) :

   $$\hat{\Pi}_t = \underset{(1\cdot5)}{5} - \underset{(0\cdot2)}{0\cdot5} * \text{UNEMPL}_t$$

   a) What is the marginal effect of unemployment on inflation? [1]
   b) Find out if the slope coefficient is statistically significant at 5% level. [4]
   c) Test the hypothesis $H_0 : \alpha_0 = 1$ against $H_1 : \alpha_0 \neq 1$. [5]

   [Required Table provided at the end]

7. Ecologists have long known that there is a relationship between the amount of precipitation that a location receives and the number of trees that grows in that area. Suppose that the yearly rainfall (x, measured in mm) and the amount of the around covered by trees (y, measured on a scale from 0 to 100) are recorded for 49 geographic locations. In the sample data, x has a sample mean of 1182 & a sample s.d of 226, while y has a sample mean of 50 & a sample s.d of 7. The sample correlation between x & y is 0·67. A simple linear regression model based on the above is $y = \alpha + \beta x + \in$.

We assume the errors $\in$ are independent & normally distributed with mean 0 & constant variance.

a) Use the information provided to calculate the regression equation. [6]

b) Calculate the predicted amount of tree cover for an area that receives 1230 mm of rainfall per year. [2]

c) What percentage of the variability in tree cover is explained by rainfall? [2]

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TABLE IV. *t* DISTRIBUTION*

Values of $t_{\alpha,\nu}$

ν \ α	0.05	0.025	0.01	0.005
1	6.314	12.706	31.821	63.657
2	2.920	4.303	6.965	9.925
3	2.353	3.182	4.541	5.841
4	2.132	2.776	3.747	4.604
5	2.015	2.571	3.365	4.032
6	1.943	2.447	3.143	3.707
7	1.895	2.365	2.998	3.499
8	1.860	2.306	2.896	3.355
9	1.833	2.262	2.821	3.250
10	1.812	2.228	2.764	3.169
11	1.796	2.201	2.718	3.106
12	1.782	2.179	2.681	3.055
13	1.771	2.160	2.650	3.012
14	1.761	2.145	2.624	2.977
15	1.753	2.131	2.602	2.947
16	1.746	2.120	2.583	2.921
17	1.740	2.110	2.567	2.898
18	1.734	2.101	2.552	2.878
19	1.729	2.093	2.539	2.861
20	1.725	2.086	2.528	2.845
21	1.721	2.080	2.518	2.831
22	1.717	2.074	2.508	2.819
23	1.714	2.069	2.500	2.807
24	1.711	2.064	2.492	2.797
25	1.708	2.060	2.485	2.787
26	1.706	2.056	2.479	2.779
27	1.703	2.052	2.473	2.771
28	1.701	2.048	2.467	2.763
29	1.699	2.045	2.462	2.756
30	1.697	2.042	2.457	2.750
40	1.684	2.021	2.423	2.704
60	1.671	2.000	2.390	2.660
120	1.658	1.980	2.358	2.617
∞	1.645	1.960	2.326	2.576