M.A. Examination, 2018
Semester-II
Economics
Course- C-9 [New] / Paper – VI [Old]
(Computer Application)

Time: Three Hours **Full Marks: 40**

Questions are of value as indicated in the margin

Answer ***any four*** questions

1. (a) (i) How do you represent the decimal number 25 in binary system?
   (ii) What is the decimal equivalent of the binary number $(10101)_2$?
   (iii) What is a 'bit' and a 'byte'? 1+1+2 = 4

   (b) What types of charts would you prefer to describe the following data?
   (i) Daily minimum and maximum temperatures in Santiniketan over last six months?
   (ii) Relative share of SC, ST, OBC and General castes within a given population
   (iii) Gender distribution of students in five different classes in the Department of Economics, Visva-Bharati, in 2017-18 academic session.
   (iv) Share of labour, irrigation other inputs in total agricultural production cost. 4

   (c) How would you generate an integer random number between (10,50) in Excel? How would you ensure that once generated, the number will not change every time you refresh the Excel sheet? 2

2. (a) Suppose the values of two variables 'x' and 'y' are entered in the cells A1 and B1 respectively in an Excel sheet. What should be the formula put in cell C1 that computes:
   (i) Cube root of 'x'
   (ii) natural log of 'x'
   (iii) value '10' raised to the power of 'x'
   (iv) value of 'x' as a percentage of 'y'?
   (v) Antilog of 'y'? 5

   (b) Suppose following questions were part of a questionnaire used in a survey among the households in a village. Show how you will format your Excel sheet to enter the data so that anybody can obtain all the necessary information without any need to check the filled-up questionnaires later on.

   Q (i). Caste : (Put √): *1. SC 2. ST 3. OBC 4. GENERAL*

   Q (ii) Average requirement of fuel wood (Put √ at appropriate places):

   _____ *Kg / Quintal / Bundle* per *Day / Week / Month*

   Q (iii). Sources of earning during last six months (*put √ on corresponding option/options):*

   1. Agriculture; 2.Daily wage labourer 3. Business 4. Salaried employment 5. Any Other 5

3. (a) Explain the concept of 'p-value' as reported against a regression result (assume least square regression) by statistical soft wares. How we infer the significance of regressors based on p-values?

P.T.O.

(b) Consider the following part of a regression result generated through Excel.

Variable	Coefficient	t-stat	p-value
INTERCEPT	102.33	T0= 5.18	0.000
X1	0.01	T1= 1.79	0.078
X2	-3.33	T2= -2.25	0.029
X3	3.38	T3= 2.97	0.005
No. of Observation=215; F= 3.69 ; Significance F = 0.018			

Show the relative positions of the t-statistics computed against the regressors X1, X2 and X3 under the t-distribution with appropriate degrees of freedom. Also discuss the level of significance of each of the regressors. 4+6 = 10

4. (a) If data on two variables X and Y are given in two columns of an Excel sheet and you know that Y depends on X, how can you decide about the functional form of the model that you will estimate? Explain your answer with two examples.

(b) In a survey of 50 households data on household's daily expenditure on food (in Rs.) is collected along with family size. Then food expenditure is regressed on family size (FSIZE) in a quadratic form. The partial regression result is produced below:

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	-20.91	27.19	-0.77	0.45
FSIZE	216.26	12.38	17.47	0.00
FSIZESQR	-6.92	1.20	-5.79	0.00

On the basis of the above result, draw a graph showing estimated daily expenditure on food against family size for those households. Explain its shape. 5+5=10

5. Following is the result of a regression that was run in Excel:

	A	B	C	D	E	F
1	***Regression Statistics***					
2	Multiple R	0.59				
3	R Square	?				
4	Adjusted R Square	0.25				
5	Standard Error	?				
6	Observations	30				
7	**ANOVA**					
8		***df***	***SS***	***MS***	***F***	*Signifi-cance F*
9	Regression	4	?	1145	?	0.0231
10	Residual	25	8350	334		
11	Total	29	12930			
12		*Coefficients*	*Standard Error*	*t Stat*	*P-value*	
13	Intercept	216.274	?	10.022	0.0001	
14	X1	0.914	0.4557	2.0059	0.0558	
15	X2	-1.109	1.3353	-0.8303	0.4143	
16	X3	1.459	0.6268	?	0.0284	
17	X4	0.851	1.1926	0.714	0.4819	

(i) Write down the formula for filling up the missing values in the cells marked by interrogation sign (cells **B3, B5, C9, E9, C13** and **D16).** Please note that only formula is required for these cells, NOT the values.

(ii) What is your conclusion regarding the overall significance of the regression?

(iii) Discuss about the significance of each of the four explanatory variables and their possible effect on the dependent variable.

(iv) With the same data, but with a different estimated model, the residual sum of square is found to have reduced to 8000 (instead of current 8350). What will be the change in Total Sum of Squares (TSS)? Why? 3+2+4+1 = 10

6. Suppose 'y', 'x' and 'd' are three variables that are stored in a Stata data file named 'test.dta' and stored in the 'D' drive of the computer hard disk. While 'y' and 'x' are continuous variables,'d' is a binary variable representing presence or absence of a quality in any observation by (0,1). 'y' depends on 'x' linearly but their relationship might be affected by the value of 'd'. Write down the set of commands in Stata sequentially so that you can statistically conclude whether the intercept, or slope or both in the relationship between 'y' and 'x' are affected by 'd'. Discuss your conclusion by considering all possible cases of significance of the estimated coefficients in your regression. 4 + 6 = 10

[Question #7 and #8 are based on the data described at the end of this question paper]

7. Given the description of the data at the end of this question paper, sequentially write the command lines for a Stata DO-file that will execute the following tasks (in same DO file):
   (i) Open the data file, calculate the total income of the households from two possible earning members.
   (ii) Run a regression to check the effect of family size, agricultural land, Education of Head and Age of Head on total income of the household. 10

8. Given the description of the data at the end of this question paper, sequentially write the command lines for a Stata DO-file that will execute the following tasks (in same DO file):
   (i) Open the data file, reshape the data at individual level.
   (ii) Generate new variables and delete all the variables that are not needed to carry out the next task (below)
   (iii) Run an appropriate regression that tells us whether number of years of education of a person increases his chance to get a salaried employment. 10

Description of data for question #7 and #8:

Location of data file on computer: **"C:\Users\Desktop\STATA\Test.dta"**
Number of observation: **100** [household level survey data]

Variable	Description
hhid	Unique identification number of the survey household
fsize	Total number of members in the household
earn1	Name of the first earning member of the household (considered as head of the household)
age1	Age of the first earning member of the household
sex1	Sex of the first earning member of the household [coded: 1= Male; 2= Female]
edu1	Number of years of education of the first earning member [0=illiterate]
occu1	Occupation code (1 to 5, as described at the end of this table) of the first earning member
earn2*	Name of the second earning member of the household
income1	Average annual income (Rs.) of the first earning member from the occupation described in occu1
age2*	Age of the second earning member of the household
sex2*	Sex of the second earning member of the household [coded: 1= Male; 2= Female]
edu2*	Number of years of education of the second earning member [0=illiterate]
occu2*	Occupation code (1 to 5, as described at the end of this table) of the second earning member
income2*	Average annual income (Rs.) of the second earning member from the occupation described in occu2
conexp	Monthly average consumption expenditure of the household
land*	Amount of agricultural land in the household

** Implies some of the values of these variable might be missing (i.e, appears as 'dots')*

Codes used for occupation: 1=Own agriculture ; 2=Daily labour; 3=Own business 4= Salaried employment ; 5= Any other

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