

**Jadavpur University Department of Economics**BA EXAMINATION, 2022 [2<sup>nd</sup>Year, 4<sup>th</sup> Semester]**APPLIED ECONOMICS**

Time: Two Hours

Full Marks: 30

Answer any **three** questions

10 x 3=30

1. (i) Consider the following Cobb-Douglas type production function:

$Q=AL^aK^b$ , where Q is output, L denotes labour units, K is capital and A is an exogenous technology parameter.

Show how one can test for constant returns to scale for the above-mentioned production function. Describe the steps involved in performing the test. Write down a regression equation and show how you can test whether one of the explanatory variables is redundant.

(ii) Estimates of the OLS coefficients may be imprecise in the sense that large standard errors lead to wider confidence intervals. True/False explain. Explain what the VIF is and what is its use.

(iii) Define heteroskedasticity and provide examples of econometric models where heteroskedasticity is likely to exist. Show what steps to be followed to estimate the parameters if heteroskedasticity is present in the model.

(iv) Describe the steps of the DW test for autocorrelation. What are its disadvantages and which alternative tests can you suggest? 2.5x4=10

2. Using data of 4137 college students, following equation was estimated by OLS:

$$\text{colgpa} = 1.392 - 0.0135 \text{ hspcr} + 0.00148 \text{ sat}, \text{ where } n=4137, R^2=0.273$$

where colgpa is measured on a four-point scale, hspcr is the percentile in the high school graduating class (defined so that, for example, hspcr = 5 means the top 5% of the class), and sat is the combined math and verbal scores on the student achievement test.

- (i) Why does it make sense for the coefficient on hspcr to be negative?
- (ii) What is the predicted college GPA when hspcr = 20 and sat = 1,050?
- (iii) Suppose that two high school graduates, A and B, graduated in the same percentile from high school, but Student A's SAT score was 140 points higher (about one standard deviation in the sample). What is the predicted difference in college GPA for these two students? Is the difference large?

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- (iv) Holding hspec fixed, what difference in SAT scores leads to a predicted colgpa difference of .50, or one-half of a grade point? Comment on your answer.  
2+1+4+3

3. Do poets die young? Data was collected on the age of death for different types of writers- novel writers, poets, writers of non-fiction. A one-way ANOVA was performed to test for differences among three types of writers with age at death as the dependent variable. Complete the following ANOVA table and fill in the seven missing values.

Source	DF	Sum of squares	Mean Square	F-value
Model	?	???	1372.1	???
Error	???	25088	???	
Total	122	???		

Write a 2 to 5 sentence report of your description and hypothesis test findings using language as appropriate for a client who is intelligent but is not knowledgeable about statistics. 6+4=10

4. State any research problem for which you may conduct a primary survey. Prepare a short questionnaire for that survey. How can you determine the sample size? Discuss in detail about the sampling method that you may use to conduct the survey and also mention the reason of selecting that method. 1+ 5+1+3=10