**Econometrics final exam questions**

1. Assume you are testing the hypothesis that the mean of the population is … . You have used … observations for the test purposes. You do not have any of the population parameters. What is the statistic you use and what is the critical for … .
2. Assume some test has the degrees of freedom parameter equal to … . If you had … observations which distribution would fit the best for doing the test? What would be critical value for …?
3. There are … observations in the dataset. You are testing the hypothesis that the value of the population mean is equal to …. Sample mean and standard deviation are … and … respectively. What is the p-value for the test?
4. You are testing the hypothesis that population variance is equal to …. Sample variance of … observations is …. What is the test result?
5. There are … companies that sell spaghetti. A cook claims that the average cooking time is the same for all … brands. You are tasked to test this claim. As an experiment you are allowed to cook each brand … times. After calculations you get SST equal to … whereas SSA is equal to …. What is the test result?
6. If the standard error and … statistic for the simple regression slope are …and … respectivly, what is the regression coefficient? Do we reject the test if we had … observations?
7. If R2=… and TSS = … find the value of RSS. Find the value of adjusted R2 if this was a simple regression and we had … observations.
8. Adjusted R-squared for the regression is equal to …. If you had … observations and … variables in the regression, what was the value of R-squared itself?
9. Describe R-squared and provide full mathematical formula for the estimation of this measure.
10. Explain the simple regression assumptions providing proper mathematical notations. What do we get if the assumptions are satisfied?
11. What is the meaning of the slope coefficient for simple regression if both dependent and independent variables are expressed in …? What if we have change independent variable to level forms?
12. Calculate standard error of simple regression in case RSS is … and number of observations is …. How is SER related to R2 of this regression?
13. Consider the following regression: … . Forecast Y for ….
14. Assume we have the following Cobb-Douglas production function estimated via regression analysis: ... . What is the elasticity of output with respect to labor? What kind of returns to scale do we have here?
15. Yt= -17.97 + 0.89X1t + 0.09X2t + et. Assuming TSS = ... and RSS = ... what is the result of testing joint insignificance hypothesis of both slopes (use ... confidence)?
16. Explain the principle of OLS in terms of multiple regression (You do not need to provide full mathematical solution, but you need to provide proper notation).
17. Provide the explanation of OVB with a solid example. Which assumption is violated when we have this problem?
18. You have OVB in simple regression. The omitted variable is positively correlated with both dependent and independent variables. What is the sign of the bias?
19. What is multicollineraity in multiple regression? How can we detect and remedy multicollinerity?
20. You have 5 slope coefficients in you regression. The p-values (ordered with coefficients) are as follows: ... , ..., ..., ..., ... . Which of the coefficients is individually significant with ... level?
21. Assume you are using LM test for a regression with ... observations where you try to restrict ... coefficients. LM test-stat is equal to .... What is the conclusion with ... significance?
22. There are two alternative models of salary: 1) explains salary in terms of ..., 2) explains salary in terms of level and .... Which measure would be better to compare the model if in both cases dependent was level form?
23. Assume the multiple regression below with the standard errors of the coefficients given underneath each (brackets do not mean negative number). Comment on individual significance of the coefficients using … significance level (assume … observations). If you had to use backward elimination technique for variable selection, which variable would you take out first?

$$Y\_{i}=…$$

 (se) …

1. The folowing regression was estimated for the math grades of students. Interpret the results: …
2. You are testing seasonality in the data by including 3 seasonal dummies, no other variables. You have … observations. If the F-stat of your regression is …what can we tell that the seasonality is present?
3. You are given the following regression with the standard errors of coefficients underneath (brackets do not mean negative number):

$$Salary\_{i}=…+…Exper\_{i}+…Exper\_{i}^{2}+…Dm\_{i}+e\_{i}$$

 (se) (…) (…) (…) (…)

where *Salary* represents hourly salary of an individual, *Exper* – experience in years and *Dm* is male dummy which takes the value of 1 if the individual is male and 0 otherwise. Assuming … observations were used for the regression and this is the true model of reality, do you think there is gender discriminations in salaries?

1. Adding two new dummy variables to the regression resulted in … decrease in residual sum of squares (RSS). Assuming that the original regression had … RSS, … sample size and … independent variables, are the new variables jointly significant using … significance level?
2. Assume you are trying to model … using regression analysis. Which functional form would best fit for that purpose and why?
3. The R-squared statistic for the simple regression is equal to … . If the variances of Y and X are equal to … and … respectively, find the covariance between X and Y.
4. After using GLS we get a transformed model with the parameters and statistics as below. Did we succeed in remedying autocorrelation? ...
5. Various statistics for 4 regressions are presented in the table. Which models have first order autocorrelation if you had … observations and … variables in each regression? Is there positive or negative autocorrelation?
6. If R-squared for multiple regression with … independent variables is equal to …, show the correct regression equation.
7. The results of White heteroscedasticity test are presented below. Comment on the possibility of heteroscedasticity (use … significance level). Do we have conflicting results form two approaches to White test?
8. If the scattergram for the squared residuals and explanatory variable of the regression looks like below, how can we improve the regression for heteroscedasticity?
9. If the scattergram for the squared residuals and explanatory variable of the regression looks like below, how can we improve the regression for heteroscedasticity?
10. Assume we are running a JA test and the augmented model is like below. Assuming we can decide on the good model form without doing the reverse model, give the right comment for significant δ.
11. Assume you are conducting Ramsey RESET test to determine correct functional form for the regression. You are suspecting … functional form. If you have a simple regression write down the test procedure.
12. Explain why heteroscedasticity and serial correlation affect … property of BLUE in the regression.
13. If Durbin-Watson … for the regression, find out the … slope coefficient for the regression on residuals.
14. The information on regression residuals is presented in the table. Are regression residuals normally distributed? Is this a relevant assumption?
15. Define and describe dummy variable trap and give one example where you could encounter this.
16. Assume the regression estimation yields the result below. When X2 is equal to …, what is the impact of one unit change in X1
17. Assume you have a regression of salary on experience (exper) and experience-squared (expersq) and the result of the estimation is below. At what point will the experience start influencing salary negatively?
18. You have two regressions explaining the same variable. One regression includes the X and … (model1) whereas the second only includes … of the same X (model2). Assume different statistics about the two regressions are given below. Choose the relevant model and explain the answer?
19. Define and describe heteroscedasticity with mathematical expressions and graphs.
20. Auxilary regression for Breusch-Pagan test has R-squared of …. You have used … observations for the regression. If original regression had … variables, do you have heteroscedasticity?
21. Assume you made an auxiliary regression to test heteroscedasticity with Breusch-Pagan test. In the original regression you had … variables and you ran the regression on … observations. What is the result of testing if … of the auxiliary regression is …?
22. Explain the result of the White heteroscedasticity … test if the test-statistic and p-value are as following: …, ….
23. Assume you are using White heteroscedasticity … test. In the original regression you have … variables and … observations. If you include squared and cross-products in auxiliary regression, what would be your critical value for … test?
24. How do you … the regression to get rid of heteroscedasticity when the error terms are … to explanatory variable in the simple regression?
25. Assume … regression with heteroscedasticity. If there is no specific single variable causing the problem how do you remedy the regression?
26. Assume … model of the form below. What is the short-run propensity of investment growth? …
27. Assume … model of the form below. What is the long-run propensity of investment growth? …
28. Assume the following time-series graph of the earnings per share on J&J company. What kind of trend is more likely in this data?
29. Show two ways you can detrend the time-series data.
30. Do we have seasonality in the following time-series plot of monthly data? If yes, how would you model it?
31. Ljung-Box test statistic for … model is equal to …. Is … good representation of the reality?
32. Assume … competing time-series models for predicting the same stationary data. Which model is a better predictor?
33. Assume the following ADF test result from R. Do we have unit root?
34. Assume we have the following KPSS test result from R. Is data stationary?
35. Assume Durbin-Watson (DW) test-statistic is equal to …. What can you tell about first order autocorrelation in the regression.
36. Assume static time-series regression with only one explanatory variable and 80 observations. If Breusch-Godfrey auxiliary for autocorrelation of order 2 has R-squared of 0.07, do we have autocorrelation of order 2?
37. Provide mathematical expressions and compare … and …. Which one of them has trend?
38. Assume you have a static model. You conduct … test on … of the regression and the result is given below. Can we suspect spurious regression with … significance level?
39. If you have … order autocorrelation in the regression, how would you apply … to get rid of it (provide mathematical formulas)?
40. As with all regressions, time-series regressions should satisfy certain assumptions. State these assumptions with mathematical representations.
41. Assume you are using regression analysis for prediction of average monthly family expenditure in Azerbaijan based on family income. You are interested in the families who have income level equal … manats. Naturally, regression gives you one estimate for one income level. What transformation or procedure would be required to find out … interval for the expenditure if the income level is …?
42. Assume you are trying to define whether Brazilian poultry producers are dumping the prices of exports to Azerbaijan. You have a … data of Azerbaijani imports from …. The suspicion of dumping arose in …. What model would you build to check the dumping?
43. Describe additive method of … time-series when you have … data?
44. Give mathematical representations of … time-series and random walk with drift and explain how those two are different.
45. Explain … process. Mathematically prove that … process is stationary.
46. Assume you have the following static time-series regression. Is there any reason to suspect spurious regression here?
47. If you suspect heteroscedasticity in time-series models, how can you use … model to test that (provide math)?
48. Provide a methodology you can test EMH (efficient market hypothesis) using … .
49. Define and describe GARCH(…,…) model.