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Register Number:

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**ST. JOSEPH’S COLLEGE (AUTONOMOUS), BENGALURU-27**

**M.Sc. BIG DATA ANALYTICS – II SEMESTER**

**SEMESTER EXAMINATION: APRIL 2017**

**BDA 2216 - Advance Statistics**

**Time 2.5 Hours Maximum Marks 70**

**This Question Paper Contains TWO Printed Paper And ONE Part**

**Answer Any Seven questions 7 x10 = 70**

1. A) Differentiate between estimate and estimator. Mention the four good qualities of an estimator. 3

B) Obtain MLE of $μ$ and $σ$ when *X* ~ N($μ,σ^{2}$), $when σ^{2}$ is unknown. 7

1. A) Define maximum likelihood estimator (MLE). Explain invariance property of MLE with an example 6

B) What do you mean by i) Degrees of freedom ii) Standard Error 2

C) State sufficient conditions for consistency. 2

1. A) Explain the types of errors involved in testing of hypotheses and illustrate with an example 5

B) A field of poppies is known to produce flowers with an average height of 64.3cm. To see whether the growth of poppies is affected by the presence of ladybirds, ten thousand were introduced to the field for a summer and then the heights of thirty randomly selected poppies were measured in September. The researchers want to know whether the heights have been affected by the ladybirds. State null and alternative hypotheses and mention an appropriate testing procedure which can be applied in this situation. 5

1. A) What do you mean by normality? Explain any one method for testing validity of normality in detail. 6

B) Explain the difference between R square and adjusted R square. 4

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1. A) Outline one-way ANOVA. 7

B) Write a note on logistic regression. 3

1. A) Stating the assumptions involved, write down multiple linear regression with usual notation with least squares of the coefficients for a (use matrix notation). 5

B) Explain procedure for testing equality of two variances 5

1. State and Prove the Gauss Markov theorem. 10
2. A) Write a note on testing of hypothesis. 5

B) Two random samples drawn from two normal populations are 5

Sample 1 20 16 26 27 23 22 18 24 25 19

Sample II 27 33 42 35 32 34 38 28 41 43 30 37

Test using variance ratio at 5 percent level of significance whether the two populations have the same variances. The value of F11,9 at 5 per cent level of significance is 3.11.

1. A)Derive the variance of the estimator of the constant term and the β coefficient in case of a two variable regression analysis. 6

B) Derive the estimator of the variance of the error term. 4

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