

# Question Paper

Exam Date & Time: 18-Feb-2019 (02:00 PM - 05:00 PM)



## MANIPAL ACADEMY OF HIGHER EDUCATION

**FIRST SEMESTER M.O.T./ M.Sc. M.L.T./ M.Sc. M.R.P./ M.Sc. CLINICAL PSYCHOLOGY/ M.Sc. E.S.S./ M. Opt./ M.Sc. R.T./ M.Sc. ECOCARDIOGRAPHY/M.Sc. CARDIACATHERIZATION & INTERVENTIONAL TECHNOLOGY./ M.Sc. H.I.M./ M.Sc. M.I.T./ M.P.T./ M.Sc. AUDIOLOGY/M.Sc. (S.L.P.) DEGREE EXAMINATION - FEBRUARY 2019**

**SUBJECT: RES 601 - ADVANCED BIOSTATISTICS & RESEARCH METHODOLOGY/ RESEARCH METHODOLOGY & BIOSTATISTICS/ BIOSTATISTICS & RESEARCH METHODOLOGY/ RESEARCH METHODS, EPIDEMIOLOGY & STATISTICS (2018 SCHEME)**

**Monday, February 18, 2019 (14.00 - 17.00)**

**Answer ALL the questions.**

**Marks: 100**

**Duration: 180 mins.**

- 1) The daily numbers of animals treated at a certain veterinarian clinic over a 20-day period are as follows: (8)  
22 17 19 31 28 29 21 33 36 24 15 28 25 28 22 27 33 19 25 28  
Calculate mode and the three quartiles.
2. **Differentiate between the following:**
- 2A) Discrete variables and continuous variables. (4)
- 2B) Stratified sampling and quota sampling. (4)
- 2C) Type II error and power of the test. (4)
- 2D) Reference range and confidence interval. (4)
3. **Explain the following with an example:**
- 3A) The model used in survival analysis and interpretation of its coefficients. (4)
- 3B) Sensitivity and specificity of diagnostic test. (4)
- 4) State the assumptions to perform one way ANOVA. Explain the situation to use Kruskal Wallis test with an example. (8)
- 5) Illustrate the procedure of sample selection by systematic sampling. Enumerate its uses and limitations. (6)
- 6) Describe the contents incorporated in the methodology section of a research thesis/protocol. (5)
- 7) With the help of a schematic diagram explain retrospective cohort study design and its (10)

analysis.

- 8) Differentiate between stratified and block randomization methods used in clinical trials. (6)
- 9) Given below are the Category Fluency Test scores of 8 subjects randomly selected from a normally distributed population of early Alzheimer's disease. Construct 95% confidence interval for the population mean.  
11 10 6 3 11 10 9 11 (5)
- 10) A hospital administrator wishes to know what proportion of discharged patients is unhappy with the care received during hospitalization. How large a sample should be drawn if we let the absolute error margin as 3 percent, the confidence interval is 95% and the anticipated percentage of unhappy patients is 30? (4)
- 11) A study was planned to find whether there is any difference in the average RBC Cholinesterase values between alcoholic and non-alcoholic adult males. What should be the minimum sample size required in each group to detect a clinically significant difference of  $2 \mu\text{mol}/\text{min}/\text{ml}$  at 90% power and 5% level of significance? Assume the pooled standard deviation of RBC Cholinesterase values is  $6 \mu\text{mol}/\text{min}/\text{ml}$ . (4)  
 $(Z_{1-\alpha/2} = 1.96, Z_{1-\beta} = 1.28)$
- 12) State the assumptions to perform a linear regression analysis. What information is contained in the coefficient of determination? (6)
13. Suppose the systolic blood pressure of adult males is approximately normally distributed with mean 130 mmHg and standard deviation 10 mmHg. In a sample of 600 apparently normal adult males, how many will be with systolic blood pressure.
- 13A) More than 140 mmHg. (2)
- 13B) In the range 120 - 150 mmHg. (2)
- 13C) Below 130 mmHg. (2)

- 14) In a study of diabetes, the following results were obtained from samples of males and females above 35 years of age. (8)

	<b>Number of participants</b>	<b>Number of diabetic cases</b>
<b>Males</b>	100	46
<b>Females</b>	76	32

Can one conclude on the basis of this data that in the sampled populations there is a difference in proportions that are diabetic among males and females? (Let  $\alpha = 0.05$ )

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