

**BSc (Honours) Semester -III Examination 2020**

Subject- Statistics

Paper- CC6B (Statistical Inference-Practical)

Full Marks: 20

Time: 2 hours

Answer all questions:  
(Notations have usual meanings)

1. Let 0.3, 0.8, 0.2, 0.9, 0.2, 0.4, 0.8 are random sample from  $U(0, \theta)$ . Compute an unbiased estimate of  $\theta$ . 5

2. Let  $-2, 5, -6, 9, -5, -9$  be the observed values of a random sample of size 6 from a discrete distribution having probability density function

$$f(x, \theta) = \begin{cases} e^{-(x-\theta)} & , \text{if } x > \theta \\ 0, & \text{otherwise} \end{cases}$$

Then find the maximum likelihood estimate of  $\theta$ . 5

3. Let  $X$  be a random variable with probability density function  $f \in \{f_0, f_1\}$ , where

$$f_0(x) = \begin{cases} 2x, & \text{if } 0 < x < 1 \\ 0, & \text{otherwise} \end{cases}$$

and

$$f_1(x) = \begin{cases} 3x^2, & \text{if } 0 < x < 1 \\ 0, & \text{otherwise} \end{cases}$$

Let we wish to test the null hypothesis  $H_0: f = f_0$  against the alternative hypothesis  $H_1: f = f_1$ . Find the most powerful test at level of significance  $\alpha = 0.19$ . 5

4. Let  $X$  be a binomial distribution with parameter  $n$  and  $p, n = 3$ . For testing the hypothesis  $H_0: p = 2/3$  against  $H_1: p = 1/3$ , let a test be: "Reject  $H_0$  if  $X \geq 2$  and accept  $H_0$  if  $X \leq 1$ ". Then find the probabilities of Type-I and Type-II errors. 5