Roll No. .....

Y – 3185 (A)

M.A./M.Sc. (Mathematics) (Fourth Semester) (SPECIAL)

EXAMINATION, August 2021

(SECOND CHANCE)

Paper – 410

ADVANCED MATHEMATICAL STATISTICS

Time : Three Hours

Maximum Marks : 85 (For Regular Students) *Minimum Pass Marks : 29*

Maximum Marks : 100 (For Private Students) *Minimum Pass Marks : 34*

Note—Attempt *all* questions.

1. Fit an exponential curve of the form $y = ab^x$ to the following data— 17/20

x	y
1	1
2	1.2
3	1.8
4	2.5
5	3.6
6	4.7
7	6.6
8	9.1

2. Write probability density function of normal distribution. Show that for normal distribution

$$\mu_{2n} = \sigma^2(2n-1)\mu_{2n-2}$$

and $$\mu_{2n} = 1.3.5.....(2n-1)\sigma^{2n}$$ 17/20

3. Let T_1 and T_2 be unbiased estimator of $\gamma(\theta)$ with efficiencies e_1 and e_2 respectively and $\rho = \rho_\theta$ be the correlation coefficient between them. Prove that— 17/20

$$\sqrt{e_1e_2} - \sqrt{(1-e_1)(1-e_2)} \le \rho \le \sqrt{e_1e_2} + \sqrt{(1-e_1)(1-e_2)}\,.$$

P.T.O.

4. Define F-distribution. Prove that for F-distribution— 17/20

$$\mu'_r = \left(\frac{v_2}{v_1}\right)^r \frac{\left|\frac{v_1}{2}+r\right| \left|\frac{v_2}{2}-r\right|}{\left|\frac{v_1}{2}\right| \left|\frac{v_2}{2}\right|}$$

Also obtain its mean and variance.

5. The varieties A, B, C, D of wheat were sown in 4 plots each and the following yields in quintals per acre were obtained : 17/20

A	8	4	6	7
B	7	5	5	3
C	2	5	4	4

Test the significance of difference between the yields of the varieties. Given that 5% tabulated value of F for 2 and 9 degrees of freedom is 4.26.