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W-3316(A)

M.A./M.Sc. (Fourth Semester) Examination, (Second Chance) June-2020

MATHEMATICS

Paper - 410

Advanced Mathematical Statistics

Time : Three Hours

Maximum Marks : 85

Minimum Pass Marks : 29

Note : Attempt **all** questions.

Unit - I

Q.1. Find the Karl Pearson's coefficient of correlation between height of fathers and sons:

Height of fathers	65	66	67	67	68	69	70	72
Height of Sons	67	68	69	68	72	72	69	71

Unit - II

Q.2. Write the standard form of probability density function of normal distribution. Prove that $\mu_n' = 0$ when n is odd and $\mu_n' = \frac{2^{n/2}\sigma^n}{\sqrt{\pi}}\left|\frac{n}{2}+\frac{1}{2}\right.$, when n is even. Also obtain the recurrence relation $\mu_{2n} = (2n-1)\sigma^2\mu_{2n-2}$.

Unit - III

Q.3. Let T_1 and T_2 be unbiased estimate of $\gamma(\theta)$ with efficiencies e_1 and e_2 respectively and ρ be the correlation coefficient between them. Then prove that $\sqrt{e_1e_2}-\sqrt{(1-e_1)(1-e_2)} \le \rho \le \sqrt{e_1e_2}+\sqrt{(1-e_1)(1-e_2)}$.

Unit - IV

Q.4. The outputs of two machines A and B are given

Hours	Machine A	Machine B
1	12	10
2	8	12
3	15	12
4	8	7
5	16	16
6	20	22
7	18	20
8	19	10
9	15	12
10	27	25
11	11	16
12	24	21
13	17	17
14	19	15
15	13	17
16	9	10
17	11	10
18	26	7

Test the null hypothesis that the output of Machine A is same as Machine B.

Unit - V

Q.5. The following table gives the yield of wheat per acre for trial plotes treated with four different levels of fertilizer. Each level was applied to 5 plots randomly chosen over a field.

	Treatment			
Plot No.	I	II	III	IV
1	21	24	34	40
2	25	33	26	47
3	31	34	38	39
4	17	39	32	41
5	26	35	35	33

Carryout one way analysis of variance and state your conclusion,

Given, F(3,16) at 5% level of significance = 3.24.