



1-4-2016

Integrated M.Sc.-I (Second Semester)
Mid-Semester Examination 2015-16
Department of Mathematics, SOPS, Doon University Dehradun
Generic Course-II, Econometrics (MAG-152)

Time Allowed: 2Hours

Maximum Marks: 30

Note: (i) Attempt All Questions from Sections A,B,C (ii) Do neat & clean work.

SECTION A

Attempt ALL:

(1x6=6)

1. If $Y = b$, where b is a constant, what is $\text{Cov}(X, Y)$?
2. If $Y = V + W$, what is $\text{Var}(Y)$?
3. Which probability distribution is used to test for differences between two population variances?
4. If we are testing for the difference between the means of two related samples with samples of $n_1 = 20$ and $n_2 = 20$, what is the number of degrees of freedom?
5. What is the standard deviation of a binomial distribution where $n = 16$ and $p = 0.20$?
6. At a certain intersection, the light for eastbound traffic is red for 15 seconds, yellow for 5 seconds, and green for 30 seconds. Find the probability that out of the next eight eastbound cars that arrive randomly at the light, exactly three will be stopped by a red light.

SECTION: B

Attempt ALL:

(3x4=12)

1. Derive the least squares approximations of the type $ax^2 + bx + c$ to the function $2x$ at the points $x_i = 0, 1, 2, 3, 4$.
2. If $z = ax + by$ and r is the correlation co-efficient between x and y , show that
$$\sigma_z^2 = a^2\sigma_x^2 + b^2\sigma_y^2 + 2abr\sigma_x\sigma_y$$
3. The following results were obtained from marks in Applied Mechanics and Engineering Mathematics in an examination:

	Applied Mechanics (x)	Engineering Mathematics (y)
Mean	47.5	39.5
Standard Deviation	16.8	10.8

$r = 0.95$.

Find both the regression equations. Also estimate the value of y for $x = 30$.
4. The average no. of articles produced by two machines per day are 200 and 250 with standard deviations 20 and 25 respectively on the basis of records of 25 days production. Can you regard both the machines equally efficient at 5% level of significance?

SECTION C

Attempt ALL:

(6x2=12)

1. (a) Out of 800 families with 4 children each, how many families would be expected to have (i) at least one boy (ii) no girl (iii) at most two girls? Assume equal probabilities for boys and girls.
(b) Out of 800 families with 5 children each, how many would you expect to have (i) 3 boys (ii) 5 girls (iii) either 2 or 3 boys? Assume equal probabilities for boys and girls.
2. The income of a group of 10,000 persons was found to be normally distributed with mean ₹ 750 p.m. and standard deviation of ₹ 50. Show that, of this group, about 95% had income exceeding ₹ 668 and only 5% had income exceeding ₹ 832. Also find the lowest income among the richest 100.