KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DEPARTMENT OF MATHEMATICS & STATISTICS
DHAHRAN, SAUDI ARABIA

STAT 502: Statistical Inference
Semester 142
Second Major Exam (Subjective)
Wednesday May 20, 2015
7:30 − 9:00 pm

Q.No.1:- (9+6=15 points)

(a) Derive the formula for obtaining confidence interval for the difference between the means of two (independent) normal populations having equal variances.

(b) Two suppliers manufacture a plastic gear used in a laser printer. The impact strength of these gears measured in foot-pounds is an important characteristic. A random sample of 10 gears from supplier 1 results in $\bar{x}_1 = 290$ and $s_1 = 18$, while another random sample of 16 gears from the second supplier results in $\bar{x}_1 = 321$ and $s_1 = 21$. Construct a 98% confidence interval estimate for the difference in mean impact strength (assuming the equality of population variances), and interpret this interval.

Q.N.2:- (4+6=10 points)

(a) Given the nine sample values $4.5, 6.5, 3.8, 4.2, 7.7, 8.5, 9.4, 5.3, 3.9$ from a normal distribution with mean μ and variance 4. Find the best critical region for testing $H_0: \mu = 4$ against $H_1: \mu > 4$ of size 0.005.

(b) Is the test derived in part (a) uniformly most powerful unbiased (UMPU) test? Why?

With the Best Wishes