THE OPEN UNIVERSITY OF SRI LANKA
B.Sc./B.Ed. Degree Programme, Continuing Education Programme
APPLIED MATHEMATICS – LEVEL 05
AMU 3189/ AME 5189- STATISTICS II
CLOSE BOOK TEST - 2010/2011

Duration: One and Half Hours.

Date: 29.03.2011	**Time: 4.00 p.m. – 5.30 p.m.**

Non programmable calculators are permitted. Statistical tables are provided.

Answer all questions.

(1) Mrs. Perera and Mrs. Silva are two teachers who teach Mathematics for grade ten in the Sunethra Collage. Mrs. Perera teaches Mathematics for 28 students in grade 10A and Mrs. Silva teaches Mathematics for 34 students in grade 10 B. The sectional head wants to know that teachings of the both teachers are equally effective. Marks of the year end examination in 2010 were observed and following statistics were calculated.

Variable	Count	Mean	StDev	Median
Mrs. Prerera	28	52.74	14.96	52.86
Mrs. Silva	34	60.33	16.55	61.76

From the past experience it is known that the Mathematics marks of grade 10A and grade 10B are distributed with equal variance.

(i) Suggest a suitable Statistical test to test the requirement of the sectional head.

(ii) Conduct the Statistical test what you have suggested in the part (i) to test the requirement of the sectional head. Use 5% level of significance.

(iii) Interpret the results obtained in part (ii). Give your conclusion regarding the requirement of the sectional head.

(iv) State all the assumptions that you have made in part (i) , (ii) and (iii)

(2) An inventor has developed a new, energy-efficient lawn mower engine. He claims that the engine will run continuously more than for 5 hours (300 minutes) on a single gallon of regular gasoline. To test inventor's claim a simple random sample of 25 engines are tested. The engines run for an

average of 295 minutes, with a standard deviation of 20 minutes. Assume that run times for the population of engines are normally distributed.

(a) Construct 95% confidence interval for the mean runtime of the engine on a single gallon of regular gasoline. Interpret your answer.

(b) Suppose you are asked to conduct a statistical test to test the inventor's claim.

(i) Clearly sate the null hypothesis and the alternative hypothesis that you should test.

(ii) In the context of this situation describe type I and type II errors.

(iii) What is your conclusion at 0.5 level of significance.

(3) A public opinion poll surveyed a simple random sample of 1000 voters in a particular area. Respondents were classified by gender (male or female) and by voting preference (Republican, Democrat, or Independent). Results are shown in the Contingency table below.

	Voting Preferences			
	Republican	**Democrat**	**Independent**	**Row total**
Male	200	150	50	400
Female	250	300	50	600
Column total	450	450	100	1000

(i) The researcher says that the proportion of males and the proportion of females are equal in that particular area. Conduct a statistical test and give your conclusion to test the researchers view. Use a 0.05 level of significance.

(ii) Do the men's voting preferences differ significantly from the women's preferences? Conduct a statistical test and give your conclusion. Use a 0.05 level of significance.