The Open University of Sri Lanka

B.Sc/B.Ed. DEGREE, CONTINUING EDUCATION PROGRAMME

No Book Test - 2016/2017

Level 05 - Applied Mathematics

APU3147/APE5147– Statistical Inference

Duration: - One Hour.

DATE: - 28-10-2017   **Time: - 9.00 a.m. to 10.00 a.m.**

Non programmable calculators are permitted. Statistical tables are provided.

Answer all questions.

1.

In a particular school Mathematics Mark of a randomly selected student is denoted by X.

Suppose $X \sim N(\mu, \sigma^2)$, μ and σ^2 are unknown.

Let X_1, X_2, X_3,………. X_{20} denotes a random sample of X with size 20 .

Let $\bar{X} = \frac{\sum_{i=1}^{20} X_i}{20}$

Mathematics marks of randomly selected 20 students in grade ten are collected. The estimated mean of the Mathematics marks, estimated standard deviation of the Mathematics marks, standard error of the estimated sample mean of the Mathematics marks and 95% confidence interval for the mean of the mathematics marks in grade ten students were estimated from the selected sample. The results are given bellow.

Variable	n	$\hat{\mu}$	$\hat{\sigma}$	Standard Error($\hat{\mu}$)	95% CI for μ
Marks	20	48.18	11.99	2.24	(43.79, 52.56)

State whether the following statements are true or false.

(i)   Standard deviation of $\bar{X}$ = 11.99

(ii)   Bias($\bar{X}$) = 0

(iii)   Estimated mean of $\bar{X}$ = 48.18

(iv) $MSE(\widehat{(\overline{X})}) < 7$

(v)   For any sample from X, sample mean $= 48.18$

(vi)   With 95% confidence we can say that X is in between 43.79, 52.56

(vii)   With 95% confidence we can say that $\overline{X}$ is in between 43.79, 52.56

(viii)   With 95% confidence we can say that mean of the mathematics marks in grade ten student is in between 43.79, 52.56

(ix)   The principal comment with 95% confidence that the mean of the mathematics marks of the grade 10 students is 50.

(x)   Vice principal comment with 95% confidence that the mathematics marks of a randomly selected student in grade 10 is 50.

2.

Suppose weight of a certain product, produced by ABC Company, follows normal distribution. However, the mean weight and variance weight of randomly selected product is unknown. Weights of 16 randomly selected products in grams are given bellow.

93.91	95.36	106.84	98.11	96.64	94.76	97.25	105.04
104.82	93.98	95.63	96.47	98.67	98.42	102.55	105.79

(i)   Find the 95% confidence interval for mean weight of a product and interpret the results.

(ii)   Find the 90% confidence interval for variance weight of a product and interpret the results.