



UNIVERSITY OF GHANA
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FIRST SEMESTER EXAMINATIONS: 2012/ 2013

LEVEL 300: BACHELOR OF SCIENCE IN ENGINEERING

BMEN 305: RESEARCH METHODOLOGY (1 Credit)

TIME ALLOWED: **ONE HOUR**

INSTRUCTIONS: **Answer all questions.** Relevant statistical table will be provided.

- 1a. Mention two advantages and two disadvantages with the following methods of data collection.
 - i. Interviews
 - ii. Observation
- b. A NASA engineer would prefer to throw out an electric circuit that is really fine than to use one on a space craft that is actually broken. In taking that decision, he has committed an error, state the type of error committed and explain why he would prefer to commit that error.
- 2a. What is meant by probability sampling? List four techniques of probability sampling.
- b. With suitable examples, explain any two of the sampling techniques mention in (2a).
3. The weight of a costly catalyst electrodes purchased by a chemical company follows normal distribution. The sales manager of the vendor firm claims that the mean weight of the electrode is 150 gm. The quality manager of the chemical company wants to verify the claim. So he has taken a sample of 25 electrodes. The mean and the variance of the electrodes in the sample are found to be 145 gm and 100 gm, respectively. Verify the claim of the sales manager at a significance level of 0.05.

4. The internal diameter of shafts produced in a machine follows normal distribution with the variance of 225 mm. A random sample of 64 shafts taken from the production has its mean diameter of 100 mm. Find the confidence interval for the diameter of shafts at a significance level of 0.10.
5. The age of students undergoing postgraduate programme in distance mode follows normal distribution whose population is infinite. The expected mean of the age of the students is 45 years and its variance is unknown. The researcher feels that the mean age of the students is significantly less than the expected mean age of the population. So, he has selected a random sample of 125 students and its mean and variance are found to be 50 years and 25 years respectively. Verify the intuition of the researcher at a significance level of 0.10.

