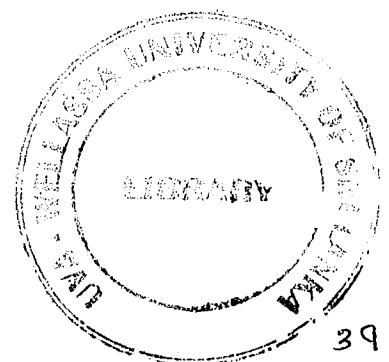


Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Computer Science and Technology
200 level 1st Semester Examination – June / July 2017
CST 212-3 Statistical Methods I



Part C: Essay Questions (30 mark)

1. In a certain province 60% of registered voters are Republicans, 30% are Democrats and 10% are Independents. When those voters were asked about increasing military spending 40% of Republicans opposed it. 65% of the Democrats opposed it. 55% of the Independents opposed it.
 - a) What is the probability that a randomly selected voter in this province opposes increased military spending? (2 mark)
 - b) Suppose we observe that the chosen person will oppose increase military spending. What is the probability that person is a Republican? (4 mark)

2. The Edwards's Theater chain has studied its movie customers to determine how much money they spend on concessions. The study revealed that the spending distribution is approximately normally distributed with a mean of \$4.11 and a standard deviation of \$1.37.
 - a) What percentage of customers will spend less than \$3.00? (3 mark)
 - b) What percentage of customers will spend in between \$3.00 and \$4.00? (3 mark)
 - c) Calculate to the spending amount corresponds to the top 87th percentile? (4 mark)

3. A manufacturer of paper used for making grocery bags is interested in improving the tensile strength of the product. The Product Engineer thinks that tensile strength is a function of the hardwood concentration in the pulp and that the range of hardwood concentration s of practical interest is between 5% and 20%. A team of engineers responsible for the study decides to investigate 4 levels of hardwood concentration: 5%, 10%, 15% and 20%. They decide to makeup six test specimens at each concentration level, using a pilot plant. All 24 specimens are tested on a laboratory tensile tester, in random order. The data from this experiment are as follows,

Hardwood Concentration (%)	Observation					
	1	2	3	4	5	6
5	7	8	15	11	9	10
10	12	17	13	18	19	15
15	14	18	19	17	16	18
20	19	25	22	23	18	20

- a) Suggest the suitable model to analyze this data. (2 mark)
- b) Write down the appropriate hypothesis to test the significance difference in the hardwood concentration. (4 mark)
- c) Obtain the degree of freedom for the Hardwood concentration, Error and Total and calculate the F-ratio value. (4 mark)
- d) Compare the calculated F-ratio value with F table value at 95% significance level and State whether the each hardwood concentration are equally effect. (4 mark)
- ($F_{3,20}(0.05) = 3.09$)

Source	Degree of freedom	Sum of squared values	Mean sum of squared	F-Ratio
Hardwood concentration		382.79	127.60	
Error		130.17	6.51	
Total		512.96		

