



Terminal Examination – Semester Fall 2017

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Course Title:	Statistics and Probability Theory				Course Code:	MTH-262	
Course Instructor's:	Dr. Aamir Sanaullah, Dr. Riflat Jabeen, Dr. Muhammad Ismail				Program Name:	BSE DDP & SDP BCS DDP & SDP	
Semester:	4 th & 5 th	Batch:	FA14, SP14	Section:	A, B	Date:	
Time Allowed:	03 Hour				Maximum Marks:	50	
Student's Name:	Sahar Tania				Reg. No.	CIIT/ FA15-BCS-120	
Important Instructions / Guidelines:							
<ul style="list-style-type: none"> Attempt all questions. Use of Calculator is allowed. 							

Question 1

(7+6)

- a) According to a dietary study, a high sodium intake may be related to ulcers, stomach cancer, and migraine headaches. The human requirement for salt is only 220 milligrams per day, which is surpassed in most single servings of ready-to-eat cereals. If a random sample of 20 similar servings of certain cereal has a mean sodium content of 244 milligrams and a standard deviation of 24.5 milligrams, does this suggest at the 0.05 level of significance that the average sodium content for a single serving of such cereal is greater than 220 milligrams? Assume the distribution of sodium contents to be normal. $z = 4.3848$
We accept.
- b) It has been reported that 40% of the adult population participate in computer hobbies during their leisure time. A random sample of 180 adults found that 65 engaged in computer hobbies. At $\alpha = 0.01$, is there sufficient evidence to conclude that the proportion differs from 40%? H_0 accept, $z = -1.06$

Question 2

(6+7)

- a) Johnson Electronics makes calculators. Consumer satisfaction is one of the top priorities of the company's management. The company guarantees a refund or a replacement for any calculator that malfunctions within 2 years from the date of purchase. It is known from past data that despite all efforts, 5% of the calculators manufactured by the company malfunction within a 2-year period. The company mailed a package of 10 randomly selected calculators to a store. Find the probability that exactly 2 of the 10 calculators will be returned for refund or replacement within a 2-year period. 7.4635
- b) The line width for semiconductor manufacturing is assumed to be normally distributed with a mean of 0.5 micrometer and a standard deviation of 0.05 micrometer.
- What is the probability that a line width is greater than 0.62 micrometer? 0.0012
 - What is the probability that a line width is between 0.47 and 0.63 micrometer? 0.721
 - What is the probability that a line width is less than 0.38 micrometer? 0.0082





Question 3

(6+6)

While browsing through the magazine rack at a bookstore, a statistician decides to examine the relationship between the price of a magazine and the percentage of the magazine space that contains advertisements. The data are given in the following table.

Percentage containing ads	37	43	58	49	70	28	65	32
Price (\$)	5.5	6.95	4.95	5.75	3.95	8.25	5.5	6.75

- Find the estimated regression equation of price on the percentage containing ads. $\hat{p} = -0.172$
- Is there a positive or a negative correlation between the price and the percentage containing ads. $r = -0.8380$

Question 4

For the following frequency distribution.

(3+3+3+3)

Class Limits	10-19	20-29	30-39	40-49	50-59
Frequency	3	5	10	8	4

- Find relative frequencies of the employees. 6.8%
- Find arithmetic mean. 36.167
- Find the median for the above given frequency distribution. 36.5
- Find coefficient of variation for above. 2.1125