IT								

1025

Sri Lanka Institute of Information Technology

B.Sc. Special Honours Degree
in
Information Technology

Mid-Term Examination
Year 2, Semester 1 (2013)

MA220 Probability & Statistics

Duration: 1 Hour

.....
(Time.....)

Instruction to Candidates:

- Answer in the paper itself.
- Calculators are allowed.
- Total Marks 20.
- This paper contains 5 printed pages without Cover Page.
- Electronic devices capable of storing and retrieving text, including electronic dictionaries and mobile phones are not allowed.

Part I: Underline the correct answer(s). [Total marks 10]

1. The sample mean and the standard deviation of the following data is given respectively:

72, 72, 73, 68, 69, 75, 65, 70

(a) 70.5, 3.16

(b) 70, 3.02

(c) 65, 3.5

(d) 70, 9.4

(e) None of the above

2. The sample space of the discrete random variable X is $S = \{1,2,3,4,5\}$. $P(X = x) = \frac{x}{15}$. What is the probability that $X \geq 3$?

a) $\frac{3}{15}$

b) $\frac{12}{15}$

c) $\frac{9}{15}$

d) $\frac{6}{15}$

e) None of the above

3. A family has two children. What is the probability that both are boys, given that at least one is a boy?

a) $\frac{3}{4}$

b) $\frac{2}{3}$

c) $\frac{1}{4}$

d) $\frac{1}{3}$

e) None of the above

4. If, for a random variable X, we have $E(X) = 2$ and $E(X^2) = 10$, find Var(X).

a) 6
b) 8
c) $\sqrt{6}$
d) $\sqrt{8}$
e) None of the above

5. Suppose that A and B are two events with P(A) = 0.6, P(B) = 0.5 and P(A□B) = 0.9. Evaluate P(A ∩ B).

a) 0.1
b) 0.2
c) 0.4
d) 0.3
e) None of the above

6. Two fair dice, each with 5 sides, are rolled. Find the probability that the sum is 8.

a) $\frac{3}{25}$
b) $\frac{2}{25}$
c) $\frac{1}{5}$
d) $\frac{1}{25}$
e) None of the above

7. A company purchases large lots of a certain kind of electronic device. What is the mean of the number of defective units found in a sample of 100 units if the lot is 1% defective?

(a) 5
(b) 1
(c) 0.99
(d) 3
(e) None of the above

8. Poisson parameter for arrivals of aircrafts for a period of t hours is $\lambda = 6t$. What is the probability that exactly 4 arrive during a 1-hour period?

(a) e^{-6}
(b) $e^{-12}12^4$
(c) $\frac{e^{-12}12^4}{4!}$
(d) $\frac{e^{-6}6^4}{4!}$
(e) None of the above

9. A continuous random variable x that can assume values between $x = 0$ and $x = 1$ has a density function given by $f(x) = x$. Find $P(0 < x < 1)$.

(a) 0.25
(b) 0.5
(c) 0.75
(d) 0.1
(e) None of the above

10. The z score for the mean is:

a) $+1$
b) -1
c) 0
d) 2
e) None of the above

Part II: Answer in the space provided. [Total marks 10]

1. The following data represent the length of life in years, measured to the nearest tenth, of 30 similar RAM cards.

1.0	1.2	1.2	1.3	1.3	1.4	1.5	1.5	1.5	1.7
1.9	1.9	2.0	2.2	2.3	2.5	3.0	3.3	3.7	4.3
4.5	4.7	4.7	5.0	5.0	5.0	5.0	5.6	5.9	6.5

This data was analyzed using SPSS and the output given below was obtained.

Descriptives

			Statistic	Std. Error
x	Mean		3.0867	.31359
	95% Confidence Interval for Mean	Lower Bound	2.4453	
		Upper Bound	3.7280	
	5% Trimmed Mean		3.0204	
	Median		2.4000	
	Variance		2.950	
	Std. Deviation		1.71760	
	Minimum		1.00	
	Maximum		6.50	
	Range		5.50	
	Interquartile Range		3.28	
	Skewness		.436	.427
	Kurtosis		-1.321	.833

(i) Construct a box plot for the above data. **[4 marks]**

(ii) Comment on the distribution of lifetime of RAMs. **[1 mark]**

2. A company produces two brands of computers, B and C, for sale. Brand C produces twice as many computers as brand B, but 4% of the output from brand B is faulty and 10% of the output from brand C is faulty. A computer is taken at random from the combined output and tested. What is the probability that this computer is faulty?

[5 marks]