CONFIDENTIAL

Infrastructure University Kuala Lumpur

FINAL EXAMINATION
SEPTEMBER/OCTOBER SEMESTER 2015

BACHELOR OF ACCOUNTANCY (HONS)
BACHELOR OF BUSINESS ADMINISTRATION (HONS)
BACHELOR OF BUSINESS ADMINISTRATION (HONS) IN E-COMMERCE
BACHELOR OF COMPUTER SCIENCE (HONS)
BACHELOR OF INFORMATION TECHNOLOGY (HONS) IN NETWORK TECHNOLOGY
BACHELOR OF SOFTWARE ENGINEERING (HONS)

INTRODUCTION TO STATISTICS
(BMS 101)

(TIME : 3 HOURS)

MATRIC NO. : | | | | | | | | | |

IC. / PASSPORT NO. : | | | | | | | | | | | | | | |

LECTURER : **NORA'ASIKIN BINTI ABU BAKAR**

GENERAL INSTRUCTIONS

1. This question booklet consists of 6 printed pages including this page.
2. Answer **ALL** questions for Section A in the **Answer Booklet.**
3. Use **Graph Paper** for **Question 2 c) and 3 a) in Section A** and **Question 1 c), d) & e) in Section B.**
4. Answer only **ONE (1)** question for Section B in the **Answer Booklet.**
5. Do not open the question booklet until you are allowed to do so.

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INSTRUCTIONS: **TIME:** ***3 HOURS***

SECTION A **(80 marks)**

There are FOUR (4) questions in this section. Answer ALL Questions in the Answer Booklet.

1. a) Determine whether the following statement constitutes a population or sample. (4 marks)
   i. Number of customers coming to 5 stores per hour.
   ii. CGPA of all students in IUKL.
   iii. Heights of 50 kids in a kindergarten.
   iv. Number of books owned by all libraries in Selangor.

   b) Explain the difference between numerical and categorical variables and give example for each level of measurement. (12 marks)

   c) Determine whether the following variable constitutes a nominal, ordinal, discrete or continuous. (4 marks)
   i. Types of drink served at a birthday party
   ii. Height of students in physical education class
   iii. Citizenship of foreign workers in Malaysia
   iv. Number of computers sent for repair per month

2. Students in an experimental psychology class did research on depression as a sign of stress. A test was administered to a sample of 15 students. The scores are given as follows:

44	51	11	90	76	36	64	37
43	72	53	62	36	74	51	

   a) Construct a stem-and-leaf for the above data. (4 marks)
   b) Find the mean, mode, median and standard deviation of the scores. (7 marks)
   c) Draw a boxplot and give your comment on the scores' distribution. (6 marks)
   d) Compute Pearson coefficient of skewness to verify your finding in question c). What conclusion can you reach concerning the scores? (3 marks)

3. A large international sales organization has collected data on the number of employees and the annual gross sales during the last 7 years.

Number of employees	1975	2010	2005	2020	2030	2031	2050
Sales (in $000s)	100	110	122	130	139	152	164

a) Construct a scatter diagram on a **graph paper**. Comment on type of relationship between number of employees and sales. (4 marks)
b) Determine the correlation coefficient and coefficient of determination (11 marks)
c) Determine the least squares regression line. (3 marks)
d) Predict value of sales for 2001 employees. (2 marks)

4. a) A college admissions director wishes to estimate the mean age of all students currently enrolled. In a random sample of 20 students, the mean age is found to be 22.9 years and the standard deviation is 1.5 years. Assuming the ages are normally distributed, (10 marks)

   i. At the 0.1 level of significance, is there evidence that the mean age is more than 23 years?

   ii. Construct a 90% confidence interval of the population mean age.

   b) i. The FMA Company has designed a new type of 16 pounds bowling ball. The company knows that the average man who bowls in a scratch league with the company's old ball has a bowling average of 155. The variance of these averages is 100. The company asks a random sample of 100 men bowling in scratch leagues to bowl for five weeks with their new ball. The mean of bowling averages for these men with the new ball is 170. There is no reason to believe that the variance is any different with the new ball. Test the null hypothesis that the new ball does not improve a bowler's average at the 5% level of significance. (10 marks)

   ii. Construct a 95% confidence interval of the bowler's average population to support above conclusion.

SECTION B **(20 marks)**

There are TWO (2) questions in this section. Answer ONLY ONE (1) question in the Answer Booklet.

1. The following data shows the ages of heart patients in a hospital.

70	56	48	48	53	52	66	48	46	33
39	49	30	35	58	62	45	60	69	54
38	72	45	51	56	72	46	39	53	55
56	32	44	60	51	73	63	50	70	56

a) By using 30 as the lower limit of the first class and 7 as the width of each class, construct a frequency distribution table. (3 marks)

b) Compute class midpoint and find the mean. (3 marks)

c) Draw a histogram. Hence, estimate the mode from the histogram. (4 marks)

d) Draw a polygon and comment on the shape of the distribution for these data. (4 marks)

e) Draw a "less than or equal" ogive and estimate the median value to one decimal point from the ogive. (6 marks)

2. The following table gives the two-way classification of two major airlines, X and Y based on the airline and arrival time. Note that "less than 30 minutes late" includes flights that arrived early or on time.

	Less than 30 minutes late	30 Minutes to 1 hour late	More than 1 hour late
Airline X	429	390	92
Airline Y	393	316	80

a) If one flight is selected at random, find the probability that this flight is (7 marks)
   i. more than 1 hour late.
   ii. less than 30 minutes late.
   iii. a flight on airline X given that it is 30 minutes to 1 hour late.
   iv. more than 1 hour late given that it is a flight on airline Y.

b) Are the following events mutually exclusive? (2 marks)
   i. "airline X" and "more than 1 hour late".
   ii. "less than 30 minutes late" and "more than 1 hour late".

c) Are the events " airlines Y" and "30 minutes to 1 hour late" dependent event? Give your reason. (4 marks)

d) Draw a Tree diagram to illustrate the above table. (7 marks)

***** END OF QUESTIONS *****

FORMULAE

$$s = \sqrt{\frac{1}{n-1}\left[\sum x^2 - \frac{(\sum x)^2}{n}\right]}$$

$$\bar{x} = \frac{\sum x}{n}$$

$$CV = \frac{s}{\bar{x}} \times 100$$

$$PCS = \frac{3(\bar{x} - \tilde{x})}{s}$$

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$P(A|B) = \frac{P(A \cap B)}{P(B)}$$

$$\sigma^2 = E(X^2) - \mu^2$$

$$\mu = \sum x \times p(x)$$

$$P(X) = {}^{n}C_x p^x q^{n-x}$$

$$P(X) = e^{-\mu}\left(\frac{\mu^x}{x!}\right)$$

$$Z = \frac{x - \mu}{\sigma}$$

$$\bar{x} \pm t\alpha/_2 \frac{s}{\sqrt{n}}$$

$$\bar{x} \pm z\alpha/_2 \frac{\sigma}{\sqrt{n}}$$

$$v = n - 1$$

$$Z = \frac{\bar{x} - \mu_{\bar{x}}}{\frac{\sigma}{\sqrt{n}}}$$

$$t = \frac{\bar{x} - \mu_{\bar{x}}}{\frac{s}{\sqrt{n}}}$$

$$S_{xx} = \sum x^2 - \frac{(\sum x)^2}{n}$$

$$S_{yy} = \sum y^2 - \frac{(\sum y)^2}{n}$$

$$S_{xy} = \sum xy - \frac{\sum x \sum y}{n}$$

$$\hat{\beta}_1 = \frac{S_{xy}}{S_{xx}}$$

$$\hat{\beta}_0 = \bar{y} - \hat{\beta}_1 \bar{x}$$

$$\hat{y} = \hat{\beta}_0 + \hat{\beta}_1$$

$$r = \frac{S_{xy}}{\sqrt{S_{xx} S_{yy}}}$$

$$r^2 = \frac{{S_{xy}}^2}{S_{xx} S_{yy}}$$

Student *t* Distribution Table

df	0.25	0.2	0.15	0.1	0.05	0.025	0.02	0.01	0.005	0.003	0.001	0.0005
5	0.727	0.92	1.156	1.476	2.015	2.571	2.757	3.365	4.032	4.773	5.893	6.869
6	0.718	0.906	1.134	1.44	1.943	2.447	2.612	3.143	3.707	4.317	5.208	5.959
7	0.711	0.896	1.119	1.415	1.895	2.365	2.517	2.998	3.499	4.029	4.785	5.408
8	0.706	0.889	1.108	1.397	1.86	2.306	2.449	2.896	3.355	3.833	4.501	5.041
9	0.703	0.883	1.1	1.383	1.833	2.262	2.398	2.821	3.25	3.69	4.297	4.781
10	0.7	0.879	1.093	1.372	1.812	2.228	2.359	2.764	3.169	3.581	4.144	4.587
11	0.697	0.876	1.088	1.363	1.796	2.201	2.328	2.718	3.106	3.497	4.025	4.437
12	0.695	0.873	1.083	1.356	1.782	2.179	2.303	2.681	3.055	3.428	3.93	4.318
13	0.694	0.87	1.079	1.35	1.771	2.16	2.282	2.65	3.012	3.372	3.852	4.221
14	0.692	0.868	1.076	1.345	1.761	2.145	2.264	2.624	2.977	3.326	3.787	4.14
15	0.691	0.866	1.074	1.341	1.753	2.131	2.249	2.602	2.947	3.286	3.733	4.073
16	0.69	0.865	1.071	1.337	1.746	2.12	2.235	2.583	2.921	3.252	3.686	4.015
17	0.689	0.863	1.069	1.333	1.74	2.11	2.224	2.567	2.898	3.222	3.646	3.965
18	0.688	0.862	1.067	1.33	1.734	2.101	2.214	2.552	2.878	3.197	3.611	3.922
19	0.688	0.861	1.066	1.328	1.729	2.093	2.205	2.539	2.861	3.174	3.579	3.883
20	0.687	0.86	1.064	1.325	1.725	2.086	2.197	2.528	2.845	3.153	3.552	3.85

Standard Normal Distribution Table

z	0	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0	0.5	0.504	0.508	0.512	0.516	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.591	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.648	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.67	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.695	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.719	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.758	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.791	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.834	0.8365	0.8389
1	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.877	0.879	0.881	0.883
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.898	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.937	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.975	0.9756	0.9761	0.9767
2	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817