CONFIDENTIAL

Infrastructure University Kuala Lumpur

FINAL EXAMINATION
JUNE SEMESTER 2016

BACHELOR OF ACCOUNTANCY (HONS)
BACHELOR OF BUSINESS ADMINISTRATION (HONS)
BACHELOR OF SCIENCE (HONS) IN LOGISTICS AND SUPPLY CHAIN MANAGEMENT
BACHELOR OF COMPUTER SCIENCE (HONS)
BACHELOR OF INFORMATION SYSTEMS (HONS)

INTRODUCTION TO STATISTICS
(STAT 1000)

(TIME : 3 HOURS)

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

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

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

GENERAL INSTRUCTIONS

1. This question booklet consists of 7 printed pages including this page.
2. Answer **ALL** questions for Section A in the **ANSWER BOOKLET.**
3. Answer only **TWO (2)** questions for Section B in the **ANSWER BOOKLET.**

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

SECTION A **(60 MARKS)**

There are SIX (6) questions in this section. Answer ALL Questions in the Answer Booklet.

1. Briefly explain the following with one example provided:
   a) nominal data (2 marks)
   b) ordinal data (2 marks)
   c) discrete data (2 marks)
   d) continuous data (2 marks)

2. The following data shows the football clubs supported by 20 students in a class.

   Chelsea, Chelsea, Manchester United, Manchester City, Arsenal, Arsenal, Manchester City, Manchester United, Chelsea, Arsenal, Chelsea, Chelsea, Manchester United, Manchester City, Arsenal, Arsenal, Manchester City, Chelsea, Chelsea, Manchester United.

   a) Construct a summary table for the data. (4 marks)
   b) Draw a pie chart to represent the data. (4 marks)

3. Briefly discuss the difference between the frequency polygon and the cumulative frequency polygon. (4 marks)

4. Calculate mean, median, mode and the inter-quartile range from the following data: 1, 2, 1, 2, 3, 4, 3, 4, 1, 1. (14 marks)

5. A fair coin is tossed three consecutive times.
   a) Draw the tree diagram, complete with probabilities of all events. (7 marks)
   b) Write the sample space of this experiment. (2 marks)
   c) Determine the probability to obtain same items for all three throws. (2 marks)

6. Let X be the random variable representing the number of "3" occurs in three tossing of a dice (with faces 1 to 6).
   a) Construct a table of probability distribution of all possible values of X. (8 marks)
   b) Evaluate the mean and variance of X. (7 marks)

SECTION B **(40 MARKS)**

There are THREE (3) questions in this section. Answer ONLY TWO (2) questions in the Answer Booklet.

1. a) Suppose a random sample of size 36 is chosen from a normally distributed population with mean 600 and variance 12. Determine the probability that a sample mean is greater than 602. (6 marks)

   b) A population has variance 16 but unknown mean. A random sample of size 16 chosen from this population gives mean 50. Construct a 95% confidence interval for the population mean. (5 marks)

   c) A researcher claims that the average entry salary for fresh graduate is RM24000 per year. A random sample of 10 fresh graduates has been selected and found that the mean salary is RM23450 and standard deviation RM400. Test this claim at 0.05 significance level. (9 marks)

2. a) The average life of a certain type of motor is 10 years, with a standard deviation of 2 years. If the manufacturer is willing to replace only 3% of the motors that fail, how long a guarantee should he offer? Assume that the lives of the motors follow a normal distribution. (6 marks)

   b) A company pays its employees an average wage of $3.25 an hour with a standard deviation of 60 cents. If the wages are approximately normally distributed, determine:
      i. the probability of the workers getting wages between $2.75 and $3.69 an hour. (7 marks)
      ii. the minimum wage of the highest 5%. (4 marks)

   c) It was found that the mean length of 100 parts produced by a lathe was 20.05 mm with a standard deviation of 0.02 mm. Find the probability that a part selected at random would have a length greater than 20.09 mm. (3 marks)

3. A dietetics student wants to look at the relationship between calcium intake and knowledge about calcium in sports science students. Further she wants to know if knowledge about calcium can be used **to predict** calcium intake of the students. Table 1 shows the data she collected.

$Knowledge\ score\ (Out\ of\ 50)$	$Calcium\ intake\ (mg/day)$	$(Knowledge\ score)^2$	$(Calcium\ intake)^2$	$Knowledge\ score \times Calcium\ intake$
10	450	100	202500	4500
42	1050	1764	1102500	44100
38	900	1444	810000	34200
15	525	225	275625	7875
22	710	484	504100	15620
32	854	1024	729316	27328
40	800	1600	640000	32000
14	499	196	249001	6986
26	730	676	532900	18980
32	894	1024	799236	28608

a) Determine the correlation coefficient for calcium intake per day. Interpret your answer. (10 marks)

b) Calculate coefficient of determination. Interpret your answer. (3 marks)

c) Find the equation of the regression line for calcium intake. (5 marks)

d) Predict the calcium intake of a students whose knowledge score is equal to 30 out of 50. Give your comment whether the x-value is meaningful to predict the value of y. (2 marks)

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

T-Distribution

	Tail probability, p											
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**
1	1	1.376	1.963	3.078	6.314	12.71	15.89	31.82	63.66	127.3	318.3	636.6
2	0.816	1.061	1.386	1.886	2.92	4.303	4.849	6.965	9.925	14.09	22.33	31.6
3	0.765	0.978	1.25	1.638	2.353	3.182	3.482	4.541	5.841	7.453	10.21	12.92
4	0.741	0.941	1.19	1.533	2.132	2.776	2.999	3.747	4.604	5.598	7.173	8.61
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

Z Scores

z	**0**	**0.01**	**0.02**	**0.03**	**0.04**	**0.05**	**0.06**	**0.07**	**0.08**	**0.09**
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	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	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	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	0.8340	0.8365	0.8389
1.0	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	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	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	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981

2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990
3.1	0.9990	0.9991	0.9991	0.9991	0.9992	0.9992	0.9992	0.9992	0.9993	0.9993
3.2	0.9993	0.9993	0.9994	0.9994	0.9994	0.9994	0.9994	0.9995	0.9995	0.9995
3.3	0.9995	0.9995	0.9995	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9997
3.4	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9998

Negative Z Scores

z	**0.09**	**0.08**	**0.07**	**0.06**	**0.05**	**0.04**	**0.03**	**0.02**	**0.01**	**0.0**
-2.5	0.0048	0.0049	0.0051	0.0052	0.0054	0.0055	0.0057	0.0059	0.0060	0.0062
-2.4	0.0064	0.0066	0.0068	0.0069	0.0071	0.0073	0.0075	0.0078	0.0080	0.0082
-2.3	0.0084	0.0087	0.0089	0.0091	0.0094	0.0096	0.0099	0.0102	0.0104	0.0107
-2.2	0.0110	0.0113	0.0116	0.0119	0.0122	0.0125	0.0129	0.0132	0.0136	0.0139
-2.1	0.0143	0.0146	0.0150	0.0154	0.0158	0.0162	0.0166	0.0170	0.0174	0.0179
-2.0	0.0183	0.0188	0.0192	0.0197	0.0202	0.0207	0.0212	0.0217	0.0222	0.0228
-1.9	0.0233	0.0239	0.0244	0.0250	0.0256	0.0262	0.0268	0.0274	0.0281	0.0287
-1.8	0.0294	0.0301	0.0307	0.0314	0.0322	0.0329	0.0336	0.0344	0.0351	0.0359
-1.7	0.0367	0.0375	0.0384	0.0392	0.0401	0.0409	0.0418	0.0427	0.0436	0.0446
-1.6	0.0455	0.0465	0.0475	0.0485	0.0495	0.0505	0.0516	0.0526	0.0537	0.0548
-1.5	0.0559	0.0571	0.0582	0.0594	0.0606	0.0618	0.0630	0.0643	0.0655	0.0668
-1.4	0.0681	0.0694	0.0708	0.0721	0.0735	0.0749	0.0764	0.0778	0.0793	0.0808
-1.3	0.0823	0.0838	0.0853	0.0869	0.0885	0.0901	0.0918	0.0934	0.0951	0.0968
-1.2	0.0985	0.1003	0.1020	0.1038	0.1056	0.1075	0.1093	0.1112	0.1131	0.1151
-1.1	0.1170	0.1190	0.1210	0.1230	0.1251	0.1271	0.1292	0.1314	0.1335	0.1357
-1.0	0.1379	0.1401	0.1423	0.1446	0.1469	0.1492	0.1515	0.1539	0.1562	0.1587
-0.9	0.1611	0.1635	0.1660	0.1685	0.1711	0.1736	0.1762	0.1788	0.1814	0.1841
-0.8	0.1867	0.1894	0.1922	0.1949	0.1977	0.2005	0.2033	0.2061	0.2090	0.2119
-0.7	0.2148	0.2177	0.2206	0.2236	0.2266	0.2296	0.2327	0.2358	0.2389	0.2420
-0.6	0.2451	0.2483	0.2514	0.2546	0.2578	0.2611	0.2643	0.2676	0.2709	0.2743
-0.5	0.2776	0.2810	0.2843	0.2877	0.2912	0.2946	0.2981	0.3015	0.3050	0.3085
-0.4	0.3121	0.3156	0.3192	0.3228	0.3264	0.3300	0.3336	0.3372	0.3409	0.3446
-0.3	0.3483	0.3520	0.3557	0.3594	0.3632	0.3669	0.3707	0.3745	0.3783	0.3821
-0.2	0.3829	0.3897	0.3936	0.3974	0.4013	0.4052	0.4090	0.4129	0.4168	0.4207
-0.1	0.4247	0.4286	0.4325	0.4364	0.4404	0.4443	0.4483	0.4522	0.4562	0.4602
-0.0	0.4641	0.4681	0.4721	0.4761	0.4801	0.4840	0.4880	0.4920	0.4960	0.5000

FORMULAE

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

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

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

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

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

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

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

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

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

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

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

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

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

$$v = n - 1$$

$$Z = \frac{\bar{x} - \mu_{\bar{x}}}{\sigma_{\bar{x}}}$$

$$t = \frac{\bar{x} - \mu_{\bar{x}}}{\sigma_{\bar{x}}}$$

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

$$\sigma_{\bar{x}} = \frac{s}{\sqrt{n}}$$

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

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

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

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

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

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

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

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