UNIVERSITI KUALA LUMPUR
BUSINESS SCHOOL

FINAL EXAMINATION
MARCH 2024 SEMESTER

COURSE CODE	**: EAB21403**
COURSE NAME	**: STATISTICS FOR BUSINESS**
PROGRAMME NAME	**: BACHELOR IN ACCOUNTING (HONS)**
DATE	**: 4 JULY 2024**
TIME	**: 2.00 PM – 5.00 PM**
DURATION	**: 3 HOURS**

INSTRUCTIONS TO CANDIDATES

1. **Please CAREFULLY read the instructions given in the question paper.**
2. **This question paper has information printed on both sides of the paper.**
3. This question paper consists of **SEVEN (7)** questions.
4. Answer **ALL** questions.
5. Please write your answers on the answer booklet provided.
6. All questions must be answered in **English** (any other language is not allowed).
7. Formulas and tables have been appended for your reference.
8. **This question paper must not be removed from the examination hall.**

THERE ARE TEN (10) PAGES OF QUESTIONS, INCLUDING THIS PAGE.

(Total: 100 marks)

Question 1

Given a sample data as below:

96	11	76	85	23	38	62	60	70	46	65	55	65	56

Required:

(a) Arrange the data in ascending order and prepare the relevant columns for the calculation of variance and standard deviation.

(1.5 marks)

(b) Calculate the following:

i. Mean;

(1.5 marks)

ii. Median;

(1.5 marks)

iii. Mode;

(1.5 marks)

iv. Variance;

(1.5 marks)

v. Standard deviation;

(1.5 marks)

vi. Range;

(1.5 marks)

vii. First Quarter (Q1);

(1.5 marks)

viii. Second Quarter (Q2);

(1.5 marks)

ix. Third Quarter (Q3);

(1.5 marks)

x. Inter Quartile Range (IQR); and

(1.5 marks)

xi. 90th percentile.

(1.5 marks)

[18 marks]

Question 2

Below is a sample group data.

i	K_i	X_i	f_i	cf_i	$f_i x_i$	$x_i{}^2$	$f_i x_i{}^2$
1		5	4				
2		10	2				
3		15	4				
4		20	4				
5		25	2				
6		30	4				
		35	10				
	TOTAL		**30**				

Copy the above table to your answer script:

Required:

(a) Complete the table.

(4 marks)

(b) Calculate the following:

i. Mean;

(2 marks)

ii. Median;

(3.5 marks)

iii. Mode;

(3.5 marks)

iv. Variance; and

(3.5 marks)

v. Standard deviation.

(1.5 marks)

[18 marks]

Question 3

The American Council of Education reported that 47% of college freshmen earn a degree and graduate within five years. Assume that graduation records show women make up 50% of the students who graduated within five years, but only 45% of students who did not graduate within five years. The students who had not graduated within five years either dropped out or were still working on their degrees.

Let A_1 = the student graduated within five years
A_2 = the student did not graduate within five years
W = the student is a female student

Required:

(a) Draw a tree diagram for the above problem.

(5 marks)

(b) Using the given information, find the values for $P(A_1)$, $P(A_2)$, $P(W \mid A_1)$, and $P(W \mid A_2)$.

(4 marks)

(c) Determine the probability that a female student will graduate within five years?

(2 marks)

(d) Determine the probability that a male student will graduate within five years?

(2 marks)

(e) Given the preceding results, determine the percentage of women and the percentage of men in the entering freshman class?

(2 marks)

[15 marks]

Question 4

A Harris Interactive survey for InterContinental Hotels & Resorts asked respondents, "When travelling internationally, do you generally venture out on your own to experience culture, or stick with your tour group and itineraries?" The survey found that 23% of the respondents stick with their tour group (USA Today, January 21, 2014).

Required:

(a) In a sample of six international travelers, determine is the probability that two will stick with their tour group?

(3 marks)

(b) In a sample of six international travelers, determine is the probability that at least two will stick with their tour group?

(5 marks)

(c) In a sample of 10 international travelers, determine is the probability that none will stick with the tour group?

(2 marks)

[10 marks]

Question 5

(a) In an article about the cost of health care, *Money* magazine reported that a visit to a hospital emergency room for something as simple as a sore throat has a mean cost of $328 (*Money*, January 2014). Assume that the cost for this type of hospital emergency room visit is normally distributed with a standard deviation of $92. Answer the following questions about the cost of hospital emergency room visit for this medical service.

Required:

i. Determine is the probability that the cost will be more than $500?

(2 marks)

ii. Determine is the probability that the cost will be less than $250?

(2 marks)

iii. Determine is the probability that the cost will be between $300 and $400?

(2 marks)

iv. If the cost to a patient is in the lower 8% of charges for this medical service, determine the cost of this patient's emergency room visit?

(3 marks)

(b) Encik Ishak Remy is the supervisor for the Kenyir Hydroelectric Dam. Encik Ishak knows that the dam's turbines generate electricity at the peak rate only when at least 1,000,000 gallons of water pass through the dam each day. He also knows from experience, that the daily flow is normally distributed, with the mean equal to the previous day's flow and a standard deviation of 200,000 gallons. Yesterday, 850,000 gallons flowed through the dam. What is the probability that the turbines will generate at peak rate today?

(5 marks)

[14 marks]

Question 6

The National Quality Research Centre at the University of Michigan provides a quarterly measure of consumer opinions on products and services (The Wall Street Journal, February 18, 2015). A survey of 10 restaurants in the Fast Food / Pizza group showed a sample mean of customer satisfaction index of 71. Past data indicated that the population standard deviation is $\sigma = 5$.

Required:

(a) Compute the standard error?

(2 marks)

(b) Determine is the margin of error at 95% confidence?

(2 marks)

(c) Determine is the margin of error at 99% confidence?

(2 marks)

(d) Find the 95% confidence interval of the population mean.

(2 marks)

(e) Find the 99% confidence interval of the population mean.

(2 marks)

[10 marks]

Question 7

The marketing manager of a large supermarket chain would like to determine the effect of shelf space on the sales of pet food. A random sample of 12 equal-sized stores is selected with the following results:

STORE	SHELF SPACE, *X* (FEET)	WEEKLY SALES, *Y* (HUNDREDS OF DOLLARS)	STORE	SHELF SPACE, *X* (FEET)	WEEKLY SALES, *Y* (HUNDREDS OF DOLLARS)
1	5	1.6	7	15	2.3
2	5	2.2	8	15	2.7
3	5	1.4	9	15	2.8
4	10	1.9	10	20	2.6
5	10	2.4	11	20	2.9
6	10	2.6	12	20	3.1

Required:

(a) Plot a complete linear regression diagram with shelf space as independent variable. State the *X* and *Y* axis, and draw the straight line to represent the regression model.

(4 marks)

(b) Assuming a linear relationship, what are the regression coefficients b_0 *and* b_1

(7 marks)

(c) Interpret the meaning of the slope b_1 in this problem.

(2 marks)

(d) Predict the average weekly sales (in hundreds of dollars) of pet food for stores with 8 feet of shelf space for pet food.

(2 marks)

[15 marks]

END OF EXAMINATION PAPER

LIST OF FORMULAS

STATISTICS

Mean for sample, $\bar{x} = \dfrac{\sum f_i x_i}{\sum_{i=1}^{n} f_i}$

Variance for sample (Ungrouped data),

$s^2 = \dfrac{\sum (x_i - \bar{x})^2}{n-1}$

Variance for sample (Grouped data),

$s^2 = \dfrac{\sum \left[f_i (x_i - \bar{x})^2 \right]}{n-1}$

Standard deviation, $s = \sqrt{s^2}$

PROBABILITY

P(A) = 1 – P(A') – Rule of complement
P(A or B) = P(A) + P(B) – P(A ∩ B) - Not Mutually Exclusive event
P(A or B) = P(A) + P(B) – Mutually exclusive event
P(A and B) = P(A) x P(B|A) – Conditional / Dependent event
P(A and B) = P(A) x P(B) – Independent event

$_nP_r = \dfrac{n!}{(n-r)!}$

$_nC_r = \dfrac{n!}{(n-r)!r!}$

PROBABILITY DISTRIBUTION

$\mu = \Sigma x \,.\, P(X)$

$\sigma = \sqrt{\sum \left[x^2 - P(X) \right] - \mu^2}$

$P(X) = \dfrac{n!}{(n-x)!x!} \bullet p^x \bullet q^{n-x}$ - Binomial Formula

$\mu = n \,.\, p$ - Binomial Formula

$\sigma^2 = n \bullet p \bullet q$

NORMAL DISTRIBUTION

$Z = \dfrac{x - \bar{x}}{s}$

Z test = $\bar{x} \pm z_{\alpha/2} \bullet \dfrac{\sigma}{\sqrt{n}}$

CONFIDENCE INTERVAL – ONE POPULATION

$\hat{p} - E < \hat{p} + E$ where $E = z_{\frac{\alpha}{2}} \bullet \sqrt{\dfrac{\hat{p}\hat{q}}{n}}$ and σ known

$\bar{x} - E < \mu < \bar{x} + E$ where $E = z_{\frac{\alpha}{2}} \bullet \dfrac{\sigma}{\sqrt{n}}$ and σ known and for σ unknown, $E = t_{\frac{\alpha}{2}} \bullet \dfrac{s}{\sqrt{n}}$

TEST STATISTICS

$z = \dfrac{\hat{p} - p}{\sqrt{\dfrac{pq}{n}}}$, for proportion and σ known

$z = \dfrac{\bar{x} - \mu}{\dfrac{\sigma}{\sqrt{n}}}$, for mean and σ known

$t = \dfrac{\bar{x} - \mu}{\dfrac{s}{\sqrt{n}}}$ for both and σ unknown

SAMPLE SIZE DETERMINATION

$n = \dfrac{\left[z_{\frac{\alpha}{2}} \right]^2 \bullet 0.25}{E^2}$, for proportion ($\hat{p}$ and $\hat{q}$ unknown)

$n = \dfrac{\left[z_{\frac{\alpha}{2}} \right]^2 \bullet \hat{p} \bullet \hat{q}}{E^2}$, for proportion ($\hat{p}$ and $\hat{q}$ known)

LINEAR CORRELATION

Slope, $b_1 = \dfrac{n\Sigma xy - \Sigma x \Sigma y}{n\Sigma x^2 - (\Sigma x)^2} = \dfrac{SS_{XY}}{SS_{XX}}$

$b_o = \bar{y} - b_1 \bar{x}$, Regression, $\hat{y} = b_o + b_1 x$

$r = \dfrac{n\Sigma xy - \Sigma x \Sigma y}{\sqrt{\left(n\Sigma x^2 - (\Sigma x)^2 \right)\left(n\Sigma y^2 - (\Sigma y)^2 \right)}}$

CUMULATIVE STANDARD NORMAL DISTRIBUTION

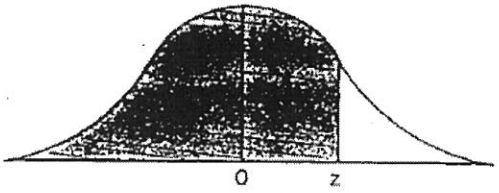

Table entries are cumulative probabilities represented in the shaded area above.

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
.3	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517
.4	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879
.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
.6	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549
.7	.7580	.7611	.7642	.7673	.7704	.7734	.7764	.7794	.7823	.7852
.8	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133
.9	.8159	.8186	.8212	.8238	.8264	.8289	.8315	.8340	.8365	.8389
1.0	.8413	.8438	.8461	.8485	.8508	.8531	.8554	.8577	.8599	.8621
1.1	.8643	.8665	.8686	.8708	.8729	.8749	.8770	.8790	.8810	.8830
1.2	.8849	.8869	.8888	.8907	.8925	.8944	.8962	.8980	.8997	.9015
1.3	.9032	.9049	.9066	.9082	.9099	.9115	.9131	.9147	.9162	.9177
1.4	.9192	.9207	.9222	.9236	.9251	.9265	.9279	.9292	.9306	.9319
1.5	.9332	.9345	.9357	.9370	.9382	.9394	.9406	.9418	.9429	.9441
1.6	.9452	.9463	.9474	.9484	.9495	.9505	.9515	.9525	.9535	.9545
1.7	.9554	.9564	.9573	.9582	.9591	.9599	.9608	.9616	.9625	.9633
1.8	.9641	.9649	.9656	.9664	.9671	.9678	.9686	.9693	.9699	.9706
1.9	.9713	.9719	.9726	.9732	.9738	.9744	.9750	.9756	.9761	.9767
2.0	.9772	.9778	.9783	.9788	.9793	.9798	.9803	.9808	.9812	.9817
2.1	.9821	.9826	.9830	.9834	.9838	.9842	.9846	.9850	.9854	.9857
2.2	.9861	.9864	.9868	.9871	.9875	.9878	.9881	.9884	.9887	.9890
2.3	.9893	.9896	.9898	.9901	.9904	.9906	.9909	.9911	.9913	.9916
2.4	.9918	.9920	.9922	.9925	.9927	.9929	.9931	.9932	.9934	.9936
2.5	.9938	.9940	.9941	.9943	.9945	.9946	.9948	.9949	.9951	.9952
2.6	.9953	.9955	.9956	.9957	.9959	.9960	.9961	.9962	.9963	.9964
2.7	.9965	.9966	.9967	.9968	.9969	.9970	.9971	.9972	.9973	.9974
2.8	.9974	.9975	.9976	.9977	.9977	.9978	.9979	.9979	.9980	.9981
2.9	.9981	.9982	.9982	.9983	.9984	.9984	.9985	.9985	.9986	.9986
3.0	.9987	.9987	.9987	.9988	.9988	.9989	.9989	.9989	.9990	.9990
3.1	.9990	.9991	.9991	.9991	.9992	.9992	.9992	.9992	.9993	.9993
3.2	.9993	.9993	.9994	.9994	.9994	.9994	.9994	.9995	.9995	.9995
3.3	.9995	.9995	.9995	.9996	.9996	.9996	.9996	.9996	.9996	.9997
3.4	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9998

z	1.282	1.645	1.960	2.326	2.575	3.090	3.291	3.981	4.417
F(z)	.90	.95	.975	.99	.995	.999	.9995	.99995	.999995

Source: Adapted by permission from A. M. Mood, *Introduction to the Theory of Statistics*, Table II, New York: McGraw-Hill Book Company, 1950.