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Faculty of Management and Social Sciences
Department of Logistics & Transport
BSc Hons in Logistics and Transportation
Course CODE: COM551

Year 1 Semester II

REPEAT EXAMINATION

Mathematics for Business II – LTMB1214

- This paper consists of SEVEN questions on SEVEN (07) pages.
- Answer FOUR (04) Questions including Question 01.
- Only non-programmable calculators are allowed.
- You may use appropriate graphs, diagrams, equation/s to prove or justify the answers.
- If you have any doubt as to the interpretation of the wording of a question, make your own decision, but clearly state it on the script.
- Write Legibly.

Date: 2022.08.29   Pass mark: 50%   Time: 02 Hours

Question 01: (Compulsory)

(a) Consider the differential equation $\frac{d^2y}{dx^2} - 6\frac{dy}{dx} + 5y = 0$.

    (i) Write the auxiliary equation. (02 Marks)

    (ii) Obtain the general solution. (03 Marks)

(b) Use the Trapezoidal rule with step size h = 1 to approximate the integral $\int_0^4 f(x)dx$ where a table of values for the function f(x) is given in Table 1. (05 Marks)

Table 1

x	0	1	2	3	4
$f(x)$	2	1	2	3	5

(c) Consider the graph G = (V, E) with V = {1, 2, 3, 4, 5} and E = {(1,2), (1,3), (2,3), (2,4), (3,4), (4,5)}.

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(i) Sketch the given graph $G = (V, E)$. (03 Marks)

(ii) Determine the order of vertices 1 and 4. (02 Marks)

(d) Find the truth set of each of these predicates where the <u>domain is the set of integers</u>.

(i) $P(x): x^2 < 8$ (02 Marks)

(ii) $R(x): x + 7 < 12$ (03 Marks)

(e) A firm manufactures two products A and B on machines I and II as shown in the Table 2:

Table 2

Machine	Product		Available Hours
	A	B	
1	30	20	300
11	5	10	110
Profit per unit (Rs)	6	8	

The total time available is 300 hours and 110 hours on machines I and II, respectively. Products A and B contribute a profit of Rs 6 and Rs 8 per unit, respectively. Construct the LP Model. (Do not solve). (05 Marks)

Question 02

(a) Consider the differential equation $\frac{d^2y}{dx^2} - 6\frac{dy}{dx} + 8y = 0$.

(i) Is the given differential equation homogeneous or non-homogeneous? State reasons for your answer. (03 Marks)

(ii) Find the general solution of the differential equation. (06 Marks)

(iii) Find the particular solution when $y(0) = -2$ and $y'(0) = 6$. (04 Marks)

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(a) Use the <u>graphical method</u> to solve the following LP problem. (12 Marks)

$$Maximize\ Z = 15x_1 + 10x_2$$

$$subject\ to$$

$$4x_1 + 6x_2 \leq 360$$

$$3x_1 \leq 180$$

$$5x_2 \leq 200$$

$$x_1, x_2 \geq 0$$

Question 03

(a) Anita Electric Company produces two products P_1 and P_2. Products are produced and sold on a weekly basis. The weekly production cannot exceed 25 for product P_1 and 35 for product P_2 because of limited available facilities. The company employs total of 60 workers. Product P_1 requires 2 man-weeks of labour, while P_2 requires one man-week of labour. Profit margin on P_1 is Rs. 60 and on P_2 is Rs. 40. <u>Formulate</u> this problem as an LP problem to maximize profit and <u>solve</u> that using graphical method. (15 Marks)

(b) Construct a truth table for the below logical statement and comment whether it is a tautology, contradiction or neither. (10 Marks)

$$(p \lor q) \land \sim(\sim q \land r)$$

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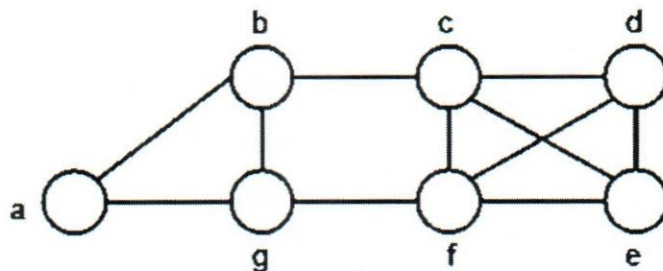
Question 04

(a) Use figure 1 to answer the following questions.

Figure 1

   (i) Write two walks of length 6.   (04 Marks)

  (ii) What is the difference between a trail and path?   (02 Marks)

 (iii) Name a cycle of length 5.   (03 Marks)

 (iv) Is the given graph bipartite? Give reasons to your answer.   (03 Marks)

  (v) Is the given graph complete? Give reasons to your answer.   (03 Marks)

(b) Consider the given table to estimate $\int_1^3 \frac{1}{x^2+1} \, dx$.

Table 3

x	1	1.5	2	2.5	3
$y = \dfrac{1}{x^2 + 1}$	0.5	0.308		0.138	

  (i) Copy and complete table 3.   (03 Marks)

 (ii) Estimate the value of the integral using Trapezoidal Rule.   (04 Marks)

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(iii) Calculate the exact value of the integral and comment whether your estimation is an underestimate or an overestimate. (03 Marks)

Question 05

(a) Write the negations of the given statements.

(i) For any prime number x, the number $x + 1$ is composite. (02 Marks)

(ii) There exists an integer k such that $2k + 1$ is even. (02 Marks)

(b) Find the general solution to differential equation.

(i) $\frac{d^2y}{dx^2} + 5\frac{dy}{dx} + 6y = 12e^x$ (07 Marks)

(ii) Hence find the particular solution that satisfies $y = 1$ and $\frac{dy}{dx} = 0$ when $x = 0$.
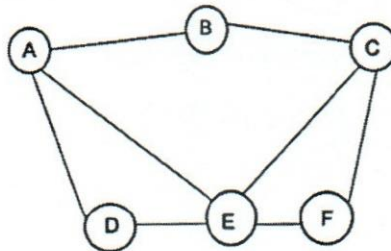
(05 Marks)

(c) Consider the given graph below.

Figure 2

(i) Obtain the complement graph of the given graph in Figure 2. (04 Marks)

(ii) Obtain the line graph of the given graph in Figure 2. (05 Marks)

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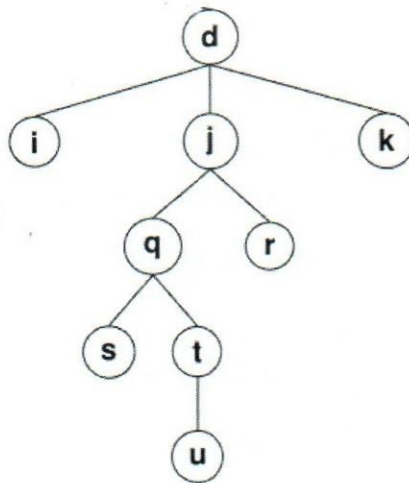Course CODE: COM551

Question 06

(a) Consider Figure 3 to answer the following questions.

Figure 3

(i)   What is the root of the tree? (02 Marks)

(ii) Name the siblings of vertices d, j, and q. (04 Marks)

(iii) Name the levels of vertices q and u. (02 Marks)

(iv) Name the leaves of the tree. (03 Marks)

(v)   Write the height of the tree. (02 Marks)

(vi) What are the descendants of vertex j? (02 Marks)

(vii) Write the truth table of the following logical statement. (10 Marks)

$$[(\sim q \wedge p) \rightarrow r] \leftrightarrow [(\sim r \rightarrow \sim q) \vee p]$$

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Question 07

(a) A diet for a sick person must contain at least 4,000 units of vitamins, 50 units of minerals and 1,400 calories. Two foods A and B are available at a cost of Rs. 4 and Rs. 3 per unit, respectively. If one unit of A contains 200 units of vitamins, 1 unit of mineral and 40 calories and one unit of food B contains 100 units of vitamins, 2 units of minerals and 40 calories. Formulate this problem as an LP model to find combination of foods to be used to have least cost? (Do not solve.) (10 Marks)

(b) The diagram shows part of the curve with equation $y = 3\sqrt{x} - \sqrt{x^3} + 4$ and the line with equation $y = 4 - \frac{1}{2}x$.
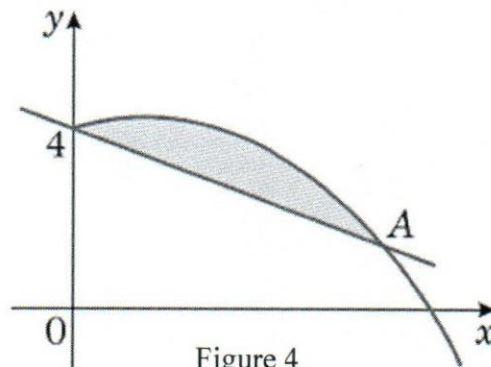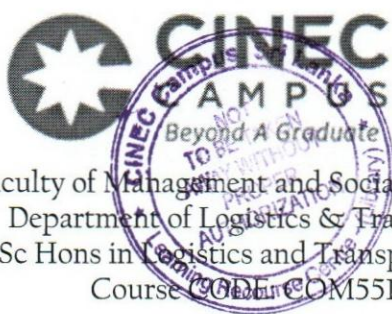

Figure 4

(i) <u>Verify</u> that the line and the curve cross at the point $A(4, 2)$. (04 Marks)
(ii) Find the area of the finite region bounded by the curve and the line.
(08 Marks)
(c) Make a truth table for the given expression. (03 Marks)
$$(\sim p \wedge q) \vee (p \wedge \sim q)$$

--------------------END OF THE QUESTION PAPER-----------------

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Course Code – COM551

Year 1 Semester II
REPEAT EXAMINATION
Introduction to Law – LTIL1310

- This paper consists of EIGHT questions on TWO (02) pages.
- Answer <u>FIVE (05)</u> questions including question 01.
- Only non-programmable calculators are allowed.
- You may use appropriate graphs, diagrams, equation/s to prove or justify the answers.
- If you have any doubt as to the interpretation of the wording of a question, make your own decision, but clearly state it on the script.
- Write legibly.

Date: 2022.08.25   Pass mark: 50%   Time: 03 Hours

Question 01: (Compulsory)

Law and morality are two distinct questions, yet many are of the view that, a law which is truly immoral cannot be a real law and that people may have an option of not following such a law.
Appraise the above statement considering natural law and legal positivism.

(20 Marks)

Question 02
    (a) List out the sources of law in a domestic legal system   (5 Marks)
    (b) Briefly explain the concept of *stare decisis* (Precents)   (15 Marks)

Question 03
    (a) What is the modern definition of international law?   (5 Marks)
    (b) Briefly explain the criteria of Statehood under international law. (15 Marks)

Question 04

    (a) What is a contract?   (5 Marks)
    (b) What is the difference between an offer and an invitation to treat?   (5 Marks)

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(c) What are the differences in the consequences which may result from a breach of a condition in comparison to a breach of a warranty? (10 Marks)

Question 05

(a) What is a Partnership? (5 Marks)

(b) A partner is both a principle and an agent. How correct is this statement?
(10 Marks)

(c) List out the ways in which a partnership may be dissolved. (5 Marks)

Question 06

(a) What is an agency? (5 Marks)

(b) What are the modes in which an agency relationship may be created?
(7 Marks)

(c) What are the requirements that needs to be established to prove the existence of an agency of necessity? (8 Marks)

Question 07
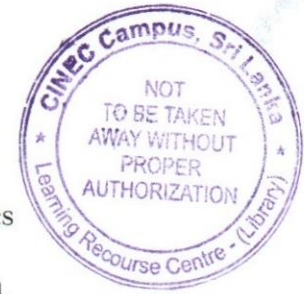
A company once duly incorporated has an existence of its own. Discuss this statement considering the Salomon principle. (20 Marks)

Question 08

Write a brief description about any two of the following. (10*2 Marks)

(a) Consideration and *justa causa*.
(b) Insurable interest.
(c) Monism and Dualism.
(d) Concept of subrogation.

--------------------END OF THE QUESTION PAPER-----------------

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Year 1 Semester II

REPEAT EXAMINATION

Mathematics for Business II – LTMB1214

- This paper consists of SEVEN questions on SEVEN (07) pages.
- Answer FOUR (04) Questions including Question 01.
- Only non-programmable calculators are allowed.
- You may use appropriate graphs, diagrams, equation/s to prove or justify the answers.
- If you have any doubt as to the interpretation of the wording of a question, make your own decision, but clearly state it on the script.
- Write Legibly.

Date: 2022.08.29   Pass mark: 50%   Time: 02 Hours

Question 01: (Compulsory)

(a) Consider the differential equation $\frac{d^2y}{dx^2} - 6\frac{dy}{dx} + 5y = 0$.

  (i) Write the auxiliary equation.   (02 Marks)

  (ii) Obtain the general solution.   (03 Marks)

(b) Use the Trapezoidal rule with step size h = 1 to approximate the integral $\int_0^4 f(x)dx$

where a table of values for the function f(x) is given in Table 1.   (05 Marks)

Table 1

x	0	1	2	3	4
$f(x)$	2	1	2	3	5

(c) Consider the graph G = (V, E) with V = {1, 2, 3, 4, 5} and E = {(1,2), (1,3), (2,3), (2,4), (3,4), (4,5)}.

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(i) Sketch the given graph $G = (V, E)$. (03 Marks)

(ii) Determine the order of vertices 1 and 4. (02 Marks)

(d) Find the truth set of each of these predicates where the <u>domain is the set of integers</u>.

   (i) $P(x): x^2 < 8$ (02 Marks)

   (ii) $R(x): x + 7 < 12$ (03 Marks)

(e) A firm manufactures two products A and B on machines I and II as shown in the Table 2:

Table 2

Machine	Product		Available Hours
	A	B	
I	30	20	300
II	5	10	110
Profit per unit (Rs)	6	8	

The total time available is 300 hours and 110 hours on machines I and II, respectively. Products A and B contribute a profit of Rs 6 and Rs 8 per unit, respectively. Construct the LP Model. (Do not solve). (05 Marks)

Question 02

(a) Consider the differential equation $\frac{d^2y}{dx^2} - 6\frac{dy}{dx} + 8y = 0$.

   (i)   Is the given differential equation homogeneous or non-homogeneous? State reasons for your answer. (03 Marks)

   (ii)   Find the general solution of the differential equation. (06 Marks)

   (iii)   Find the particular solution when $y(0) = -2$ and $y'(0) = 6$. (04 Marks)

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(a) Use the graphical method to solve the following LP problem. (12 Marks)

$$Maximize\ Z = 15x_1 + 10x_2$$

$$subject\ to$$

$$4x_1 + 6x_2 \leq 360$$

$$3x_1 \leq 180$$

$$5x_2 \leq 200$$

$$x_1, x_2 \geq 0$$

Question 03

(a) Anita Electric Company produces two products P_1 and P_2. Products are produced and sold on a weekly basis. The weekly production cannot exceed 25 for product P_1 and 35 for product P_2 because of limited available facilities. The company employs total of 60 workers. Product P_1 requires 2 man-weeks of labour, while P_2 requires one man-week of labour. Profit margin on P_1 is Rs. 60 and on P_2 is Rs. 40. Formulate this problem as an LP problem to maximize profit and solve that using graphical method. (15 Marks)

(b) Construct a truth table for the below logical statement and comment whether it is a tautology, contradiction or neither. (10 Marks)

$$(p \lor q) \land \sim(\sim q \land r)$$

Question 04

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(a) Use figure 1 to answer the following questions.
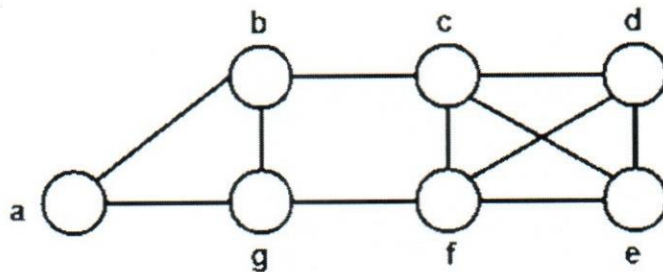

Figure 1

(i) Write two walks of length 6. (04 Marks)

(ii) What is the difference between a trail and path? (02 Marks)

(iii) Name a cycle of length 5. (03 Marks)

(iv) Is the given graph bipartite? Give reasons to your answer. (03 Marks)

(v) Is the given graph complete? Give reasons to your answer. (03 Marks)

(b) Consider the given table to estimate $\int_1^3 \frac{1}{x^2+1} dx$.

Table 3

x	1	1.5	2	2.5	3
$y = \frac{1}{x^2 + 1}$	0.5	0.308		0.138	

(i) Copy and complete table 3. (03 Marks)

(ii) Estimate the value of the integral using Trapezoidal Rule. (04 Marks)

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(iii) Calculate the exact value of the integral and comment whether your estimation is an underestimate or an overestimate.   (03 Marks)

Question 05

(a) Write the negations of the given statements.

(i) For any prime number x, the number $x + 1$ is composite.   (02 Marks)

(ii) There exists an integer k such that $2k + 1$ is even.   (02 Marks)

(b) Find the general solution to differential equation.

(i) $\frac{d^2y}{dx^2} + 5\frac{dy}{dx} + 6y = 12e^x$ (07 Marks)

(ii) Hence find the particular solution that satisfies $y = 1$ and $\frac{dy}{dx} = 0$ when $x = 0$.

(05 Marks)

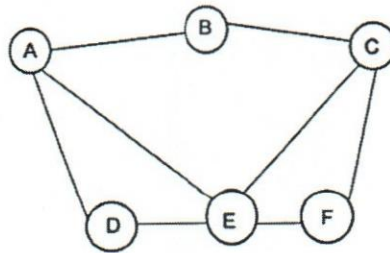(c) Consider the given graph below.

Figure 2

(i) Obtain the complement graph of the given graph in Figure 2.   (04 Marks)

(ii) Obtain the line graph of the given graph in Figure 2.   (05 Marks)

Question 06

Faculty of Management and Social Sciences
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BSc Hons in Logistics and Transportation
Course CODE: COM551

(a) Consider Figure 3 to answer the following questions.

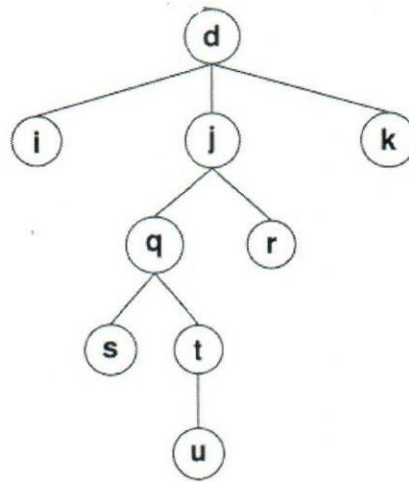Figure 3

(i) What is the root of the tree? (02 Marks)

(ii) Name the siblings of vertices d, j, and q. (04 Marks)

(iii) Name the levels of vertices q and u. (02 Marks)

(iv) Name the leaves of the tree. (03 Marks)

(v) Write the height of the tree. (02 Marks)

(vi) What are the descendants of vertex j? (02 Marks)

(vii) Write the truth table of the following logical statement. (10 Marks)

$$[(\sim q \wedge p) \rightarrow r] \leftrightarrow [(\sim r \rightarrow \sim q) \vee p]$$

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Question 07

(a) A diet for a sick person must contain at least 4,000 units of vitamins, 50 units of minerals and 1,400 calories. Two foods A and B are available at a cost of Rs. 4 and Rs. 3 per unit, respectively. If one unit of A contains 200 units of vitamins, 1 unit of mineral and 40 calories and one unit of food B contains 100 units of vitamins, 2 units of minerals and 40 calories. Formulate this problem as an LP model to find combination of foods to be used to have least cost? (Do not solve.) (10 Marks)

(b) The diagram shows part of the curve with equation $y = 3\sqrt{x} - \sqrt{x^3} + 4$ and the line with equation $y = 4 - \frac{1}{2}x$.
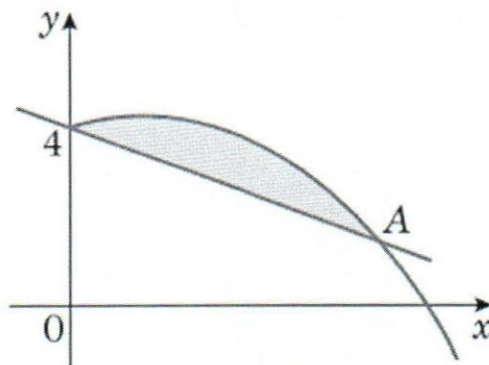

Figure 4

(i) <u>Verify</u> that the line and the curve cross at the point $A(4, 2)$. (04 Marks)

(ii) Find the area of the finite region bounded by the curve and the line.

(08 Marks)

(c) Make a truth table for the given expression. (03 Marks)

$$(\sim p \wedge q) \vee (p \wedge \sim q)$$

--------------------END OF THE QUESTION PAPER-----------------

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Course CODE: COM551

Year 1 Semester II

REPEAT EXAMINATION

Transport Geography – LTTG1212

- This paper consists of SEVEN questions on THREE (03) pages.
- Answer FOUR Questions including Question 01.
- Only non-programmable calculators are allowed.
- You may use appropriate graphs, diagrams, equation/s to prove or justify the answers.
- If you have any doubt as to the interpretation of the wording of a question, make your own decision, but clearly state it on the script.
- Write Legibly.

Date: 2022.08.26   Pass mark: 50%   Time: 02 Hours

Question 01 (Compulsory)

It's being accepted worldwide that "There is no transportation without geography and there's no geography without transportation".

(a) Explain in your own words how transportation is influenced by geography as well as influencing it.   (06 marks)

(b) What are absolute and relative barriers for transportation? Give examples for each.   (03 marks)

(c) What's the difference between geographic concentration and geographic specialization?   (06 marks)

(d) Describe with an example in the modern day, how the transportation has overcome physical environment with technology.   (10 marks)

Question 02

(a) **"The space in transportation is organized in such a way that it should rely in various dimensions".** Identify and explain the two major dimensions that spatial organization relies on.   (08 Marks)

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(b) There are 4 major Locational influences of transportation. Explain in detail, two such locational influences with examples. (06 Marks)

(c) What are the constraints for transportation infrastructure? (05 Marks)

(d) Mention and briefly explain three key elements in a transportation network.
(06 Marks)

Question 03

"Unit Delivery" is a newly formulated parcel delivery company and they aim to deliver parcels to any part of the world within a time frame of 24 hours. However, the owner of Unit Delivery company doesn't have a clear idea about the types of transport network structures.

(a) As a student learning Transport Geography module, mention and explain the most suitable network structure for the above scenario by highlighting the benefits of using the mentioned network structure. (10 Marks)

(b) Compare and contrast the pros and cons between **"Hub and Spoke Network structure"** and **"Point to Point Network structures"**. (10 Marks)

(c) **"The reciprocity of transportation are majorly two types"**. Mention and explain the two types. (05 Marks)

Question 04

(a) What's the centrality and intermediacy function of a transportation terminal?
(05 Marks)

(b) What're the major attributes linked with the performance of a transportations terminal?
(05 Marks)

(c) What's an inland port?
(05 Marks)

(d) Explain the type of intermodal terminals.
(10 Marks)

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Question 05

(a) "Containerized transportation substantially changed port dynamics". Explain in your own words. (10 Marks)

(b) Distinguish between Monofunctional and Polyfunctional terminals. (06 Marks)

(c) Briefly explain the factors that impact the airport traffic. (09 Marks)

Question 06

a) What's urbanization? What are the three major demographic trends that drives urbanization? (07 Marks)

b) Explain the vicious cycle of congestion. (08 Marks)

c) Explain how the two concepts called "**Urban Sprawl**" and "**Transportation**" are related to each other. (06 Marks)

d) Name four major issues in urban transportation. (04 Marks)

Question 07

Write short notes on the below topics. (05 * 05 Marks)

(a) Congestion.

(b) Pendulum movements.

(c) City Logistics.

(d) Manufacturing districts

(e) Rationalization of deliveries.

---------------END OF THE QUESTION PAPER----------------

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Year 1 Semester II

REPEAT EXAMINATION

Business Statistics – LTBS1209

- This paper consists of SEVEN questions on NINE (09) pages.
- Answer FOUR Questions including Question 01.
- Only non-programmable calculators are allowed.
- You may use appropriate graphs, diagrams, equation/s to prove or justify the answers.
- If you have any doubt as to the interpretation of the wording of a question, make your own decision, but clearly state it on the script.
- Write Legibly.

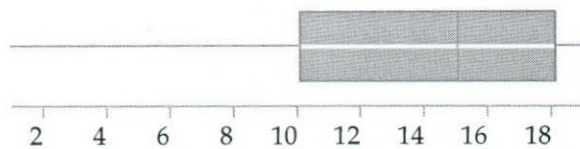Date: 2022.08.20   Pass mark: 50%   Time: 02 Hours

Question 01

(a) Underline the most suitable answer/s
1) Consider the boxplot below.

Which of the following statements are true?

I. The distribution is skewed left.
II. The interquartile range is about 8.
III. The median is about 10.

        A. I only
        B. II only
        C. III only
        D. I and II

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E. II and III

2) Which of the following is a discrete random variable?
I. The average weight of a randomly selected group of boys.
II. The number of students registered at CINEC in 2018
III. Space available in the Dean's office in square meters
   A. I only
   B. II only
   C. III only
   D. I and II
   E. II and III

3) A simple random sample consists of four observations: {1, 3, 5, 7}. Based on these sample observations, what is the best estimate of the standard deviation of the population?

   A. 2
   B. 2.58
   C. 6
   D. 6.67
   E. 3

4) A population consists of four observations: {1, 3, 5, 7}. What is the variance?
   A. 2
   B. 4
   C. 5
   D. 6
   E. 3

5) If E(X) = 2, what is the value of E(3X +2)
   I.   2
   II.   8
   III. 6

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IV.   4

V.   5

6) If V(X) = 3, what is the value of V(3X + 2)?
  I.   11
  II.   9
  III.   29
  IV.   27
  V.   20

7) In quality control of manufactured items, the most common measure of dispersion is
  I.   Quartile Deviation
  II.   Range
  III.   Standard Deviation
  IV.   Inter quartile range
  V.   Variance

8) In a Poisson probability distribution
  I.   The mean and standard deviation of the distribution are the same (equal)
  II.   The mean and variance of the distribution are the same (equal)
  III.   The probability of success is always greater than 5
  IV.   The number of trials is always less than 5
  V.   It always contains a contingency table

9) If X and Y are two events with $P(X) = a$, $P(Y) = b$ and $P(X \cap B) = c$. What is the value of $P[X' \cap (A \cup B)]$
  I.   1-a+b+c
  II.   a – c
  III.   b-c
  IV.   1 + a + b -c
  V.   a+ b – c

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10) Consider the statements given below.

1. The arithmetic mean of a frequency distribution is a weighted average, the weight being the frequencies of classes.
2. If a distribution has the longer tail towards left, it is said to be a negatively skewed distribution
3. Measures of kurtosis are not relevant for a skewed distribution.

Which of the above statement/s is/are correct?

        (A)1. Only
        (B) 2. Only
        (C)3. Only
        (D)1 and 2 only
        (E) All 1., 2. And 3.

(10 Marks)

(b) Identify the variable type of the variables given below   (05 Marks)

Variable Name	Qualitative	Quantitative	
		Discrete	Continuous
1. Gender			
2. No of members in your family			
3. Payment method (Cash/Card/Cheque)			
4. Price of a mobile phone			
5. Number of national schools in western province			

(c) Identify the measurement scale of the variables given below   (10 Marks)

Variable Name	Measurement Scale			
	Ordinal	Nominal	Interval	Ratio
1. Gender				

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2. No of members in your family				
3. Payment method (Cash/Card/Cheque)				
4. Price of a mobile phone				
5. Number of national schools in western province				
6. Per capita income				
7. Gross monthly salary of a person				
8. Anemic status of a child (Anemic or Non anemic)				
9. Haemoglobin level in blood of a person				
10. Blood sugar level of a person				

Question 02

A manufacturing company is considering two methods of checking the quality of production of the batches of items it produces.

METHOD I:

- A random sample of size 10 is taken from a large batch and the batch is accepted if there are no defectives.
- If there is only 1 defective, then another sample of size 10 is taken and the batch is accepted if there are no defectives in the second sample.
- Otherwise the whole batch is rejected.

METHOD II

- A random sample of size 20 is taken from a large batch and the batch is accepted if there is at most ONE defective in the sample.
- Otherwise, the whole batch is rejected.

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The factory knows that 1% of items produced are defective and wishes to use the method of checking the quality of production for which the probability of accepting the whole batch is largest.

(a) Calculate the probability that the batch is accepted according to the METHOD I

(10 Marks)

(b) Calculate the probability that the batch is accepted according to the METHOD II

(10 Marks)

(c) Suggest the most suitable method for the organization (05 Marks)

Question 03

(a) State whether the following could be modelled by a Poisson distribution or not. Justify your answer.
  (i)   The number of misprints on a page in the first draft of a book.
  (ii) Number of bacteria in $1m^3$ of water.

(06 Marks)

(b) Suppose that faults of in a Cotton Fabric occur at random, with an average of one per 10 square meters. This can be modeled as a Poisson Random variable.
  (i)   Identify the parameter/s of Poisson Distribution (02 Marks)
  (ii) Write the Probability density function of the Poisson Distribution

(02 Marks)

  (iii) What is the probability that 10 square meter fabric will have no faults

(05 Marks)

  (iv) What is the probability that 10 square meter fabric will have at most 01 faults (05 Marks)
  (v)   What is the probability that 20 square meter fabric will have at least 2 faults. (05 Marks)

Question 04

The lifetime of a certain kind of a LED bulb has a normal distribution with mean 500 hours and standard deviation of 50 hours.

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Find the probability that,

(a) The percentage of bulbs with a lifetime of at least 600 hours
(b) The percentage of bulbs with a lifetime of at most 650 hours
(c) The percentage of bulbs with a lifetime between 375 hours and 675 hours
(d) Find the minimum lifetime of the best 5% of the bulbs
(e) If the manufacturer of the LED bulbs is willing to claim only 5% warranty claims of his production, calculate the warranty period of the manufacturer.

(5*5 Marks)

Question 05

(a) If $P(X) = \frac{1}{2}$, $P(X \cup Y) = \frac{3}{4}$ and $P(Y') = 5/8$
  (i)   Find $P(X' \cap Y')$
  (ii)   Find $P(X' \cup Y')$
  (iii)   Find $P(X' \cap Y)$
  (iv)   State whether event X and Y are independent

(3*4 Marks)

(b) The probability that a doctor will diagnose Covid 19 correctly is 0.8. the probability that a Covid 19 patient will die by his treatment after correct diagnosis is 0.3. The probability that a patient with Covid 19 will die after not diagnosing the disease correctly is 0.7. if a Covid 19 patient died, find the probability that the doctor had diagnose the Covid 19 correctly using Baye's theorem.   (07 Marks)

(c) Four married couples have bought 08 seats in the same row for a cinema. In how many different ways can they be seated;   (06 Marks)
  (i)   With no restrictions
  (ii)   If each couple is to sit together
  (iii)   If all men sit together to the right of all the women

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Question 06

(a) A quality control inspector tested nine samples of each of three designs A, B and C of certain bearing for a new electrical winch. The following data are the number of hours it took for each bearing to fail when the winch motor was run continuously at maximum output, with a load on the winch equivalent to 1.9 times the intended capacity.

A :   16   16   53   15   31   17   14   30   20

B :   18   27   23   21   22   26   39   17   28

C :   31   16   42   20   18   17   16   15   19

(i) Calculate mean, median, range and standard deviation for each group

(16 Marks)

(ii) Suggest which design is best. Justify your answer   (04 Marks)

(iii)   The mean monthly salaries paid to 100 employees of the above company was USD 50,000.

The mean monthly salaries paid to male and female employees were USD 52,000 and USD 42,000 respectively.

Determine the number of males and females employed by the company.

(05 Marks)

Question 07

(a)   If A and B are two events. If $A \subseteq B$ Prove that $P(A) \le P(B)$ (05 Marks)

(b)   In an experiment to study the relationship of hypertension and smoking habits, the following data collected for 180 individuals:

	Non Smokers	Moderate Smokers	Heavy Smokers
Hypertension	21	36	30
No hypertension	48	26	19

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If one of these individuals is selected at random, find the probability that the person is

(i) experiencing hypertension, given that the person is a heavy smoker.

(05 Marks)

(ii) a nonsmoker, given that the person is experiencing hypertension.

(05 Marks)

(c) In each of the following situations, explain what graphical display you would use to present the information most appropriately. Do a sketch of the display highlighting the important aspects that should be considered in those graphs.

(i) Student Coordinator of the Faculty of Management at CINEC Campus should present the number of students recruited for the Logistics Degree programme for the period of 2012 to 2022. (02 Marks)

(ii) Student Coordinator of the Faculty of Management at CINEC Campus needs to present, the number of male and female students eligible for the undergraduate programme from each of the streams: Mathematics, Bio-Sciences, Commerce and Arts. (04 Marks)

(iii) Course Coordinator of the Faculty of Management at CINEC Campus needs to compare marks obtained by first year undergraduate students for Mathematics and Business English modules. (04 Marks)

-----------------END OF THE QUESTION PAPER-----------------

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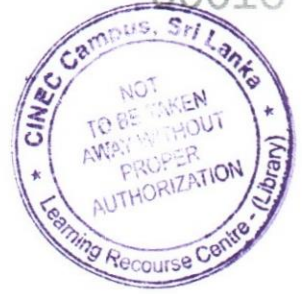Course CODE: COM552

The Standardised Normal Distribution Table
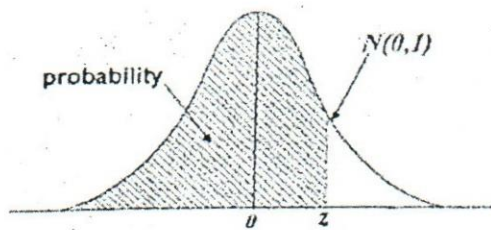
The distribution tabulated is that of the normal distribution with mean **zero** and standard deviation 1. For each value of Z, the standardized normal deviate, (the proportion P, of the distribution less than Z) is given. For a normal distribution with mean μ and variance σ^2 the proportion of the distribution less than some particular value X is obtained by calculating $Z = (X - \mu)/\sigma$ and reading the proportion corresponding to this value of Z.

Z	P	Z	P	Z	P
-4.00	0.00003	-1.00	0.1587	1.05	0.8531
-3.50	0.00023	-0.95	0.1711	1.10	0.8643
-3.00	0.0014	-0.90	0.1841	1.15	0.8749
-2.95	0.0016	-0.85	0.1977	1.20	0.8849
-2.90	0.0019	-0.80	0.2119	1.25	0.8944
-2.85	0.0022	-0.75	0.2266	1.30	0.9032
-2.80	0.0026	-0.70	0.2420	1.35	0.9115
-2.75	0.0030	-0.65	0.2578	1.40	0.9192
-2.70	0.0035	-0.60	0.2743	1.45	0.9265
-2.65	0.0040	-0.55	0.2912	1.50	0.9332
-2.60	0.0047	-0.50	0.3085	1.55	0.9394
-2.55	0.0054	-0.45	0.3264	1.60	0.9452
-2.50	0.0062	-0.40	0.3446	1.65	0.9505
-2.45	0.0071	-0.35	0.3632	1.70	0.9554
-2.40	0.0082	-0.30	0.3821	1.75	0.9599
-2.35	0.0094	-0.25	0.4013	1.80	0.9641
-2.30	0.0107	-0.20	0.4207	1.85	0.9678
-2.25	0.0122	-0.15	0.4404	1.90	0.9713
-2.20	0.0139	-0.10	0.4602	1.95	0.9744
-2.15	0.0158	-0.05	0.4801	2.00	0.9772
-2.10	0.0179	0.00	0.5000	2.05	0.9798
-2.05	0.0202	0.05	0.5199	2.10	0.9821
-2.00	0.0228	0.10	0.5398	2.15	0.9842
-1.95	0.0256	0.15	0.5596	2.20	0.9861
-1.90	0.0287	0.20	0.5793	2.25	0.9878
-1.85	0.0322	0.25	0.5987	2.30	0.9893
-1.80	0.0359	0.30	0.6179	2.35	0.9906
-1.75	0.0401	0.35	0.6368	2.40	0.9918
-1.70	0.0446	0.40	0.6554	2.45	0.9929
-1.65	0.0495	0.45	0.6736	2.50	0.9938
-1.60	0.0548	0.50	0.6915	2.55	0.9946
-1.55	0.0606	0.55	0.7088	2.60	0.9953
-1.50	0.0668	0.60	0.7257	2.65	0.9960
-1.45	0.0735	0.65	0.7422	2.70	0.9965
-1.40	0.0808	0.70	0.7580	2.75	0.9970
-1.35	0.0885	0.75	0.7734	2.80	0.9974
-1.30	0.0968	0.80	0.7881	2.85	0.9978
-1.25	0.1056	0.85	0.8023	2.90	0.9981
-1.20	0.1151	0.90	0.8159	2.95	0.9984
-1.15	0.1251	0.95	0.8289	3.00	0.9986
-1.10	0.1357	1.00	0.8413	3.50	0.99977
-1.05	0.1469			4.00	0.99997

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Year 1 Semester II

REPEAT EXAMINATION

Macroeconomics – LTME 1211

- This paper consists of SEVEN questions on SIX (06) pages.
- Answer FOUR Questions including Question 01.
- Only non-programmable calculators are allowed.
- You may use appropriate graphs, diagrams, equation/s to prove or justify the answers.
- If you have any doubt as to the interpretation of the wording of a question, make your own decision, but clearly state it on the script.
- Write Legibly.

Date: 2022.08.18   Pass mark: 50%   Time: 02 Hours

Question 01 (Compulsory)

a) The circular flow model shows that firms and households are both buyers and sellers simultaneously. How is this possible?   (05 marks)

b) What are the four factors of production and what are their respective payments?

(04 marks)

c) Use the simple circular flow model to show the circular flow income and explain the equivalence between factor income flow, household expenditure flow and the value of output flow.   (10 marks)

d) What is the difference between open economy and closed economy?   (01 mark)

e) What happens to the size of the income flow when

   i.   When leakages are larger than injections

   ii.   When injections are larger than leakages   (05 marks)

(Total marks 25)

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Question 02

Fill in the blanks

a) The labour market equilibrium decided by _____ curve and _____ curve.

b) Children age below age 15 is _____ part of the _____ of Sri Lanka.

c) Cyclical unemployment is also known as _____ unemployment.

d) The fact that money can be immediately used in exchange, whereas valuable jewelry cannot, illustrates the fact that money is very_____.

e) The measure of the money supply that includes currency of commercial bank and public, deposits with the Central Bank and deposits of other institutions with the Central Bank is called _____.

f) The portion of bank deposits that a bank must keep on reserve are known as

_____.

g) The portion of bank reserves that banks are permitted to lend or invest are known as _____.

h) The rate at which the Central Bank provides credit to commercial banks_____.

i) _____ and _____ rates provide a lower bound and upper bound respectively, to call rates.

j) Under expansionary monitory policy by open market operations, Central Bank _____ treasury bills in the the secondary market in order to inject liquidity to the market.

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k) Under contractionary monitory policy by open market operations, Central Bank _____ treasury bills in the secondary market in order to reduce liquidity in the market.

l) The theory that assumes that the velocity of money is constant in the equation $M \times V = P \times Y$ is the _____.

m) The three motives to hold money are _____, _____. _____.

n) The two primary functions of a commercial bank are _____, _____.

o) In a commercial bank balance sheet the bank's _____ are its sources of funds and _____ are its uses of funds.

p) At the start of the twenty-first century, Zimbabwe experienced _____ inflation so that economists had difficulty measuring it.

q) Phillips curve is a historical inverse relationship between _____ and _____ in an economy.

(Total Marks 25)

Question 03

a) Define unemployment and explain how it is differs from underemployment.

(06 marks)

b) How do we measure the unemployment rate? (03 marks)

c) Explain why unemployment figures are not usually accurate. (05 marks)

d) Explain the social and economic consequences of unemployment. (10 marks)

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e) In an economy with a labour force of 27.3 million people and 3.1 million unemployed people, what is the unemployment rate? (01 mark)

(Total Marks 25)

Question 04

a) Explain the functions of a Central Bank and their role with respect to achieving macroeconomic objectives (10 marks)

b) Explain what would a central bank do if it wanted to

(i) lower the interest rates and

(ii) increase the interest rates (10 marks)

c) Distinguish between expansionary and contractionary monetary policy.

(05 marks)

(Total Marks 25)

Question 05

a) Distinguish between inflation, disinflation and deflation (06 marks)

b) Explain using a numerical example the relationship between the inflation and real income (purchasing power). (06 marks)

c) Explain who is likely to gain and who is likely to lose from the redistribution effect of inflation. (06 marks)

d) What is the appropriate level of inflation? Why it is say so? (02 marks)

e) Explain the cost push inflation using an appropriate diagram. (05 marks)

(Total Marks 25)

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Question 06

Following information are provided for a 3-sector economy. Values are indicated in Rs. Millions.

$$C = 1200+0.75yd$$

$$T = 400+0.2y$$

$$I = 2500$$

$$G = 1600$$

a) Calculate equilibrium income (value of output) of the economy algebraically.

(08 marks)

b) The function $C = C0 + Ci\ Y$ is used to calculate the amount of total consumption in an economy. Where C is consumption expenditure and Y is national income.

    i.   What is Co and Ci?   (02 marks)

c) Briefly explain
    i.   Net National Product (NNP)
    ii.   Gross Domestic Product (GDP)
    iii.   GDP Deflator
    iv.   Real income
    v.   Economic growth

(05 marks)

d) The income-consumption schedule of a hypothetical economy has given as below.

National Income (Rs. Million)	Consumption (Rs. Million)
200	160
300	230

    i.   Derive the consumption function of this economy
    ii.   Derive the savings function of this economy   (10 marks)

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(Total Marks 25)

Question 07

Explain whether you agree with the proposition that "government should intervene more strongly in countries that are relatively lower level of economic growth and less strongly as countries grow and develop".   (25 Marks)

-------------------END OF THE QUESTION PAPER-----------------