CINEC
CAMPUS
Beyond A Graduate

Faculty of Management and Social Sciences
Department of Logistics & Transport
Undergraduate Foundation Programme
Course CODE: COM530

FINAL EXAMINATION

Concepts of Information and Communication Technology – CICT10304

- This paper consists of EIGHT questions on SIX (06) pages.
- Answer <u>FIVE (05)</u> questions including question 01.
- 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: 2023.03.28   Pass mark: 50%   Time: 03 Hours

Question 01- Compulsory

Perform following number system conversions.

a)	100001_2 to Decimal	(02 Marks)
b)	11.1000_2 to Decimal	(02 Marks)
c)	543_8 to Binary	(02 Marks)
d)	$16AB_{16}$ to Binary	(02 Marks)
e)	156_{10} to Octal	(03 Marks)
f)	1123_{10} to Hexadecimal	(03 Marks)
g)	1023_8 to Hexadecimal	(03 Marks)
h)	7.625_{10} to Binary	(03 Marks)

Question 02

a) Perform following calculations using sign magnitude arithmetic (using 6 bits)

(06 Marks)

I.   11 – 13
II.   -11 + 9

b) Briefly explain two limitations of sign magnitude representation.   (04 Marks)

c) Perform following calculations using Two's complement arithmetic (using 4 bits)

(06 Marks)

I.   -4+7
II. -6+5

d) Draw the flow chat to calculate the summation and the average of two numbers.

(04 Marks)

Question 03

a) The automated teller machine (ATM) is an automatic banking machine (ABM) that allows the customer to complete basic transactions without any help from bank representatives.

I.   List down two input devices in an ATM.   (02 Marks)
II.   List down two output devices in an ATM.   (02 Marks)
III. List down two processing mechanisms happening in an ATM.

(02 Marks)

b) a person's phone number (071)123-7798, each individual homework and assignment mark of a student in one class, typing the words "COVIID 19" in your computer search engine, 100, 212, 0, 32, the freezing and boiling points of water in Fahrenheit and Celsius, the student's average grade for each class.

(06 Marks)

I.   Identify data from above list

II.   Identify Information from the above list.

c) Convert 125 KB (Kilo Bytes) to each of the following   (04 Marks)
     I.   GB (Giga Bytes)

     II.   Bits

d) Compare and contrast CC (Carbon Copy) and BCC (Blind Carbon Copy) using an example   (04 Marks)

Question 04

Read the following case and answer the questions.

Case: Facebook Privacy Issue

Facebook discovered a security issue that allowed hackers to access information that could have let them take over around 50 million accounts. "This is a very serious security issue, and we're taking it very seriously," said CEO Mark Zuckerberg on a call with reporters.

Facebook is a phenomenon that is unique to our times. Never before the world was so connected, and talking to people from different cultures, sharing experiences, making new contacts, Facebook played a significant role in globalizing our daily lives. At this moment, around 2.5 billion people are using at least one Facebook service, roughly one-third of the world's population.

Cambridge Analytica was disclosed in 2018, but their shady practices started in 2015 when they found a way to exploit Facebook's API to gain unauthorized access to millions of users' personal information. Facebook has been developing a way to involve third party Apps into their services, and their API allowed some applications to gather data of the users and all their friends.

a) What is the threat described in this case? (02 Marks)
b) Mention two other types of security or privacy threats users have to face when connected to the internet. Briefly explain about them. (06 Marks)
c) How do you identify a secure website? Briefly explain two (2) strategies.

(04 Marks)
d) Identify two potential harms for Facebook users from the threat mentioned in the case (04 Marks)
e) Briefly explain a proactive step (step that should be taken prior to the incident) and a reactive step (step that should be taken after the incident) that the Facebook users can get to protect their accounts from outside hackers (04 Marks)

Question 05

Malith uses spreadsheet software to store the responses from 5 copies of questionnaire. Each copy consists of 6 questions. The responses to the questions are coded as values: 1,2,3 or 4. The following worksheet is used to record the responses.

	A	B	C	D	E	F	G	H	I
1		Q1	Q2	Q3	Q4	Q5	Q6		Total Number of copies
2	Copy 1	1	1	2	2	1	4		
3	Copy 2	1	2	4	4	3	3		
4	Copy 3	1	3		1	2	3		
5	Copy 4		4	2	3	2	4		
6	Copy 5	2	4	4	1	2	3		
7									
8	Mean response score	1.8	3	3.1	2.3	2.8	2.7		
9									
10	Total number of '1' and '2'	25	10	5	23	17	18		
11	Total number of '3' and '4'	14	30	34	14	23	12		
12									
13	Overall response	BAD	GOOD	GOOD	BAD	GOOD	BAD		
14									

a) When some responses are missing, the corresponding cells in the worksheet are left blank. To calculate the total number of copies without any missing responses, firstly a function is entered into I2 and then copied into I3 to I6. Write the function that should be entered in I2. (02 Marks)

b) The function that is entered in the I2 cell can be copied into I3 to I6 and can get the correct answers corresponding to the rows because of the default referencing style in MS Excel. What it is? (02 Marks)

c) Briefly explain a special case where the referencing style mentioned above cannot be applied with an example. (04 Marks)

d) The mean response score of a question is defined as;
Mean response score = Sum of all values of the responses on that question/No. of responses on that question. Write the formula that should be entered in B8.
(06 Marks)

e) The overall response of a question is regarded as 'GOOD' if it fulfills the following two conditions:
- The mean response score >2.5
- The total number of responses '3' and '4' > The total number of responses '1' and '2'

Otherwise, the overall response of the question is 'BAD'. Write the formula that should be entered in B13 (06 Marks)

Question 06

	A	B	C	D	E	F	G
1		PAYROLL RECORDS JANUARY 2021					
2	Employee	Hours	Overtime Hours	Pay Rate (/hour)	Subtotal	Income Tax	Pay After Taxes
3	John Abhot	36.00		$12.00	$432.00	24.67	
4	Terry Burke	40.00	2.00	$15.00	$645.00	24.67	
5	Linda Carlson	22.00		$12.00	$264.00	31.09	
6	Krista Carter	25.00		$15.00	$375.00	31.09	
7	John Dole	39.00		$9.00	$351.00	31.09	
8	James Erickson	40.00	9.00	$12.00	$642.00	31.09	
9	Fred Gretchen	39.00		$20.00	$780.00	31.09	
10	Sally Hertz	13.00		$12.00	$156.00	31.09	
11							
12	Number of employees worked Overtime	2					
13	Total Hours (Regular and OT)	265.00					
14	Average Pay Rate	$31.75					
15	Highest Pay After Taxes						
16							
17							
18	Income tax rate :	<$450	24.76%				
19		>=$450	31.09%				
20							

a) Write a function that should be entered in B12 cell to calculate the number of employees who worked overtime. (02 Marks)

b) Write a function that should be entered in B13 cell to calculate the total hours (both regular and OT) worked. (02 Marks)

c) Write a function that should be entered in B14 cell to calculate the average pay rate for employees. (02 Marks)

d) Subtotal is equal to an employee's pay rate *hours + Overtime hours*1.5. Write a formula to calculate the subtotal in E3 cell. (02 Marks)

e) In cells C18 and C19 are listed the Income tax rates. Write the formula that should be entered in F3 cell. (04 Marks)

f) Write the formula that should be entered in G3 cell to calculate the pay after taxes. (02 Marks)

g) In cell B15, write the formula that should be entered to calculate the highest Pay after taxes value. (02 Marks)

h) Differentiate COUNT and COUNTA functions. (04 Marks)

Question 07

Write HTML code segments for following situation.

a) To insert the title "ABC Books" to web page   (02 Marks)

b) To insert the heading "Book Details"   (02 Marks)

c) To insert a list with following details   (03 Marks)

- Children Books
- Novels
- Educational Books

d) To link to another web page "https://www.yahoo.com/"   (03 Marks)

e) To insert the following paragraph. Font should be **Bolded**.   (03 Marks)

"ABC have an extensive collection of books to purchase online and in store"

f) To insert following table.   (07 Marks)

Books		
Exercise Book	**Price**	
20 pages single rule	Rs. 60	
40 pages single rule	Rs. 120	

Question 08

a) Draw the truth table for NAND gate with three inputs.   (05 Marks)

b) Draw the logic gate and truth table for the following function. Then Simplify it.

                                                (15 Marks)

$$F(A,B,C) = (A+B)(A+\bar{B})(\overline{AC})$$

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

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FINAL EXAMINATION
Fundamentals of Management – MAGT10305

- This paper consists of EIGHT questions on TWO (02) pages.
- Answer <u>FIVE (05)</u> questions including question 01.
- 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: 2023.03.24   Pass mark: 50%   Time: 03 Hours

Question 1 (Compulsory)

(a) Define the term organization.	(3 marks)
(b) Identify organizational resources with examples.	(5 marks)
(c) Compare and contrast effectiveness and efficiency.	(5 marks)
(d) "There are four functions of Management". Discuss this statement.	(7 marks)

Question 2

(a) Identify <u>two</u> features of Management in the classical period?	(4 marks)
(b) Write <u>three</u> benefits of Scientific Management.	(5 marks)
(c) Briefly explain the <u>three</u> principals of Fayol's management.	(5 marks)
(d) Discuss <u>three</u> contributions of Hawthorne experiments	(6 marks)

Question 3

(a) What are elements of internal environment?	(4 marks)
(b) Write <u>five</u> areas covered by the internal environmental analysis	(5 marks)
(c) Briefly explain the external environment	(5 marks)
(d) 'Opportunities and threats are external to the organization'. Elucidate this statement.	(6 marks)

Question 4

    (a) Explain the <u>two</u> basic components in planning.   (5 marks)

    (b) What are SMART objectives?   (5 marks)

    (c) Briefly explain planning process.   (5 marks)

    (d) In nature of planning, how would you explain "pervasiveness of planning"?

        (5 marks)

Question 5

    (a) Explain importance of organizing function. Give <u>three</u> reasons   (5 marks)

    (b) Briefly explain the functional structure.   (5 marks)

    (c) Discuss <u>three</u> benefits of an organizational structures   (5 marks)

    (d) Compare and contrast formal and informal organization.   (5 marks)

Question 6

    (a) Briefly explain <u>three</u> characteristics of strong leaders.   (5 marks)

    (b) Write <u>three</u> advantages of trait theory   (5 marks)

    (c) Discuss disadvantages of behavioural theory of leadership. Give <u>three</u> reasons

        (5 marks)

    (d) Differentiate theory X and Y   (5 marks)

Question 7

    (a) Briefly explain Blake and Mouton's Managerial Grid   (5 marks)

    (b) Discuss the basis of contingency theory.   (5 marks)

    (c) Compare and contrast autocratic leadership style and participative leadership.

        (5 marks)

    (d) "Hersey and Blanchard's Situational Leadership theory identifies four main leadership approaches". Discuss this statement.   (5 marks)

Question 8

    (a) Write three features of controlling function   (5 marks)

    (b) Briefly explain the relationship between the planning and controlling functions.

        (5 marks)

    (c) Write five types of traditional control techniques in management.   (5 marks)

    (d) "In process of controlling, first step is to establish goals and standards". Elucidate this statement.   (5 marks)

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

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FINAL EXAMINATION

Introduction to Economics – ECON10307

- This paper consists of EIGHT questions on TEN (10) 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: 2023.03.22   Pass mark: 50%   Time: 03 Hours

Question 01: (Compulsory)   (20 Marks)

Select the most suitable answer for sub question 1 to 10.

1. Which of the following statements about opportunity costs is **TRUE**?

    I.   The opportunity cost of a given action is equal to the value foregone of all feasible alternative actions.

    II. Opportunity costs only measure direct out of pocket expenditures.

    III. To calculate accurately the opportunity cost of an action we need to first identify the next best alternative to that action.

    a) III only.

    b) I and III only.

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c) II only.

d) None of the statements is true.

2. Economics is the study of

    a) How society manages its unlimited resources.

    b) How to reduce our wants until we are satisfied.

    c) How society manages its scarce resources.

    d) How to fully satisfy our unlimited wants.

3. Suppose you find €20. If you choose to use the €20 to go to a football match, your opportunity cost of going to the game is

    a) Nothing, because you found the money.

    b) €20 (because you could have used the €20 to buy other things) plus the value of your time spent at the game.

    c) €20 (because you could have used the €20 to buy other things).

    d) None of the above.

4. Which of the following statements about sunk costs is **FALSE**?

    I.   Sunk costs are those that cannot be recovered, no matter what future action is taken.

    II. Because sunk costs cannot be recovered, they are irrelevant for future decision-making.

    III. The presence of sunk costs can affect future decision-making, if they are large enough.

    a) II and III only.

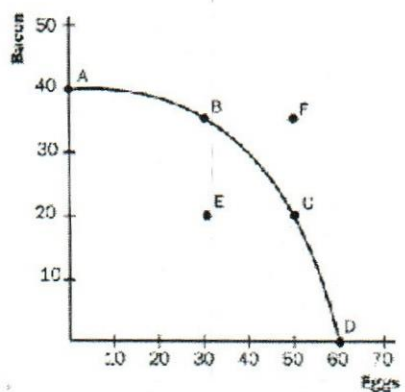   b) II only.

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c) III only.

d) I and III only.

5. Points on the production possibilities frontier are

a) Inefficient.

b) Normative.

c) Unattainable.

d) Efficient.

6.

Refer to above exhibit, if the economy is operating at point C, the opportunity cost of producing an additional 20 units of bacon is

a) 40 units of eggs.

b) 10 units of eggs.

c) 20units of eggs.

d) 50 units of eggs.

7. Which of the following is not a factor of production?

a. Labor.

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b. Land.

c. Money.

d. Capital.

8. A perfectly competitive market has

   a) Firms that set their own prices.

   b) Only one seller.

   c) At least a few sellers.

   d) Many buyers and sellers.

9. The law of demand states that an increase in the price of a good

   a) Increases the supply of that good.

   b) Decreases the quantity demanded for that good along its demand curve.

   c) Decreases the demand for other goods.

   d) Increases the quantity supplied of that good along its supply curve.

10. If an increase in the price of blue jeans leads to a decrease in the demand for tennis
    shoes, then blue jeans and tennis shoes are,

    a) Complements.

    b) Inferior goods.

    c) Normal goods.

    d) None of these answers.

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Indicate whether the statements from sub question 11 to 20 are **True or False.**

	Statement	T	F
11.	If apples and oranges are substitutes, an increase in the price of apples will decrease the demand for oranges.		
12.	If an economy is operating on its production possibilities frontier, it must produce less of one good if it produces more of another.		
13.	Fixed costs plus variable costs equal total costs.		
14.	Average total costs are total costs divided by marginal costs.		
15.	If the demand for a good is price inelastic, an increase in its price will increase total revenue in that market.		
16.	The demand for a necessity such as petrol tends to be elastic.		
17.	The production possibilities frontier tells us which combination of products an economy should produce.		
18.	Scarcity is a problem only for the poor.		
19.	Macroeconomics studies the factors that change national employment and income.		
20.	Firm's equilibrium under perfect competition is MC=MR.		

Question 02   (20 Marks)

a) Define Economics using your own words.

b) Why do economists make assumptions?

c) List four economic resources.

d) Using production possibility curve explain the following;

      i.   Problem of choice

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  ii. Problem of scarcity

e) Classify the following topics relating to microeconomics and macroeconomics.

  i. A family's decision about how much income to save.

  ii. The effect of government regulations on auto emission.

  iii. The effect of inflation on economic growth.

  iv. A firm's decision about how much workers to hire.

f) "Economics is the science which studies human behavior as a relationship between **ends** and **scare means** which have alternative uses". What is referred to as "ends" and "means".

g) What are the three basic economic problems?

h) How to calculate marginal product?

Question 03

a) "Scarcity is an issue with rich as well as poor." Do you agree with that statement? Justify your answer and explain the meaning of scarcity.   (05 marks)

b) Using the same amount of resources, Australia and New Zealand can both produce apples and oranges as shown in the following table, measured in thousands of tonnes.

Australia		New Zealand	
Apples	Oranges	Apples	Oranges
12	0	6	0
3	3	3	3
0	4	0	6

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Draw the PPF for each country. Are the opportunity costs increasing or constant? Explain

your reasoning. (10 Marks)

c) Explain the uses of production possibility frontier. (05 Marks)

Question 04

a) Give two reasons why a consumer would buy less of a product when the price goes

up. (02 Marks)

b) What is mean by '**ceteris paribus**' assumption? (02 Marks)

c) State the difference between the change in demand and change in quantity demanded.

(04 Marks)

d) Suppose the following table shows the quantity of laundry detergent that is demanded
and supplied at various prices in a Country.

P	Qd	Qs
2	65	35
4	60	40
6	55	45
8	50	50
10	45	55
12	40	60
14	35	65

i.   Use the data in the table to draw the demand and supply curves in the market for

laundry detergent. (10 Marks)

ii. What is the equilibrium price and quantity in the market? (02 Marks)

Question 05

The demand for ice cream is $QD = 70 - 4P$, and the supply of ice cream is $QS = 10 + 2P$, where P is the price of ice cream.

a) Find the equilibrium price and quantity of ice cream. (10 Marks)

b) Calculate the consumer and producer surplus at equilibrium. (05 Marks)

c) Suppose consumers' income increases and ice cream is considered a normal good. As a result, the demand curve for ice cream becomes $QD = 100 - 4P$. Find the new equilibrium price and quantity of ice cream. (05 Marks)

Question 06

a) The demand for an energy drink in Happyland is given by the following equation: $Qd = 700 - 2P - PN + 0.1I$, where P is the price of the drink, PN is the price of nuts, and I is average consumer income. (10 Marks)

    i. What happens to the demand for energy drink when the price of nuts goes up?

    ii. Are energy drink and nuts demand substitutes or demand complements?

    iii. What happens to the demand for energy drink when average consumer income rises?

    iv. Graph the demand curve for energy drink when and $PN = 100$ and $I = 10,000$.

b) Consider the information given below.

Px	Qx
5	100
10	90

Calculate the price elasticity of demand for commodity X at price 5. Is the demand for this product elastic or inelastic? (Use point elasticity of demand equation) (04 Marks)

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c) Explain three determinants of price elasticity of demand.　　　　(06 marks)

Question 07

a) What is the difference between long run and short run in theory of production?

(02 Marks)

b) Distinguish between four market structures.　　　　(08 Marks)

c) Production at Jane's Bakery shows the following relationship between the number of workers and the number of cakes produced (per day). Suppose Jane has entered a long-term lease for the bakery space, and this is its only fixed cost, the lease costs per day is $ 50. Jane pays each worker $ 80 per day. Fill the columns of the table corresponding to each level of production.　　　　(10 Marks)

Labour Input	Cakes produced	Marginal Product of Labour (MP$_L$)	Average Product (AP$_L$)	Fixed Cost (FC)	Variable Cost (VC)	Total Cost (TC)	Average Fixed Cost (AFC)
0	0						
1	100						
2	180						
3	240						

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Question 08

Select any four and write short notes.   (5*4 Marks)

a) Macroeconomics

b) Opportunity cost

c) Problem of choice

d) Wants and Needs

e) Unemployment

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

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FINAL EXAMINATION

Introduction to Transport Management, Logistics and Supply Chain Management – LOGI10303

- This paper consists of EIGHT questions on THREE (03) pages.
- Answer <u>FIVE (05)</u> questions including question 01.
- 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: 2023.03.20   Pass mark: 50%   Time: 03 Hours

Question 01 (Compulsory)

(a) "Containerization facilitates inter-modal transportation". Explain this statement in detail.   (06 Marks)

(b) Explain the following two main modes of containerization.   (2*3 Marks)
   (i) LCL
   (ii) FCL

(c) Mention and explain four (04) advantages and disadvantages of containerization (you may use examples to explain your answer)
                                                                     (08 Marks)

Question 02

(a) Describe the following terms briefly. You may use graphical illustrations to explain your answer.
   (i) Inbound Logistics.
   (ii) Outbound Logistics.   (2*3 Marks)

(b) "Transportation is an activity which is having a derived demand". Explain this statement in your words.   (06 Marks)

(c) State the reasons why people move from one place to another.
                                                                     (04 Marks)

(d) List down the major modes of transportation.   (04 Marks)

Question 03

    (a) Briefly describe what is a bill of lading?   (02 Marks)

    (b) Who are the three parties involved in a Bill of Lading?   (03 Marks)

    (c) List down 5 types of information stated on a Bill of Lading.   (05 Marks)

    (d) Explain the major functions of a Bill of Lading.   (06 Marks)

    (e) Distinguish between negotiable and non-negotiable Bill of Lading.

                                                    (04 Marks)

Question 04

    (a) Distinguish between charter shipping services and liner shipping services.

                                                    (06 Marks)

    (b) Classify and illustrate the types of cargo carried by sea.   (06 Marks)

    (c) Distinguish between a port and a harbor.   (08 Marks)

Question 05

    (a) Explain the difference between scheduled and charter flights.

                                                    (04 Marks)

    (b) The two terms "Intermodal" and "Multimodal" are used interchangeably in transportation. Explain the difference in your own words.   (06 Marks)

    (c) State and explain the advantages and disadvantages of marine transportation.

                                                  (10 Marks)

Question 06

    (a) What are the major three components in a transport system? Explain.

                                                    (06 Marks)

    (b) Differentiate between "transport rates" and "transport costs".

                                                    (04 Marks)

    (c) Mention and explain three types of significant conditions affecting transportation cost.   (06 Marks)

    (d) Classify and briefly explain the major three types of transportation costs.

                                                    (04 Marks)

Question 07

    (a) Explain how important road transportation to the economic development.

                                                    (08 Marks)

    (b) Classify and demonstrate the **"class E"** road classification of Sri Lanka.

                                                    (06 Marks)

    (c) Explain the following related to international road freight transport.

        i.   International loaded.

        ii.   International unloaded.

        iii.   Cross-trade.   (06 Marks)

Question 08

Write short notes on the below topics.   (4*5 Marks)

   (a) Types of cargo ships.
   (b) Types of containers.
   (c) Letter of Credit procedure.
   (d) Forms of Bill of Lading.

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

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FINAL EXAMINATION

Introduction to Business Statistics – STAT10302

- This paper consists of EIGHT questions on FIVE (05) 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: 2023.03.16   Pass mark: 50%   Time: 03 Hours

Question 01: Compulsory

(a) The events A and B are such that $P(A) = 1/3$, $P(B) = 2/5$ and $P(B/A') = 11/20$
    Find

    (i) $P(A \cap B)$ (ii) $P(A \cup B)$ (iii) $P(A'/B)$ (iv) $P(A/B)$

                                                     (08 Marks)

(b) If A and B are independent events. Show that A' and B' also independent events.
                                                     (08 Marks)

(c) Find how many numbers between 2000 and 4000 can be formed using the
    digits 1,2,3 and 4, if repetitions of the digits are (i) not allowed , (ii) allowed.

                                                     (08 Marks)

(d) Find the Number of arrangements that can be made by using all the letters of

the word "KAHATAGASDIGILIYA". Find, in how many of these arrangements the vowels are separated.

(06 Marks)

(e) Let A, B, and C be mutually exclusive and exhaustive events of a sample

space Ω. If P (A) = 2p , P (B) = $2p^2$ and P (C) = 4p -1 , find the value of p.

(04 Marks)

(f) The mean and the standard deviation of 100 observations were calculated as 35

and 3.1 respectively. It was later found that one observation has been erroneously recorded as 40 instead of the correct value 30. Compute the correct   mean and the standard deviation of the 100 observations.

(06 Marks)

Question 02

An examination was held to decide the awarding of a scholarship. The weights of various subjects were different. The marks obtained by 3 candidates (out of 100 in each subject) are given below:

Subject	Weight	Students		
		A	B	C
Economics	3	65	54	62
Accounting	4	68	66	63
Business Studies	2	57	59	63
General English	1	74	78	58

Calculate the weighted Arithmetic Mean and select one person for award the scholarship.   (15 Marks)

Question 03

(a) All the applicants who apply for a certain job in an institute are required to sit for an aptitude test. Those who obtain A grades in this aptitude test are selected for the job, and the rest of the applicants have to face an interview. in a survey, it was found that 60 % of the applicants get A grades , and these 40 % are females. From the applicants who face the interview, only 10 % get selected and 70 % of them are females.

Find the probability that.

      (i)   a male is selected for this job,

      (ii)   a male who has been selected for the job has obtained an A grade for the aptitude test.

(10 Marks)

(b)

      (i)   A and B are two exhaustive and mutually exclusive events in S.
If $P(A) = 1/5$,   Find P (B)

      (ii)   A third event C in S is such that A and C are independent and $P(C) = 1/4$. Calculate $P(A \cap C)$, $P(A \cup C)$, $P(A' \cap C')$

      (iii)   Are A' and C' independent? Justify Your Answer.

(05 Marks)

Question 04

Waiting times (in minutes) before being treated of 100 patients at a certain hospital are collected. The following table gives the distribution of values obtained by subtracting 20 minutes from each of these times and dividing each of the resulting differences by 10.

Range of values	Number of patients
-2 ≤ X < 0	30
0 ≤ X < 2	40
2 ≤ X < 4	15
4 ≤ X < 6	10
6 ≤ X < 8	05

(a) Estimated the mean and Standard deviation of the above table.

(05 Marks)

(b) Hence, estimate the Mean (μ) and the Standard Deviation (σ) of the waiting times of the 100 patients   (05 Marks)

(c) Also, the coefficient of skewness k defined by $k = (\mu-M)/\sigma$, where M is the mode of the waiting times of 100 patients. (05 Marks)

Question 05

A class of 23 girls and 22 boys. All these 45 students are subjected to a written test, and the summary of results are below.

	Boys	Girls
Mean	65	60
Standard Deviation	6	4

Find the Compound mean and Standard deviation for all the students.

(15 Marks)

Question 06

Write short notes on any **FIVE** of the following;
- (a) Primary and Secondary Data Sources
- (b) Mean of Group / Ungroup Data Set
- (c) Percentage bar charts
- (d) Data Collection methods
- (e) Quartiles of the Ungrouped Data Set
- (f) Median of the Ungrouped Data Set

(3* 5 Marks)

Question 07

Consumers were polled about their favorite ice cream flavors in a survey. Draw a bar graph for the following data:

Town	Vanilla	Strawberry	Chocolate	Mint Chocolate	Others
Maharagama	16	5	12	3	4
Malabe	10	15	10	4	1
Homagama	7	7	15	6	5
Nugegoda	4	5	15	12	4

(a) Construct a component bar chart to illustrate this data.   (05 Marks)

(b) Construct a multiple bar chart to illustrate this data.   (04 Marks)

(c) Draw the Pie-charts for Malabe and Nugegoda.   (06 Marks)

Question 08

The state police, using radar, checked the speeds (in kmph) of 30 passing motorists at a checkpoint. The results are listed below:

44	40	40	36	40	42	38	38	40	36	42	44
42	44	38	38	40	40	42	40	44	40	44	40
46	42	38	40	42	40						

(a) Construct the frequency table.   (04 Marks)

(b) Find the Mean, Median, and Mode of the above distribution. (03 Marks)

(c) Calculate Variance and Standard deviation.   (03Marks)

(d) Find Skewness and discuss the Shape of the distribution   (05 Marks)

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

CINEC
CAMPUS
Beyond A Graduate

Faculty of Management and Social Sciences
Department of Logistics & Transport
Undergraduate Foundation Programme
Course CODE: COM530

FINAL EXAMINATION
Mathematics – MATH10301

- This paper consists of EIGHT questions on FIVE (05) pages.
- Answer FIVE (05) 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: 2023.03.14   Pass mark: 50%   Time: 03 Hours

Question 01: (Compulsory)

For questions, 1-4 choose the correct answer.   (2 Marks each)

1. Choose the first derivative of $f(x) = 10x^3 + 4x - 9$.

   (a) $f'(x) = 10x^2 + 5$

   (b) $f'(x) = 30x^2 + 4$

   (c) $f'(x) = 10x^2 - 9$

   (d) $f'(x) = x^4 + 5\frac{x^2}{2} - 9x$

   (e) $f'(x) = 30x^2 - 9$

2. Choose the answer for $\lim_{x \to 2} \frac{x^2+4x+8}{x+3}$.

   (a) 4

   (b) −4

   (c) 2

   (d) $\frac{16}{5}$

(e) None of the above.

3. Simplify $\sqrt{45} + \sqrt{125} - \sqrt{80}$ and choose the answer.

   (a) 4

   (b) $4\sqrt{5}$

   (c) $4\sqrt{2}$

   (d) $2\sqrt{5}$

   (e) None of the above.

4. The value of $\sin 150°$ is,

   (a) $\frac{1}{\sqrt{2}}$

   (b) -1

   (c) $\frac{1}{2}$

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

   (e) None of the above.

For questions, 5-10, mention whether TRUE or FALSE.   (2 Marks each)

5. The equation of the line connecting $(4, 8)$ and $(6, 10)$ is $y = x + 4$.

6. Pythagorean theorem can be applied only for right-angled triangles.

7. The simplified value of the expression $3(4 - 7) + 15/(3 + 2)$ is 6.

8. Common ratio of a geometric progression can be calculated by dividing any term by its previous term.

9. The length of the line segment connecting the points $(2, 5)$ and $(7, 11)$ is $\sqrt{26}$ units.

10. $\left(\frac{2x^4 t^0}{y^{-2} z^3}\right)^2$ can be simplified to $\frac{4x^8 y^4}{z^6}$.

Question 02

(a) Write as a single logarithm, then simplify the answer.

      (i) $2\log_5 8 - (\log_5 12 + \log_5 16)$ (04 Marks)

      (ii) $\log_2 24 + \log_2 10 - 4\log_2 18$ (04 Marks)

(b) Considering the function $y = 4x^{\frac{1}{2}} - 4x^3 + \ln x, x > 0$:

  (i) Find $\frac{dy}{dx}$.   (04 Marks)

(c) Consider $\lim\limits_{x \to -1} \dfrac{x+1}{\sqrt{x+5}-2}$.

    (i)   Show that the above limit gives an indeterminate form when direct

            substitution is used.   (03 Marks)

    (ii)   Evaluate the limit by rewriting the expression in an equivalent form.

                                                        (05 Marks)

Question 03

(a) Given $g(x) = x^3$ and $h(x) = 4x + 1$,

    (i)   Find the value of $g(2) + h(2)$.   (03 Marks)

    (ii)   Find the value of $3g(-1) - 4h(-1)$.   (03 Marks)

    (iii)   Show that $g(5) = h(31)$.   (03 Marks)

    (iv)   Find the value of $h(g(2))$.   (03 Marks)

(b) Sketch the graphs of $f(x) = \sin x$, $g(x) = 3\sin x$ and $h(x) = 3 + \sin x$ in the same set of axes for $0 \le x \le 360°$.   (08 Marks)

Question 04

(a) Expand the given logarithms.

    (i) $\log_a(\sqrt{y}\, x^4\, z^{\frac{1}{5}})$ (04 Marks)

    (ii) $\log_b \dfrac{\sqrt{yx}}{z^3}$ (04 Marks)

(b) Show that $\frac{1}{2\sqrt{2}+\sqrt{3}} = \frac{2\sqrt{2}-\sqrt{3}}{5}$. (04 Marks)

(c) Prove that $\frac{1}{\sin x} - \sin x \equiv \frac{\cos x}{\tan x}$. (04 Marks)

(d) Find the coordinates of the point or points of intersection for line

$$y = -3 \text{ and curve } y = x^2 + 3x - 7.$$ (04 Marks)

Question 05

(a) Rationalize the denominator in $\frac{2}{3\sqrt{3}+5}$. (04 Marks)
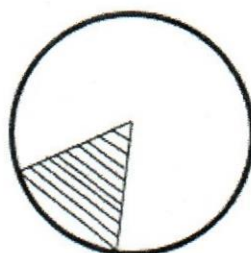
(b) Convert following angles to radians. (04 Marks)

(i) 50°

(ii) 380°

(c) Find the equation of the line through the point $(-2, 3)$ with gradient -1.

(04 Marks)

(d) Find the perimeter and the area of the shaded region where the acute angle is $\frac{\pi}{6}$

(rad) and the radius is $9cm$.

(08 Marks)

Question 06

(a) A small company producing children's toys plans an increase in output. The number of toys produced is to be increased by 8 each week until the weekly number produced reaches 1000. In week 1, the number to be produced is 280; in week 2, the number is 288; etc. Show that the weekly number produced will be 1000 in week 91. (05 Marks)

(b) Find the equation of the tangent line to the curve $y = x^3 + 2x$ at the point for which $x = 2$. (08 Marks)

(c) In a triangle PQR, Q is a right angle, $PQ = (6 - 2\sqrt{2})cm$ and $QR = (6 + 2\sqrt{2})cm$.

    (i) Find the area of the triangle. (03 Marks)

    (ii) Show that the length of PR is $2\sqrt{22}$ cm. (04 Marks)

Question 07

(a) A girl is collecting stamps. She collects 4 stamps on the first day of the month, 7 stamps on the second, 10 on the third and so on in arithmetic progression.

    (i)   How many stamps will she collect on the 20th day? (04 Marks)

    (ii)   After how many days will she have collected more than 1000 stamps?

(04 Marks)

(b) Show that $\frac{cos^4 x - sin^4 x}{cos^2 x} \equiv 1 - tan^2 x$. (04 Marks)

(c) Given that $p = 6 \cos x$, and that $q = 2 \sin x$, show that $2p^2 + 18q^2 = 72$.

(04 Marks)

(d) Give two applications of Differential Calculus and explain them briefly.

(04 Marks)

Question 08

(a)   Differentiate $f(x) = 4e^{2x}(2x^2 + 9)$. (06 Marks)

(b)   Solve given two equations. (08 Marks)

    (i) $2 \log_4(3x + 5) = 16$

    (ii) $4e^{3x+5} = 48$

(c)   Let $f(x) = 5x^2 - 4x + 2$ and $g(x) = 2e^{2x}$.

    (i) Find $(f \circ g)(x)$. (03 Marks)

    (ii) Evaluate $g(f(2))$. (03 Marks)

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