

**QUESTION ONE:**

(a) Write short notes on the following: (i) Compliment of a Set (ii) Equality of Set

(b) A new agent sells three papers: The Times, The Punch and the Daily Trust. 90 customers buy the times, 70 the Punch and 50 the Daily Trust, 25 buy both The Times and Punch, 20 The Punch and Daily Trust and 15 Daily Trust and Times. If 5 customers buy all the 3 papers, how many customers have the new agent?

**QUESTION TWO**

Given that  $\log_{10} 2 = 0.3010$ ,  $\log_{10} 3 = 0.4771$  and  $\log_{10} 7 = 0.8451$ , evaluate:

(i)  $\log_{10}\left(\frac{14}{3}\right)$       (ii)  $\log_{10}\left(\frac{7}{2}\right)$

- (b) (i) A sister is 5 years older than her brother. 4 years ago the ratio of their ages was 4:3. Find their present ages.  
(ii) Solve the quadratic equation  $2x^2 + 3x - 2 = 0$  using method completing the square.

**QUESTION THREE**

- (a) The 10<sup>th</sup> term of an A.P. is 47 and the 4<sup>th</sup> term is 17. Write down the first 3 terms of the sequence.  
(b) (i) What is the 12<sup>th</sup> term of the G.P. 2, 14, 98, ... and find sum of the first 10 terms of the G.P.  
(ii) The 3<sup>rd</sup> term of a GP is 18 and the 7<sup>th</sup> term is  $3\frac{5}{9}$ , find the GP.

**QUESTION FOUR**

(a) Differentiate the following: (i)  $y = \frac{2+3x}{x^2+3x+5}$

(ii)  $y = (2x+1)(3x^2+2x)$

- (b) The demand for the product of a manufacturer varies with the price that the manufacturer charges for the product. The manufacturer estimates that annual total revenue (stated in N1000) is a function of the price P (stated in Naira). Specifically  $f(P) = 100P^2 + 1000P$   
i. Determine the price which should be charged in order to maximize total revenue.  
ii. What is the maximum value of the annual total revenue?

**QUESTION FIVE**

- (a) Evaluate the following:  
i.  $\int (x-1)(x+2)dx$   
ii.  $\int x^3 2x^2 dx$



- (b) The marginal revenue function for a firm's product is  $MR = -0.04x + 10$  where x is the number of units sold.  
i. Determine the total revenue for selling 50 units of the product.  
ii. What is the added revenue associated with an increase in sales from 10 to 50 units.

*GOOD LUCK!*

**BINGHAM UNIVERSITY KARU**  
**FIRST SEMESTER 2018/2019 EXAMINATION**  
**COURSE: BUS 111 BUSINESS MATHEMATICS**      **CREDIT UNIT: 3**      **TIME ALLOWED: 2½ HRS**

INSTRUCTION: ANSWER ALL QUESTIONS

**QUESTION ONE:**

Given that  $\log 2 = 0.3010$ ,  $\log 3 = 0.4771$  and  $\log 7 = 0.845$ , evaluate:

- i.  $\log \left(\frac{14}{3}\right)$       (ii)  $\log \left(\frac{7}{2}\right)$
- (i) Simplify  $\log 8 + \log 4 - \log 2$
- (ii) Find  $x$  if  $\log_2 16 = x$
- (iii) Find  $y$  if  $\log_{16} y = \frac{1}{4}$

**QUESTION TWO:**

- (a) Simplify the following:

$$(i) \quad \frac{x+1}{2} - 1 = \frac{1}{4} \quad (ii) \quad x - \frac{3(x+1)}{5} = 1$$

(b) Solve the simultaneous equation  $\frac{x}{4} + y = \frac{1}{2}$  and  $x - \frac{y}{2} = -\frac{5}{2}$

(c) Solve the equation  $2x^2 + 3x - 2 = \mu$  using method of completing the square.

**QUESTION THREE**

- (a) After examining 250 defective items, a factory quality Controller came up with the following report. Defects in finishing 90, defects in hardness 150 and defects in dimension 159. Defects in both hardness and finishing 30, defects in both finishing and dimension 24 and defects in both hardness and dimension 60. All three defects 15.

- i. Use a Venn diagram to illustrate this report.
- ii. Find how many items have only one defect.

- (b) (i) The first term of an AP is 3 and the eleventh term is 18. Find the member of terms in the progression if the sum is 81.

- (ii) Find the sum of 10 terms of the GP 4, 8, 16, ...

**QUESTION FOUR:**

- (a) Find the derivative of each of the following:

i.  $y = 2x^3 + 3x^2 - \frac{2}{x}$

ii.  $y = \frac{1+x^2}{3x}$

- iii. Coca-cola Nig. Ltd. sells its soft drink at N30 per bottle (liquid content only). The Research and Development Unit of the Company has determined that the cost of making  $x$  units is given by the function  $y = 500 - 26x + 0.01x^2$ . Determine the number of bottles which will lead to maximum profit. What is the maximum profit?

- (b) i. Integrate  $\int (x-1)(x+2)dx$   
 ii. evaluate  $\int_3^5 (x^2 + 3x - 4)dx$

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BINGHAM UNIVERSITY KARU  
FIRST SEMESTER BATCH (A) 2017/2018 EXAMINATION

COURSE: BUS 111 BUSINESS MATHEMATICS I

CREDIT UNIT: 3

TIME ALLOWED: 3 HRS

INSTRUCTION: ANSWER ALL QUESTIONS

QUESTION ONE

Differentiate the following implicit function

$$xy + x - 2y - 1 = 0$$

The demand for the product of a manufacturer varies with the price that the manufacturer charges for the product. The manufacturer estimate that annual total Revenue R (stated in N100) is a function of the price P (stated in Naira). Specifically,  $R = f(P) = -100P^2 + 1000P$

- (i) Determine the price which should be charged in order to maximize total revenue
- (ii) Find the maximum value of the annual total revenue.

QUESTION TWO

- (a) Evaluate the following:

$$(i) \int (2x^2 - 5x + 3) dx \quad (ii) \int (x - 1)(x + 2) dx$$

- (b) A power generating firm estimates that the annual rate of expenditure  $r(t)$  for maintenance on one of its turbine is represented by the function  $r(t) = 10,000 + 100t^2$  where  $t$  is the age of the turbine stated in years and  $r(t)$  is measured in naira.

- (i) Determine the rate at which costs are being incurred after 10 years.
- (ii) Determine those incurred in the 10<sup>th</sup> year.

QUESTION THREE

- (a) Verify De Morgan's laws using the sets below:

$$U = \{1, 2, 3, 4, \dots, 16\}$$

$$A = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$$

$$B = \{8, 9, 10, 11, 12\}$$

- (b) Of 174 students who have studied Accounting, it was found that 37 studied Banking and Finance (BF), 60 studied Marketing (M) and 111 studied Business Administration (BA). 29 studied Banking and Finance and Business Administration, 13 Marketing and Banking and Finance. If 45 Accounting students did not study either Banking and Finance or Business Administration or Marketing, how many

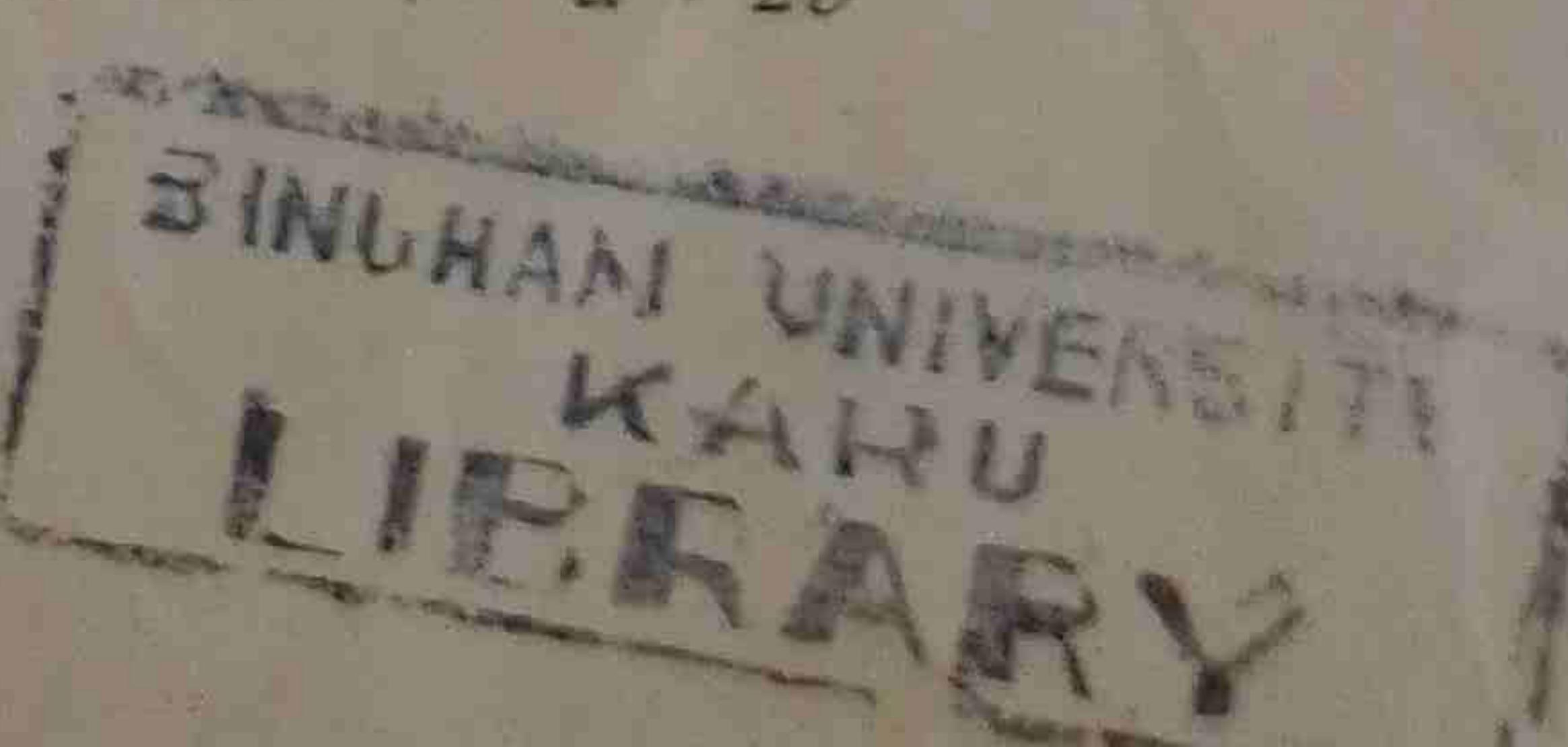
- (i) Studied all three?
- (ii) Studied Marketing and Business Administration but not Banking and Finance?

QUESTION FOUR

- (a) The 10<sup>th</sup> term of an AP is 47 and the 4<sup>th</sup> term is 17. Write down the first 3 terms of the sequence.

Given that  $\log_{10} 2 = 0.3010$ ,  $\log_{10} 3 = 0.4771$  and  $\log_{10} 7 = 0.8451$ , evaluate  $\log_{10} 42$ .

(c) Solve the simultaneous equation  $2a + 3b - 1 = 3a + b + 7 = a + 2b$



**BINGHAM UNIVERSITY KARU**  
**END OF FIRST SEMESTER 2016/2017 SESSION EXAMINATION**  
**COURSE: BUS 111 (BUSINESS MATHEMATICS I)**   **TIME ALLOWED: 2½ HOURS**  
**INSTRUCTION: ANSWER FOUR QUESTIONS**

**QUESTION ONE:**

(a) Solve the following:

(i)  $2^{2x} \times 32^{-x} = \frac{9}{81^{-x}}$

(ii)  $\log_2 16 = x$

(b) Simplify the following without using mathematics tables.

(i)  $\log\left(\frac{30}{16}\right) - 2\log_{10}\left(\frac{5}{9}\right) + \log_{10}\left(\frac{400}{243}\right)$

(ii) Given that  $\log_2 = 0.3010$ ,  $\log 5 = 0.6990$  and  $\log 3 = 0.4771$ ,  
Evaluate  $\log 25 + \log 1.5 - \log 18$

**QUESTION TWO**

(a) Solve the quadratic equation

$$3^{2x+1} + 26(3^x) - 9 = 0$$

(b) A son is 24 years younger than his father. If the ratio of their ages is 2:5, find the age of the father.

(c) In a fund-raising lottery, 64% of the money collected is given as cash prizes. There are 8 cash prizes altogether. The first price-winner gets ₦39000, the second gets ₦35000, the third ₦31000 and so on. How much money

(i) Does the 8<sup>th</sup> person gets?

(ii) Is there altogether?

(iii) Was raised for the fund?

**QUESTION THREE**

(a) What is Disjoint Set?

(b) There are 80 insurance agents who have sold insurance policies to their customers. Suppose 21 of the agents sold motor policy only, 15 home policy only and 12 life policy only while 9 did not sell any of the 3 classes of insurance. Further, 11 agents sold both home and life policies, 8 ~~both~~<sup>both</sup> home and life policy while 10 sold both motor and life policies. Use Venn diagram to determine the number of agents who sold

(i) All the 3 classes of policy

(ii) Motor policy

(iii) Home policy

**QUESTION FOUR**

(a) Differentiate the following:

(i)  $3x^2 + 7xy + 9y^2 = 6$

(ii)  $y = \frac{x^2 + x - 1}{x^2 - x - 1}$

(b) Coca-Cola (Nig.) Ltd. sells its soft drink at N30 per bottle (liquid content only). The Research and Development unit of the company has determined that the total cost of making  $x$  units is given by the function

$$Y = N500 - 26x + 0.01x^2$$

Determine the number of bottles which will lead to maximum profit. What is this maximum profit?



# BANGKOK UNIVERSITY

Faculty of Management and Media

# **COLLEGE OF BUSINESS**

## **Faculty of Accountancy and Management Studies**

### **Department of Accounting and Business Administration**

Session:	2018/2019
Competitor:	Fleet (EXAMS)
Level:	100 Level
Credit Units:	3
Course:	Introduction to Business Operations
Time Allowed:	2½ Hours

# WINTER HOLIDAY

Mc Gubbin these sheets.

**PART II**  
**Answer any two (2)**

- 1a. Define the different types of organizational structures you know and state the advantages and disadvantages.
- b) Mr. Olorunsango is an entrepreneur who desires to establish a new company in his village that will produce juice/ as his company adviser, let him know what the characteristics of a business entrepreneur should be to enable him achieve his aim and objectives of business growth.
- 2a) Briefly write down the history of Ankara Fashion?
- b) What are the challenges faced by Ankara Producers/Retailers?
- 3a) What are the health risks experienced in pop corn business?
- b) Are there other uses of popcorn? if yes, enumerate, if none, explain.
- 4) a) Frederick Hooper defined "Business", how did he define it?  
b) Briefly discuss the Memorandum of Association.  
c) Who are the stakeholders in a business enterprise? Briefly explain the role of each one of them.



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- (a) Business structure  
(c) Business efficiently

(b) Functional structure  
(d) Maximize earnings

30. The willingness and ability of an individual (or a group of individuals) to seek out investment opportunities, especially through innovation, establish and run the enterprise successfully is termed \_\_\_\_\_.

31. According to \_\_\_\_\_ business is not determined by the producer, but by the consumers.

32. Production management involves planning, implementation and control of industrial process to ensure \_\_\_\_\_ and \_\_\_\_\_ operation.

33. Production Management responsibilities include the traditional "five M's", state two out of \_\_\_\_\_;

34. Production can be classified into primary, secondary and \_\_\_\_\_ stages.

35. i) Requiring a special sequence of operations because of the uniqueness in each unit of production;  
ii) Requiring general purpose equipment which is able to do many varied operations;  
iii) Planning and co-ordinating of operations to achieve maximum efficiency in the use of facilities may be difficult.  
These are advantages to \_\_\_\_\_ system of production.  
(a) Mass production  
(b) Intermittent/Job Lot production  
(c) Customs production  
(d) Process production

36. Complete the table below:

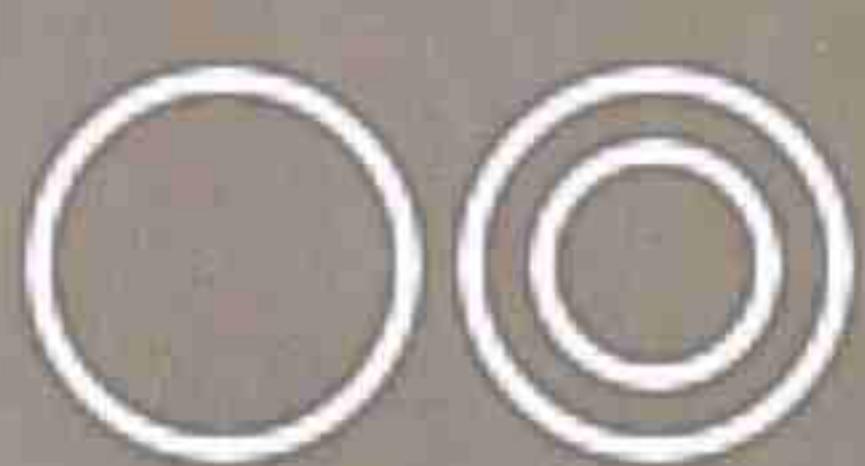
Raw materials or component part	→	Transformation or _____	→	goods
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37. \_\_\_\_\_ layout is the positioning of equipment and work stations in relation to work flow necessary to manufacture a given product.

38. Providing for a continuous flow of materials towards the final product stage, the machines and the equipment are located relative to the production sequence is known as \_\_\_\_\_ layout.

39. \_\_\_\_\_ is the careful examination of production process to ensure that products meet the required standard.

40. The position in space; the place where a factory, house, etc is to be is



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12. \_\_\_\_\_ & \_\_\_\_\_ are one of the functions of management.
13. Ease of formation is an advantage of \_\_\_\_\_.  
(a) Articles of partnership      (b) Partnership  
(c) Combines abilities      (d) Financial resources
14. Business is defined as an enterprise (public or private) which engages in the \_\_\_\_\_ of good/services that provide satisfaction to consumers and at the same time realize company's objective of profit and growth.
15. \_\_\_\_\_ normally shapes people's beliefs, values and norms in the society.
16. \_\_\_\_\_ is a business owned by one person, operated by him/her basically for profit.
17. Managerial functions includes all except \_\_\_\_\_.  
(a) Planning      (b) organizing      (c) Staffing      (d) Processing
18. In a corporation, shareholders own and control the corporation but they do not directly control most aspects of the corporation's management. TRUE or FALSE.
19. Advantages of a corporation include all, except \_\_\_\_\_.  
(a) Limited Liability      (b) Transferability of shares  
(c) Expansionary Ease      (d) Lack of Secrecy
20. Personnel Management is concerned with attracting, developing, utilizing and maintaining the work force. TRUE or FALSE.
21. Businesses are not undertaken primarily with a view to making profit. TRUE or FALSE.
22. Risk transfer could be said to be the shifting of \_\_\_\_\_ its own losses.  
(a) Responsibility of meeting      (b) Meeting its responsibility  
(c) Insurance      (d) Purchasing a policy
23. Insurance is defined as a \_\_\_\_\_ which provides \_\_\_\_\_ in the event of a misfortune.  
(a) Indemnity, Social Scheme      (b) Social Scheme, Payment  
(c) Social Scheme, Indemnity      (d) Scheme, Compensation.
24. The Principle of Indemnity doesn't state that following a loss, an insurer should provide financial compensation which would restore the insured to the same financial position as he/she was immediately before the loss. TRUE or FALSE.
25. Cash, Replacement, Repairs, Utmost Good Faith, re-instatement are methods of providing indemnity except \_\_\_\_\_.
26. Subrogation can arise by the following ways except \_\_\_\_\_.
27. The policies protecting the interest of the same insured and policies covering the same subject matter of insurance are essentials of \_\_\_\_\_.
28. Appointment and Removal of Directors, the rights and responsibilities of shareholders are attributes of \_\_\_\_\_.
29. Organizations being created, are likely to be structured in any of the following patterns.

**Bingham University**  
**Faculty of Humanities, Social and Management Sciences**  
**Department of Business Administration**  
**First Semester Examination 2013/2014 Session Batch B**  
**BUS 111-Business Mathematics I**

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*Instructions: Answer four questions*

*Time allowed 2½ hours*

**QUESTION ONE**

Simplify the following

$$(i) \quad 16^{1\frac{1}{4}} \times 8^{2/3} \times 25^{-3/4} \quad (ii) \quad \frac{75x^5 \times 6x^{-4}}{81x^6}$$

- (b) Simplify the following without using mathematical tables

$$\begin{aligned} (i) \quad & \log_3 27 + \log_4 64 \\ (ii) \quad & \log_{10} 40 + \log_{10} 5 - \log_{10} 2 \\ (iii) \quad & \log_{0.2} 25 \end{aligned}$$

- (c) Solve for x in the following:  $2 \log_x (3\frac{3}{8}) = 8$



**QUESTION TWO**

- (a) Solve for x in the following equations

$$(i) \quad (0.25)^{x-2} = 32 \quad (ii) \quad 2 \times 4^{x-3} = \frac{16^x}{8^{1-x}} \quad (iii) \quad 3^{2x+1} + 3^{x+2} = 12$$

- (b) A businessman spent  $\frac{1}{3}$  of his capital on paying his staff salary and  $\frac{2}{3}$  of the remainder on miscellaneous expenses. If he had ₦500,000 left. How much was his capital?  
 (c) A brother is 4 times older than his sister. In 7 years time, the ratio of their ages will be 5:9. Find their present ages

**QUESTION THREE**

- (a) Solve the following Simultaneous equations    (i)  $\frac{2}{x} + \frac{1}{y} = 7$                                  (ii)  $\frac{3}{x} + \frac{2}{y} = 12\frac{1}{2}$   
 (b) Solve the quadratic equation  $2x^2 + 3x - 7$  using the method of completing the square  
 (c) 3 magazines and 4 newspapers cost ₦650. Half as many newspapers and 3 times as many magazines cost ₦1450. Find the cost of 8 of each.

4(a)

Represent the solution set of each of the following inequalities graphically :

- (i)  $5(x + 1) \leq 4x + 1$
- (ii)  $0 \leq x + 1 \leq 5$
- (iii)  $2x + 4 < x + 3 < 4x - 5$

(b)

What is feasible region?

A small factory produces two products X and Y, only one of which can be produced at a time within a 50-hour week. Given that product X takes 2 hours to make, while product Y takes only one hour. Given further that product Y uses 2 times the amount of material that X uses and there is only enough material supply per week to produce the equivalent of 90 X products: Shade the feasible region satisfying the two constraints.

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Differentiate the following:

$$(i) \quad y = \frac{x^2}{3x+1} \quad (ii) \quad 4xy + x^2y = 3x$$

(b)

A food processing plant has a particular problem with the delivery and processing of perishable goods with a short life. All deliveries must be processed in a single day and, although there are a number of processing machines available, they are very expensive to run. A researcher has developed the function  $y = 12x - 2a - ax^2$  to describe the profit ( $y$ ) given the number of machines used ( $x$ ) and the number of deliveries ( $a$ ) in a day.

- (i) Show that the system is uneconomic if 4 deliveries are made in one day (i.e.  $a=4$ )
- (ii) if three deliveries are made in one day, find the number of processing machines that should be used in order that the profit is maximized. In this case, what is the maximum profit?

6(a)

Evaluate the following:

$$(i) \quad \int (3x^2 - 4x) dx \quad (ii) \quad \int (8x^3 - 6x^2 + 6x - 10) dx.$$

(b)

Find the area:

- (i) under the Curve  $y = x^2 + 3$  between limit  $x = -1$  to  $x = 2$
- enclosed between the Curves  $y = x^2 - x$  and  $y = 2x - x^2$  (ii)

(c)

The marginal revenue function for a firm's product is :  $MR = -0.04x + 10$   
Where  $x$  is the number of units sold.

- (i) What is the total revenue from the sale of 300 units of the product?
- (ii) What is the marginal revenue associated with an increase of sales from 100 units to 300 units?

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**DEPARTMENT OF BUSINESS ADMINISTRATION**  
**BINGHAM UNIVERSITY**  
**FIRST SEMESTER EXAMINATION 2010/2011 SESSION**

Session: 2010/2011 Semester: First Level: 100 Credit Units: 3  
 Course: Business Mathematics - BUS 111 Time Allowed: 2 hrs, 30min.  
 Instruction: Answer Four questions.

1(a) Evaluate the following:  
 (i)  $3^{1.4}x\sqrt{3^{1.2}}$   
 (ii)  $81^{3/4}x6^0x64^{2/3}$

1(b) Solve for x in the following:  
 (i)  $\log_{10}(2x + 1) - \log_{10}(3x - 2) = 1$   
 (ii)  $2 \log_x(3\frac{3}{8}) = 6$

(c) Given that  $\log_{10}^2 = 0.301$ ,  $\log_{10}^5 = 0.699$ .  
 and  $\log_{10}^3 = 0.477$ , Evaluate  
 (i)  $\log_{10}^{25} + \log_{10}^{1.2} - \log_{10}^{18}$   
 (ii)  $\log_{10}^{42} + \log_{10}^{21}$

2(a)i. Given two sets A and B, state De-Morgan's Law.  
 ii. Verify De-Morgan's Law using the sets below.

$\mu = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, \}$   
 $A = \{1, 2, 3, 4, 5, 6, 7, 8, 9, \}$   
 $B = \{8, 9, 10, 11, 12\}$

(b) Out of the 112 students from Bingham University, 19 read both Accounting and Sociology, 70 read Accounting or sociology but not French, 27 read Sociology but not Accounting or French, 53 read Sociology or French but not accounting, 19 read French but not Accounting or Sociology and 8 read Accounting and French but not Sociology. Assume that each student reads at least one of the courses, How many of the Students read :  
 (i) all courses (ii) only one course (iii) only two courses  
 (iv) Accounting irrespective of Sociology or French.

3(a)i. A businessman spent  $\frac{1}{3}$  of his salary on paying his staff salary and  $\frac{2}{3}$  of the remainder on miscellaneous expenses. If he had N200,000 left, how much was his capital.  
 ii. Solve  $2x^2 - x = 2$  Using method of completing the square.

(b) A company manufactures two products X and Y by means of two processes A and B. The maximum capacity of process A is 1750 hours and of process B 4000 hours. Each unit of product x requires 3 hours in A and 2 hours in B, while each unit of product Y requires 1 hour in A and 4 in B. calculate how many units of products X and Y are produced if the maximum capacity available is utilized.

BINGHAM UNIVERSITY  
DEPARTMENT OF BUSINESS ADMINISTRATION

First Semester 2017/2018 Session Examination

31K 15 9 Situation involving exposure to danger  
Risk management is the process of analysis, identification and  
acceptance or mitigation of uncertainty in investment decision.

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**BINGHAM UNIVERSITY KARU**  
**FIRST SEMESTER 2018/2019 EXAMINATION**  
**COURSE: BUS 111 BUSINESS MATHEMATICS CREDIT UNIT: 3 TIME ALLOWED: 2½ HRS**

INSTRUCTION: ANSWER ALL QUESTIONS

**QUESTION ONE:**

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- $\log \left(\frac{14}{3}\right)$
  - $\log \left(\frac{7}{2}\right)$
  - Simplify  $\log 8 + \log 4 - \log 2$
  - Find  $x$  if  $\log_2 16 = x$
  - Find  $y$  if  $\log_{16} y = \frac{3}{4}$

**QUESTION TWO:**

- (a) Simplify the following:

(i)  $\frac{x+1}{2} - 1 = \frac{1}{4}$       (ii)  $x - \frac{3(x+1)}{5} = 1$

(b) Solve the simultaneous equation  $\frac{x}{4} + y = \frac{1}{2}$  and  $x - \frac{y}{2} = -\frac{5}{2}$

(c) Solve the equation  $2x^2 + 3x - 2 = \mu$  using method of completing the square.

**QUESTION THREE**

- (a) After examining 250 defective items, a factory quality Controller came up with the following report. Defects in finishing 90, defects in hardness 150 and defects in dimension 159. Defects in both hardness and finishing 30, defects in both finishing and dimension 24 and defects in both hardness and dimension 60. All three defects 15.

- Use a Venn diagram to illustrate this report.
- Find how many items have only one defect.

- (b) (i) The first term of an AP is 3 and the eleventh term is 18. Find the member of terms in the progression if the sum is 81.
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**QUESTION FOUR:**

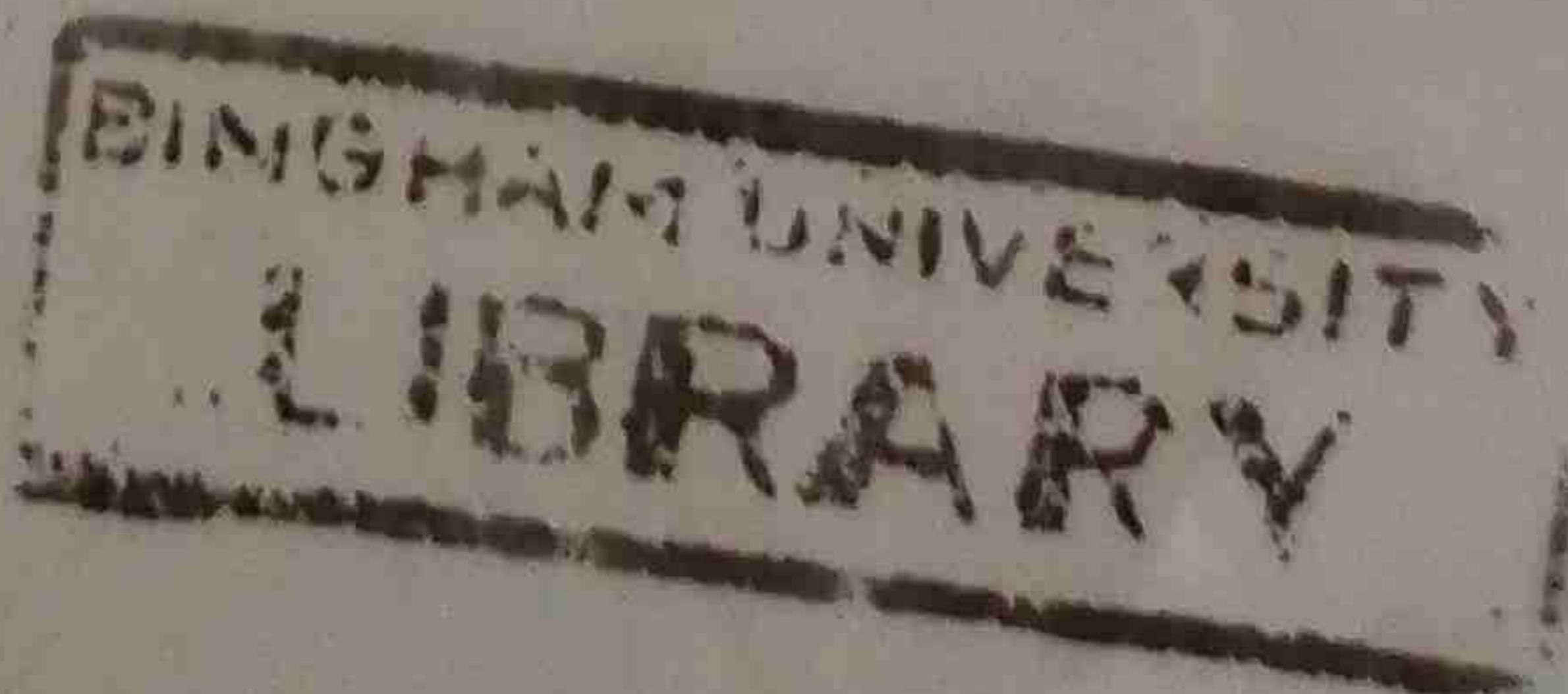
- (a) Find the derivative of each of the following:

i.  $y = 2x^3 + 3x^2 - \frac{2}{x}$

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- iii. Coca-cola Nig. Ltd. sells its soft drink at N30 per bottle (liquid content only). The Research and Development Unit of the Company has determined that the cost of making  $x$  units is given by the function  $y = 500 - 26x + 0.01x^2$ . Determine the number of bottles which will lead to maximum profit. What is the maximum profit?

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 ii. evaluate  $\int_3^5 (x^2 + 3x - 4)dx$



BINGHAM UNIVERSITY KARU  
FIRST SEMESTER BATCH (A) 2017/2018 EXAMINATION

COURSE: BUS 111 BUSINESS MATHEMATICS I  
INSTRUCTION: ANSWER ALL QUESTIONS

CREDIT UNIT: 3

TIME ALLOWED: 3 HRS

**QUESTION ONE**

- (a) Differentiate the following implicit function  

$$xy + x - 2y - 1 = 0$$

- (b) The demand for the product of a manufacturer varies with the price that the manufacturer charges for the product. The manufacturer estimate that annual total Revenue R (stated in N100) is a function of the price P (stated in Naira). Specifically,  $R = f(P) = -100P^2 + 1000P$
- (i) Determine the price which should be charged in order to maximize total revenue
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**QUESTION TWO**

- (a) Evaluate the following:

$$(i) \int (2x^2 - 5x + 3) dx \quad (ii) \int (x-1)(x+2) dx$$

- (b) A power generating firm estimates that the annual rate of expenditure  $r(t)$  for maintenance on one of its turbine is represented by the function  $r(t) = 10,000 + 100t^2$  where  $t$  is the age of the turbine stated in years and  $r(t)$  is measured in naira.
- (i) Determine the rate at which costs are being incurred after 10 years.
  - (ii) Determine those incurred in the 10<sup>th</sup> year.

**QUESTION THREE**

- (a) Verify De Morgan's laws using the sets below:

$$U = \{1, 2, 3, 4, \dots, 16\}$$

$$A = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$$

$$B = \{8, 9, 10, 11, 12\}$$

- (b) Of 174 students who have studied Accounting, it was found that 37 studied Banking and Finance (BF), 60 studied Marketing (M) and 111 studied Business Administration (BA). 29 studied Banking and Finance and Business Administration, 13 Marketing and Banking and Finance. If 45 Accounting students did not study either Banking and Finance or Business Administration or Marketing, how many
- (i) Studied all three?
  - (ii) Studied Marketing and Business Administration but not Banking and Finance?
- So marketing and business administration.*

**QUESTION FOUR**

- (a) The 10<sup>th</sup> term of an AP is 47 and the 4<sup>th</sup> term is 17. Write down the first 3 terms of the sequence.  
 (b) Given that  $\log_{10} 2 = 0.3010$ ,  $\log_{10} 3 = 0.4771$  and  $\log_{10} 7 = 0.8451$ , evaluate  $\log_{10} 42$ .  
 (c) Solve the simultaneous equation  $2a + 3b - 1 = 3a + b + 7 = a + 2b$

$$\frac{n(n-1)}{2} d =$$

$$\begin{aligned} 2a + 3(3a + 7) &= 1 \\ 2a + 9a + 21 &= 1 \\ 11a + 21 &= 1 \end{aligned}$$

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