



CMA STUDENTS'

E-BULLETIN

FOUNDATION

VOL.2 NO.1

JANUARY, 2017 ISSUE

(SYLLABUS 2016)



www.icmai.in

FOLLOW US ON



THE INSTITUTE OF COST ACCOUNTANTS OF INDIA
(Statutory body under an Act of Parliament)

Headquarters: CMA Bhawan 12, Sudder Street, Kolkata – 700 016

Tel: +91-33 2252 1031/1034/1035/1492/1602/1619/7373/7143

Delhi Office: CMA Bhawan 3, Institutional Area Lodhi Road, New Delhi - 110003

Phones : +91 11 24666100, 24622156/57/58

Behind every successful business decision, there is always a CMA



Message from the President

Dear Students,

"Education is the most powerful weapon which you can use to change the world."

— Nelson Mandela

"A Very Happy Healthy and Prosperous New Year" and hope you all are in a jubilant mood.

I am delighted to know that you have enjoyed reading the previous E-bulletin and reciprocated favourably. As an awakener my suggestion is, if you focus on results you will never change but if you focus on change, you will get results. So, from the beginning of this year, please try to stick to your own focus to get favourable result.

I strongly believe that the struggle you are in today is developing the strength you need for tomorrow. I sincerely request you that everyday do something which will inch you closer to a better tomorrow and eventually you may help the nation to build in. Push yourself because no one else is going to do it for you.

I am expecting that India will be one of the strong players in 'Digital India' movement in near future and my young friends will be the **architect**.

My sincere thanks to all the learned writers of this issue of the bulletin as, despite their busy schedules they have helped us to carry out this issue as well.

I pay my sincere thanks to all employees of the Directorate of studies for coming up with this timely issue.

I strongly believe in the words of Leonardo da Vinci that- "Study without desire spoils the memory, and it retains nothing that it takes in."

CMA Manas Kumar Thakur
President
The Institute of Cost Accountants of India

Be a CMA, be a Proud Indian



Message from the Chairman

At the outset; I wish you all A Very Happy New Year.

It is indeed a pleasure to note that you have enjoyed the first volume of the E-bulletin. Your new syllabus has been introduced in August, 2016 and in June 2017, for the first time under the new syllabus you will be appearing in the examination. So, from the very beginning you must be very careful and must try to appear for the examination with a positive mind and attitude.

“True guidance is like a small torch in a dark forest, it does not show everything once. But gives enough light for the next step to be safe” said by Swami Vivekananda.

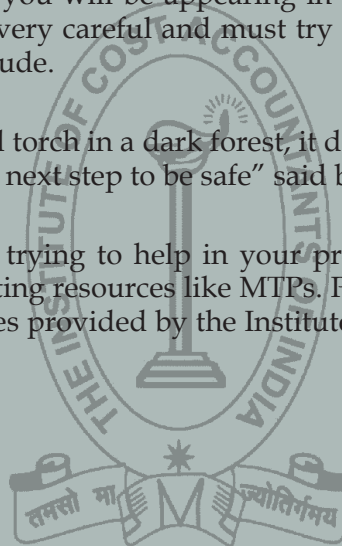
The Directorate of Studies is trying to help in your preparation with this E-bulletin along with the other and existing resources like MTPs. Please try to gather knowledge from all the available resources provided by the Institute and try to make full-proof of your efforts.

Wishing you all the best,

CMA Pappa Rao Sunkara

Chairman

Training & Education Facilities (T & EF) Committee



CONTENTS

Message from the President - **i**

Message from the Chairman - **ii**

Knowledge Update - **1**

Paper-1/Part-1 Fundamentals of Economics & Management (FEM) - **2** (Economics)

Paper-1/Part-2 Fundamentals of Economics & Management (FEM)- **5** (Management)

Paper 2: Fundamentals of Accounting (FOA) - **9**

Paper 3: Fundamentals of Laws & Ethics (FLE) - **12**

PAPER 4: Fundamentals of Business Mathematics & Statistics- (FBMS) **15**

Submissions - **25**

Practical Advice - **26**

Message from the Directorate of Studies - **27**

KNOWLEDGE UPDATE



In this section of e-bulletin we shall have a series of discussion on each subjects to provide a meaningful assistance to the students in preparing themselves for the examination at the short end and equip them with sufficient knowledge to deal with real life complications at the long end.





Paper 1:

Part 1:

Fundamentals of Economics & Management (FEM) / Economics

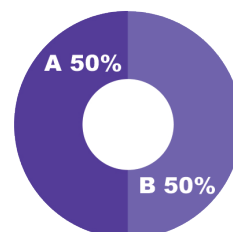
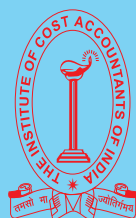
CMA Sucharita Chakraborty,
Jt. Director, Studies
She can be reached at: studies.sucharita@icmai.in

*Your
Preparation
Quick
Takes :*

Syllabus Structure

A Fundamentals of Economics 50%

B Fundamentals of Management 50%



Learning Objective- Money is at the heart of every financial systems including calculation of output, profits etc. We live in a highly advanced economic system. From an economic and financial perspective, we have to know what money is and how it influences our economy.

To understand how economy works we have to know – “**what money is**” and to understand “**why money exists**” and “**how our monetary system works**”.

Starting with-Money, Money Market and Demonetization

“What Money Is”:

Once upon a time, **Barter** system was prevailed and people used to **exchange** goods and services for **other** goods and services. It is relatively **primitive** and **insufficient** because –

- ◆ Lack of coincidence of wants
- ◆ Lack of store of value
- ◆ Lack of Divisibility of commodities
- ◆ Lack of common measure of value
- ◆ Difficulty in making deferred payments

Humans had **resolved** this issue by **creating something** that facilitates the exchange of most goods and services. **Money** is the **medium** by which we **gain access** to the **things we desire**.

Money is a tool to facilitate exchanges. It acts as an *intermediary* in transactions.

Thus **primary** purpose of money is to provide us with a **convenient medium of exchange for access to goods and services**.

“Why Money Exists”:

Money has many important functions to perform –

Primary functions

- ◆ Medium of Exchange

- ◆ Measurement of Value

Secondary functions

- ◆ Store of Value
- ◆ Standard of deferred payments
- ◆ Transfer of Money

Contingent functions

- ◆ Measurement and Distribution of National Income
- ◆ Basis of Credit
- ◆ Liquidity

“How Monetary System Works”:

Most of the money in a modern monetary system is a **fiat** money. Fiat money is money that has **no intrinsic value** but is used as a **medium of exchange** because a specific **Government deems it**.

In India, Government (Central) regulates the monetary systems through Central Bank (Reserve Bank of India). In our country, **Rupees (₹)** is the unit of account in which all money is **denominated**. So, one can buy the desired goods and services in exchange of Rupees. The unit of account is **different in different** countries (in dollar in U.S, the Yen in Japan etc), but **the concept is always the same - A government has designated a specifically denominated money as the unit of account**. Thus national currency is **legal tender** in practically every country.

Concepts of Money Supply:

Money Supply composes of the following: -

- ◆ Currency Issued by the Central Bank
- ◆ Demand deposits created by Commercial Banks

Value of Money:

The **purchasing power** of money is called **value of money** in exchange value i.e., **how much** of goods and services can be obtained in **exchange** of a unit of money.



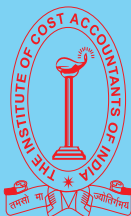
Paper 1:

Part 2:

Fundamentals of Economics & Management (FEM) / Management

CMA Dr. Sumita Chakraborty
Joint Director, Studies
She can be reached at: studies.sumita@icmai.in

*Your
Preparation
Quick
Takes :*



Learning Objectives:

- Students will demonstrate their knowledge of business and management principles
- Students will reveal effective written and oral communication
- Students will exhibit an awareness of the global environment in which businesses operate
- Students will display the ability to recognize when change is needed, adapt to change as it occurs, and lead change

Now, coming to the Management portion of your Syllabus,

Hicks define management as “the process of getting things done by and through others”.

Koontz and O'Donell state that management means getting things done through and with people.

In recent times, management has become a more scientific discipline of study having certain standardized principles and practices.

The following is a breakdown of the evolution of management thought during its developmental period:

- ♦ Early management approaches which are represented by scientific management, the administrative management theory and the human relations movement.
- ♦ Modern management approaches which are represented by scientific management, the administrative / management science approach, the systems approach and the contingency approach.

Fredrick Winslow Taylor has been accepted as the **father of scientific management**, who, for the first time proved through experiments that scientific methodology can be applied to the field of management.

According to him, a scientific process consists of:

- ♦ Observation,
- ♦ Analysis,

- ♦ Experimentation and
- ♦ Generalization.

Taylor wanted to introduce these elements into management also to establish a casual relationship between efforts and results.

Common to all the definitions are the contention that management involves activities that are directed towards determination and accomplishment of organizational goals. From these definitions emerge the functions of management which are namely:-

- ♦ Planning
- ♦ Organising
- ♦ Staffing
- ♦ Leading
- ♦ Controlling

Planning is the function that determines in advance what should be done. It consists of selecting the:

- ♦ Objectives
- ♦ Policies
- ♦ Programmes
- ♦ Procedures and other means of achieving the objectives.

Characteristics or Features of Planning:

- ♦ Planning is a primary function of management
- ♦ Planning is goal oriented
- ♦ Planning is an intellectual process
- ♦ Planning is pervasive
- ♦ Planning is continuous function:
- ♦ Planning involves choice between alternatives
- ♦ Planning is concerned with the accomplishment of group objectives
- ♦ Planning is flexible

Prerequisites of Effective Planning:

Planning does not substitute facts for judgment. It does not substitute science for the manager. However, some general principles can be followed to make planning effective.

- ◆ Make plans simple and easy to understand. When the plan itself is complicated, it invites misunderstandings among the members of organization.
- ◆ Be selective in the plan. Successful managers never try to cover too much territory.
- ◆ Plan should be geared to meet, the needs of those who implement it.
- ◆ A plan should be thorough, it should not omit any function or sub-function and should not overlook any necessary details. At the same time, controversial statements should be ignored.

Now, you may well understand that in relation to your preparation for this particular course also you have to plan and afterwards implementation of those plans you may achieve your desired goal.

Approaches to Planning:

Independent of the above philosophies of planning, we may identify four different approaches to planning in actual practice in various organisations. These approaches are described as follows:

- (a) Top-down approach
- (b) Bottom-up approach
- (c) Composite approach
- (d) Team approach.

As management consists in getting things done through others, therefore, human beings can be called the most dynamic elements of management and the other factors of production remain just dormant. In an organization direction means- guiding, overseeing or looking at these human beings.

Directing the employees include:

- ◆ Supervising employees
- ◆ Leading employees

- ◆ Motivating employees
- ◆ Communicating with employees.

Your **Study Note Chapter 11 deals with Leadership & Motivation**. Now to discuss about Leadership, first we should know how it has been defined and few relevant discussions.

According to **Koontz and Donnell**, "Leadership is the ability of a manager to induce subordinates to work with confidence and zeal".

Leadership may be defined simply as influence, the art or process of influencing people so that they will strive willingly towards the realization of common goals. The essence of leadership is followership. Thus, leadership process is an interplay of three elements-the leader, the follower and the

Difference between Leadership and Management:

Leadership and management are different from each other. Following are the two points of distinction:

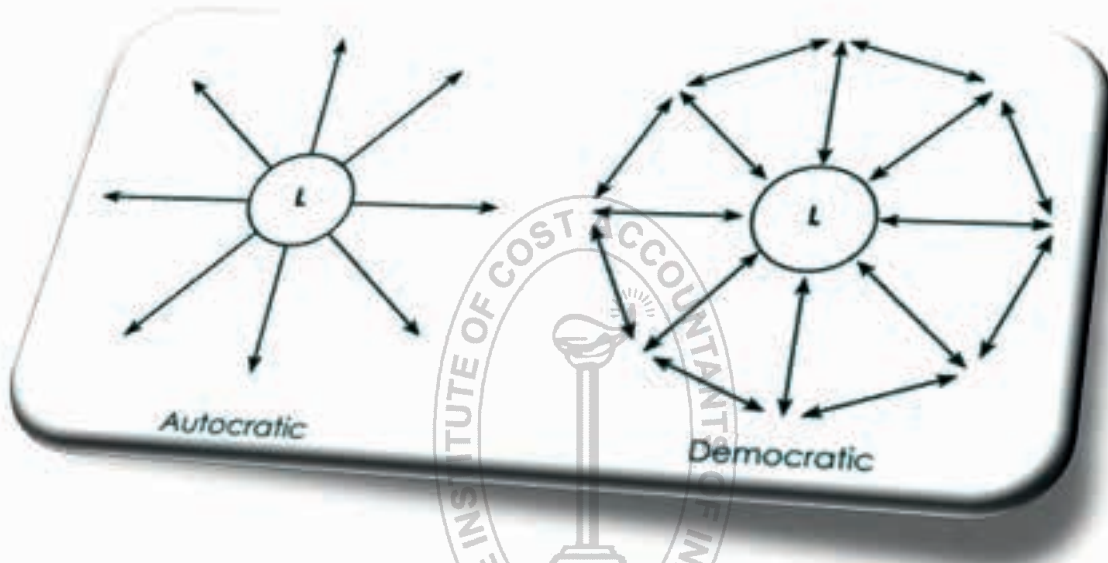
- ◆ Leadership is a part of management. Leadership is one of the managerial functions.
- ◆ Management is for the formal and organized groups while leadership can be of completely unorganized, informal groups. Leadership can be formal as well as informal Leadership Styles
- ◆ On the basis of how leaders use their power, leadership styles can be classified into three broad :
 - ❖ Autocratic,
 - ❖ Participative and
 - ❖ Free-rein

An autocratic leader exercises complete control over the subordinates. He centralizes power in himself and takes all decisions without consulting the subordinates. He dominates and drives his group through coercion and command. He loves power and never delegates authority.

A consultative or democratic leader takes decisions in consultation and participation with the subordinates. He decentralizes authority and allows the subordinates to share his power. A democratic leader provides freedom of

thinking and expression. He listens to the suggestions, grievances and opinions of the subordinates.

To have a better understanding about the Leadership Styles, see the diagram below:



Free-rein leadership involves complete delegation of authority so that subordinates themselves take decisions. The free rein leader avoids power and relinquishes the leadership position. He serves only as a contact to bring the information and resources needed by the subordinates.

In business enterprises, managers at various levels, assume the role of leadership in relation to their subordinates for getting the right things done in a proper manner to achieve a certain set of goals. The effectiveness of managers as leaders is critical to organisational survival and success. Hence there is a high premium on leadership effectiveness in business enterprises.

Read the Study Notes and with these tips, please follow your Mock Test Papers to know about the pattern of question paper.

“Management is doing things right; leadership is doing the right things”- Peter Drucker.

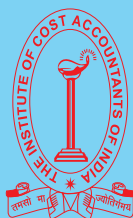


Paper 2:

Fundamentals of Accounting (FOA)

CMA (Dr.) Nibir Goswami
Associate Professor in Commerce
Vidyasagar Mahavidyalaya. W.B.
He can be reached at: drnibirgoswami@gmail.com

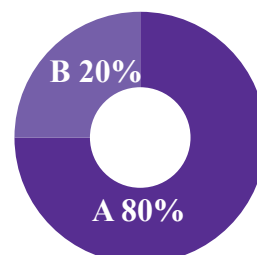
*Your
Preparation
Quick
Takes :*



Syllabus Structure

Section A covers 80 marks with Fundamentals of financial accounting and

Section B covers 20 marks with Fundamentals of cost and management accounting.



Learning Objective:

- Students will demonstrate their knowledge of the fundamental and technical concepts of accounting.
- Students will reveal critical-thinking and problem-solving skills.
- Students will exhibit the ability to recognize when change is appropriate, to adapt to change as it occurs, and to take the lead in creating change.
- Students will display a sense of responsibility and a capacity for the subject after learning

Here we will discuss one special area of accounting which is Sale on Approval or Return basis.

It is special in the sense that goods are sold to customers with an added option to return after a certain period. If the customers approve their acceptance instantly it will be treated as actual sales. However entries are made like actual sales while sending the goods.

Let us show the accounting entries with illustrations:

1. When goods are sent for approval

Debtors a/c.....Dr
To Sales a/c

_ Entry is made as if it is an actual sale. Now there are two possibilities – either the goods will be returned or will be accepted.

2. If the goods are approved and accepted

No further entry is required as already it was treated as actual sale. However if there is any change in price the following entries are required :

a. Debtors a/c.....Dr
To sales

(with the difference in the price increase)

b. Sales a/c.....Dr
To debtors

(with the difference in price decrease)

3. If the goods are returned
Sales return a/cDr
To Debtors a/c

Problems will accrue at the year end when customers may have time to approve beyond such date. So at the year end problem is – i. goods are not actually sold but entry of sale was made and ii. at the same time goods are not lying at stock. To solve such problem we need to reduce the sale and increase the value of stock by passing the following entries:

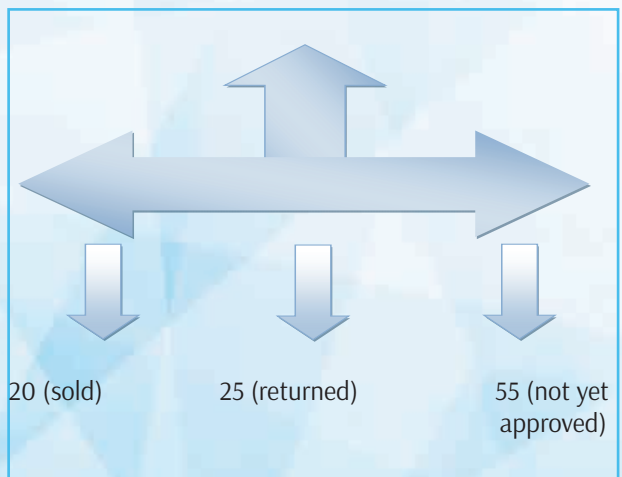
4. For reducing sales
Sales a/c.....Dr
To Debtors

5. For adding back the value of stock
Stock on sale or return a/cDr
To trading a/c

(Important to remember that value of stock to be taken at cost price)

Example: A gas company sends its products to dealers on sale on approval basis. On 24.12.2016 - 100 such items were sent for Rs. 200 each (cost Rs. 150 each). On 28.12.2016 – 20 items were approved @ Rs. 180 each and 25 items were returned. Response is yet to come for rest of the items as on 31.12.2016.

Solution :

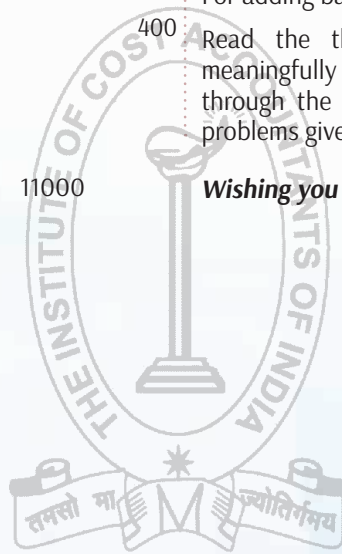


24.12.2016 debtors a/c dr (100*200) 20000

To sales a/c

20000

For sending goods		To debtors	11000
28.12.2016 sales a/c dr (25*200)	5000	For goods not yet approved	
To debtors a/c	5000	31.12.2016 stock a/c Dr (55*150)	8250
For return of goods		To trading a/c	8250
28.12.2016 sales a/cDr {20*(200-180)}	400	For adding back to stock at cost	
To debtors a/c	400	400	
For sale at reduced price		Read the theoretical portion of your Study Note	
31.12.2016 sales a/cDr (55*200)	11000	meaningfully prior to solving your problems. After going	
		through the basics only, you will be able to solve the	
		problems given in it.	
		Wishing you all the best,	





Paper 3:

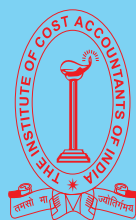
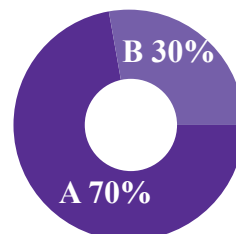
Fundamentals of Laws & Ethics (FLE)

CMA Aditi Dasgupta
Dy. Director, Examination
She can be reached at: exam.aditi@icmai.in

*Your
Preparation
Quick
Takes :*

Syllabus Structure

- A Fundamentals of Commercial Laws 70%
- B Fundamentals of Ethics 30%



Learning Objectives:

In order to internalize the concepts of subjects like law one has to have an understanding of the learning objectives of the chapters. Try to go through the Statement of Objects and Reasons issued for every act as it would give you a background to your study.

Section A deals with the fundamentals of Commercial Law.

It is also known as business law or corporate law and applies to the rights, duties and conduct of persons and businesses engaged in trade and commerce.

Study note 1 – Indian Contract Act is an important aspect of commercial law. The laws relating to contracts in India are contained in the Indian Contract Act. In the daily business entering into contracts is a normal affair and hence its importance cannot be overemphasized as this legislation deals with the enforcement of the rights and duties of the parties entering into contracts in India.

In order to constitute a valid contract the eligible contracting parties must enter into a lawful agreement with free consent and an intention to create a legal relationship supported by a lawful consideration. Please refer to section 2(h) of the Indian contract Act, 1872. Mark the important words –

- ✿ Lawful agreement
- ✿ Eligible contracting parties
- ✿ Free consent
- ✿ Creation of legal relationship
- ✿ Lawful consideration.

- A lawful agreement means that the object of the agreement must not be immoral or detrimental to public interest. There must be a definite offer and an unconditional and absolute acceptance of the offer.
- All persons are not eligible to enter into contracts. An adult of 18 years old with a sound mind not debarred from any law is considered competent to enter into a contract. (Go thru section 11 and 12 for detailed discussion on the capacity of contracting persons).

- Consent to contract is said to be free if it is not influenced by any threat, misrepresentation undue influence, fraud or mistake. It is to be borne in mind that consent is caused by any of the mentioned disqualifications, is voidable at the option of the party whose consent was so caused and if he thinks fit. (go thru sections 13,14,15,16,17,18 & 19 for an in depth understanding)
- A mere promise without an intention to create a legal relationship is not binding on the promisor and promisee and hence is not enforceable in the court of law. A contract is not legally enforceable in the court of law if it lacks the intention and in that case the parties involved cannot sue and the contract would be assumed to be not legal.
- A lawful contract must be supported by a lawful consideration. Consideration is the price at which the promise is bought. It must be real and not forbidden in any law.

Try to remember the definitions and the relevant sections for contract and allied terms. The case studies and examples in the study materials would help you to have an understanding of the subject matter.

STUDY NOTE 4 – Indian Partnership Act, 1932

Partnership business is an important form of ownership known wherein individuals agree to collectively or jointly carry on the business under a firm name with agreed share of profits or losses. The Indian Partnership Act, 1932 was enacted to regulate the partnership firms in India. In this issue we will discuss about status of minors in a partnership business.

A minor i.e. a person who has not attained the age of 18 years may not be a partner in a firm but with the consent of all the partners he may be admitted to the benefits of partnership. A minor has the right to the property and share of profits of the firm but however he is not personally liable for the acts of the firm. It is to be borne in mind that within 6 months of his attaining majority or his obtaining the knowledge that he has been admitted to the benefits of partnership, whichever is later, such person has to give a public notice that he has elected to become or not to become a partner of the firm. Such notice will determine his position in the firm. However if he fails to give such public notice then he shall become a partner in the firm after the expiry of 6 months. Please note that when a minor becomes the partner of the firm his rights and liabilities ceases to exist and he also become personally liable to third parties for all such acts of the firm done since his admission as a partner. But if he elects not to become a partner of the firm his rights and liabilities shall continue

to be those as a minor up to the date of the notice and it ceases after the date of the notice.

Indian Partnership Act, 1932 is an important legislation which requires detailed an in depth understanding for answering questions in examinations.

Section- B deals with the Fundamentals of Industrial Laws.

Industrial legislations have been framed to protect the rights of the Indian work force and provides for the duties and responsibilities of the workers and management.

In this publication our discussion would be on **Minimum Wages Act, 1948**. The object and reason of this enactment was to secure the welfare of the labors in India and to prevent their exploitation by fixation of wages and enforcement of the rules.

The minimum wage is fixed by The Central Government and the local governments and is established for trainees and piece rate workers by considering the cost of living. The wages are fixed by hour, day, weeks or months but in no case should extend for more than 1 month.

Both the Central and State governments are empowered to notify in the schedule where the number of employees is 1000 or more.

Please note that wages means all remuneration being capable of expressed in monetary terms payable by an em-

ployer (note the definition of employer as per the act) to its employee (note the definition of employee as per the act) upon completion of the determined work assigned to him. According to this act the employer is legally obliged to pay the wages on regular and timely basis.

Section- C deals with, Fundamentals of Ethics.

It is very important to understand the concept of ethics. Ethics is a science of conduct. It is the study of right or wrong in conduct. Ethical science shows the way in which one should behave with others. It is a systematized principle on which a man should act.

Business ethics or corporate ethics examines the ethical principles and ethical problems that may arise in business environment. It is the set of principles and standards that guide the behavior in the conduct of business. Since business is a social contract between the corporate and the society and also binds the business to work in a manner not detrimental to the public interest, study of business ethics has gained much importance.

Ethical problems and issues arise across all the functional areas and at all levels of a corporate. A strict or stringent law is not enough to eliminate the evils of malpractice in business. A strong ethical character is what is required to guide a corporate in determining what is wrong or right and hence abide by the regulatory framework.

“To be able to do the right thing in the right way in each case and in every moment, one must be in the right consciousness” –Sri Aurobindo.



Paper 4:

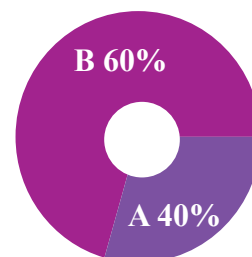
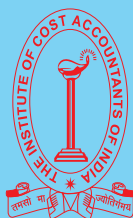
Fundamentals of Business Mathematics & Statistics (FBMS)

Dr. Lakshimikanta Roy
Visiting faculty, Vidyasagar Mahavidyalaya,
Hooghly, W.B.

*Your
Preparation
Quick
Takes :*

Syllabus Structure

- A Fundamentals of Business Mathematics 40%
- B Fundamentals of Business Statistics 60%



Learning Objectives:

- appreciate the usefulness, power and beauty of mathematics
- enjoy mathematics and develop patience and persistence when solving problems
- understand and be able to use the language, symbols and notation of mathematics
- develop mathematical curiosity and use inductive and deductive reasoning when solving problems
- become confident in using mathematics to analyse and solve problems both in professional and in real-life situations

1.1. PREFACE:-

In July 1918, an International Mathematical conference was held at Edinbora where many Mathematicians from different parts of the world participated to recollect what happened In 1618 when a famous book “Logarithms and Logarithmic Tables for uses” was published first. This book was written by John Napier who lived in Merchiston near Adinbora. He had to work hard for Twenty years to complete this Book. He is now famous as an inventor of Logarithm.

1.2. DEFINITION OF LOGARITHM:-

Let us consider the exponential form $3^2 = 9$. The power of the index 2 is called the Logarithm of the number 9 with respect to the base 3. In symbol $\log_3 9 = 2$. Thus if $a^m = n$ ($a > 0, a \neq 1$)

Then $m = \log_a n$. This Logarithmic form.

Example: Find the number whose logarithm to

the base 27 is $\frac{1}{3}$

Solution: Let the required number is x

\therefore According to the problem $\log_{27} x = \frac{1}{3}$

Or $(27)^{\frac{1}{3}} = x$

Or $(3^3)^{\frac{1}{3}} = x$

Or $3 = x$

Hence the required number is 3

1.3. LAWS OF LOGARITHMS: -

(a) The logarithm of the product of two positive numbers m and n with respect to any base other than 1 is equal to the sum of the logarithms of the numbers.

i.e., $\log_a (mxn) = \log_a m + \log_a n$ ($a \neq 1$)

Proof : Let $\log_a m = x \quad \therefore a^x = m$

And $\log_a n = y \quad \therefore a^y = n$

By Definition

$\therefore a^x \cdot a^y = mn$

Or $a^{x+y} = mn$

New by definition $x+y = \log_a (mn)$

i.e., $\log_a m + \log_a n = \log_a (mn)$

NOTE: (i) $\log_a (m \times n \times p) = \log_a [(m \times n) \times p]$
 $= \log_a (m \times n) + \log_a p = \log_a m + \log_a n + \log_a p$

(ii) $\log_a (m \times n \times p \times q \times r \times \dots) = \log_a m + \log_a n + \log_a p + \log_a q + \log_a r + \dots$

(b) The logarithm of the quotient of two positive

numbers m and n with respect to a positive base other than 1 is equal to the difference of the logarithms of the numbers.

i.e., $\log_a(m/n) = \log_a m - \log_a n$ ($a \neq 1$)

Proof let $\log_a m = x$ $\therefore a^x = m$

And $\log_a n = y$ $\therefore a^y = n$ By Definition

Now $\frac{a^x}{a^y} = \frac{m}{n}$

or $a^{x-y} = \frac{m}{n}$

\therefore By definition $x-y = \log_a\left(\frac{m}{n}\right)$

or $\log_a m - \log_a n = \log_a\left(\frac{m}{n}\right)$

NOTE: $\log_a\left(\frac{m \times n \times p \times \dots}{r \times s \times t \times \dots}\right) = (\log_a m + \log_a n + \log_a p + \dots) - (\log_a r + \log_a s + \log_a t + \dots)$

(c) The logarithm of n th power of a positive number m with respect to a positive base other than 1 is equal to n multiplied by the logarithm of the number.

i.e., $\log_a(m)^n = n \log_a m$ ($a \neq 1$)

Proof: Let $\log_a(m)^n = x$ $\therefore m^n = a^x$

and, $\log_a m = y$ $\therefore a^y = m$ By Definition

Now $a^x = m^n = (a^y)^n = a^{yn}$

$\therefore x = ny$ [\because Base of the both sides are same]

Or $\log_a(m)^n = n \log_a m$

NOTE: $\log_a \sqrt[n]{m} = \log_a(m)^{\frac{1}{n}} = \frac{1}{n} \log_a m$

(d) $\log_a m$ th power of a positive number a is equal to m i.e., $a^{\log_a m} = m$

Proof: Let $\log_a m = x$ $\therefore a^x = m$ By definition

Now $m = a^x$ or $m = a^{\log_a m}$

(e) **CHANGE OF BASE:**

The logarithm of a number to any base can be changed to the logarithm of the same number to any

other desired base such as

$$\log_a m = \log_b m \times \log_a b \text{ i.e., } \log_a m = \frac{\log_b m}{\log_b a}$$

Proof let $\log_a m = x \quad \therefore a^x = m$

and, $\log_b m = y \quad \therefore b^y = m$ By definition

Now $a^x = m = b^y$ or $b = a^{\frac{x}{y}}$

\therefore By definition $\frac{x}{y} = \log_a b$

Or $x = y \log_a b$

Or $\log_a m = \log_b m \times \log_a b$

Example 1: Prove that $\log_a m \times \log_b n = \log_a n \times \log_b m$

Solution L.H.S. = $\log_a m \times \log_b n$

= $\log_b m \times \log_a b \times \log_a n \times \log_b a$

= $\log_a n \times \log_b m \times \log_a b \times \frac{1}{\log_a b}$

= $\log_a n \times \log_b m$

= R. H. S (Proved)



Example 2: Evaluate $\log_3 4 \times \log_4 5 \times \log_5 6 \times \log_6 7 \times \log_7 3$

Solution: Given expression: $\log_3 4 \times \log_4 5 \times \log_5 6 \times \log_6 7 \times \log_7 3$

= $\log_7 4 \times \log_4 5 \times \log_5 6 \times \log_6 7$

= $\log_6 4 \times \log_4 5 \times \log_5 6$

= $\log_5 4 \times \log_4 5$

= $\log_4 4$

= 1

1.4. Important Formula

(i) $\log_a 1 = 0$

(ii) $\log_a a = 1$

$$(iii) \log_b a \times \log_a b = 1$$

$$(iv) \log_b a = \frac{1}{\log_a b}$$

1.5. WORKED OUT PROBLEMS:

1. Express M in terms of N:

$$\frac{1}{2} \log_3 M + 3 \log_3 N = 1$$

Solution: Given that $\frac{1}{2} \log_3 M + 3 \log_3 N = 1$

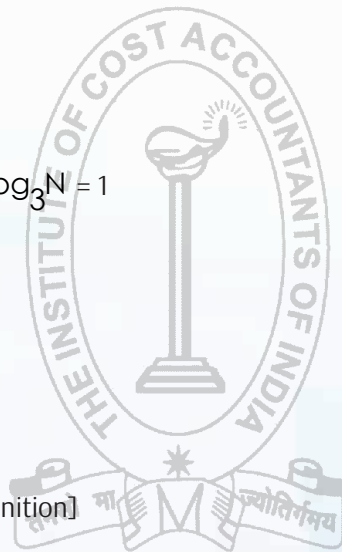
$$\text{Or } \log_3 M^{\frac{1}{2}} + \log_3 N^3 = 1$$

$$\text{Or } \log_3 (M^{\frac{1}{2}} N^3) = 1$$

$$\text{Or } M^{\frac{1}{2}} N^3 = 3^1 = 3 \text{ [By definition]}$$

$$\text{Or } MN^6 = 9 \text{ [Squaring both sides]}$$

$$\text{Or } M = \frac{9}{N^6}$$



2. Evaluate $\log_3 \log_2 \text{Log } \sqrt{3} 81$

Given Expression = $\log_3 \log_2 \text{Log } \sqrt{3} 81$

$$= \log_3 \log_2 \text{Log } \sqrt{3} 3^4$$

$$= \log_3 \log_2 \text{Log } \sqrt{3} (\sqrt{3})^8$$

$$= \log_3 \log_2 8 \log \sqrt{3} \sqrt{3}$$

$$= \log_3 \log_2 2^3 \times 1 \text{ [}\because \log_{\sqrt{3}} \sqrt{3} = 1\text{]}$$

$$= \log_3 3 \log_2 2$$

$$= \log_3 3 \times 1$$

$$= \log_3 3$$

$$= 1$$

3. Evaluate $\log_6 \sqrt{\sqrt{\sqrt{\sqrt{\sqrt{6 \dots \infty}}}}}$

Solution: Let $\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{6 \dots \infty}}}}} = x \dots \dots (1)$

$\therefore X^2 = 6 \sqrt{\sqrt{\sqrt{\sqrt{\sqrt{6 \dots \infty}}}}$ [Squaring both sides]

Or $X^2 = 6X$ [$\because \sqrt{\sqrt{\sqrt{\sqrt{\sqrt{6 \dots \infty}}}}} = X$]

Or $X^2 - 6X = 0$

Or $X(X-6) = 0$

$\therefore X = 6 \because X \neq 0$

\therefore The Given Expression $= \log_6 \sqrt{\sqrt{\sqrt{\sqrt{\sqrt{6 \dots \infty}}}}} = \log_6 6$ [By (1)]
 $= 1$

4. Prove that $7 \log \frac{16}{15} + 5 \log \frac{25}{24} + 3 \log \frac{81}{80} = \log 2$

Solution L.H.S. $= 7 \log \frac{16}{15} + 5 \log \frac{25}{24} + 3 \log \frac{81}{80}$
 $= 7(\log 16 - \log 15) + 5(\log 25 - \log 24) + 3(\log 81 - \log 80)$
 $= 7[\log 2^4 - \log(3 \times 5)] + 5[\log 5^2 - \log(3 \times 8)] + 3[\log 3^4 - \log(5 \times 16)]$
 $= 7[4 \log 2 - \log 3 - \log 5] + 5[2 \log 5 - \log 3 - \log 2^3] + 3[4 \log 3 - \log 5 - \log 2^4]$
 $= 28 \log 2 - 7 \log 3 - 7 \log 5 + 10 \log 5 - 5 \log 3 - 15 \log 2 + 12 \log 3 - 3 \log 5 - 12 \log 2$
 $= 28 \log 2 - 27 \log 2$
 $= \log 2$
 $= \text{R.H.S. (Proved)}$

5. Prove that $\frac{1}{\log_a bc + 1} + \frac{1}{\log_b ca + 1} + \frac{1}{\log_c ab + 1} = 1$

Solution: L.H.S. = $\frac{1}{\log_a bc + 1} + \frac{1}{\log_b ca + 1} + \frac{1}{\log_c ab + 1}$

$$= \frac{1}{\log_a bc + \log_a a} + \frac{1}{\log_b ca + \log_b b} + \frac{1}{\log_c ab + \log_c c}$$

$$= \frac{1}{\log_a abc} + \frac{1}{\log_b abc} + \frac{1}{\log_c abc}$$

$$= \log_{abc} a + \log_{abc} b + \log_{abc} c \left[\because \log_b a = \frac{1}{\log_a b} \right]$$

$$= \log_{abc} abc$$

$$= 1 \left[\because \log_a a = 1 \right]$$

$$= \text{R.H.S. (Proved)}$$

6. Prove that $\log_b 3^a \times \log_c 3^b \times \log_a 3^c = \frac{1}{27}$

Solution: L.H.S. = $\log_b 3^a \times \log_c 3^b \times \log_a 3^c$

$$= \frac{1}{\log_a b^3} \times \frac{1}{\log_b c^3} \times \frac{1}{\log_c a^3}$$

$$= \frac{1}{3 \log_a b} \times \frac{1}{3 \log_b c} \times \frac{1}{3 \log_c a}$$

$$= \frac{1}{27 \log_a b \times \log_b c \times \log_c a}$$

$$= \frac{1}{27 \log_c b \times \log_b c}$$

$$= \frac{1}{27 \log_b b}$$

$$= \frac{1}{27 \times 1}$$

$$= \frac{1}{27}$$

$$= \text{R.H.S. (Proved)}$$

7. If $\frac{\log x}{y-z} = \frac{\log y}{z-x} = \frac{\log z}{x-y}$, Show that $xyz = 1$

Solution: Let $\frac{\log x}{y-z} = \frac{\log y}{z-x} = \frac{\log z}{x-y} = K$ (say) where $K \neq 0$ (1)

From (1) $\frac{\log x}{y-z} = k$ or $\log x = k(y-z)$ or $x = e^{k(y-z)}$ where e is the base

$\frac{\log y}{z-x} = k$ or $\log y = k(z-x)$ or $y = e^{k(z-x)}$

and, $\frac{\log z}{x-y} = k$ or $\log z = k(x-y)$ or $z = e^{k(x-y)}$

Now $xyz = e^{k(y-z)} \cdot e^{k(z-x)} \cdot e^{k(x-y)}$
 $= e^{k(y-z)+k(z-x)+k(x-y)}$
 $= e^{k(\cancel{y-z} + \cancel{z-x} + \cancel{x-y})}$
 $= e^{k \cdot 0} = e^0 = 1$

8. If $x = 1 + \log_a bc$, $y = 1 + \log_b ca$ and $z = 1 + \log_c ab$
 Prove that $xy + yz + zx = xyz$

Solution: Given that $x = 1 + \log_a bc = \log_a a + \log_a bc$
 $= \log_a abc$

$y = 1 + \log_b ca = \log_b b + \log_b ca = \log_b abc$

$z = 1 + \log_c ab = \log_c c + \log_c ab = \log_c abc$

$\therefore \frac{1}{x} = \log_{abc} a$, $\frac{1}{y} = \log_{abc} b$ and $\frac{1}{z} = \log_{abc} c$

Now $\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = \log_{abc} a + \log_{abc} b + \log_{abc} c$
 $= \log_{abc} abc = 1$

Or $\frac{yz + zx + xy}{xyz} = 1$

Or $yz + zx + xy = xyz$ (proved)

9. Prove that $\frac{\log \sqrt{27} + \log 8 - \log \sqrt{1000}}{\log 1.2} = \frac{3}{2}$

Solution L.H.S. = $\frac{\log \sqrt{27} + \log 8 - \log \sqrt{1000}}{\log 1.2}$

$$\begin{aligned}
 &= \frac{\log(27)^{\frac{1}{2}} + \log 2^3 - \log(1000)^{\frac{1}{2}}}{\log \frac{12}{10}} \\
 &= \frac{\log(3^3)^{\frac{1}{2}} + 3\log 2 - \log(10^3)^{\frac{1}{2}}}{\log 12 - \log 10} \\
 &= \frac{\frac{3}{2}\log 3 + \frac{3}{2} \cdot 2\log 2 - \frac{3}{2}\log 10}{\log(3 \times 4) - 1} \\
 &= \frac{\frac{3}{2}\log 3 + \frac{3}{2}\log 4 - \frac{3}{2} \cdot 1}{\log 3 + \log 4 - 1} \\
 &= \frac{\frac{3}{2}(\log 3 + \log 4 - 1)}{\log 3 + \log 4 - 1} \\
 &= \frac{3}{2} = \text{R.H.S. (proved)}
 \end{aligned}$$

10. Solve $\log_8 x + \log_4 x + \log_2 x = 11$

Solution: Given that $\log_8 x + \log_4 x + \log_2 x = 11$

$$\text{Or } \frac{1}{\log_x 8} + \frac{1}{\log_x 4} + \frac{1}{\log_x 2} = 11$$

$$\text{Or } \frac{1}{\log_x 2^3} + \frac{1}{\log_x 2^2} + \frac{1}{\log_x 2} = 11$$

$$\text{Or } \frac{1}{3\log_x 2} + \frac{1}{2\log_x 2} + \frac{1}{\log_x 2} = 11$$

$$\text{Or } \frac{2+3+6}{6\log_x 2} = 11$$

$$\text{Or } \frac{11}{6\log_x 2} = 11$$

$$\text{Or } \frac{1}{6\log_x 2} = 1$$

$$\text{Or } \log_2 x = 6$$

$$\text{Or } x = 2^6 = 64$$

∴ The required solution is $x = 64$

11. Show that the value of $\log_{10} 3$ lies between $\frac{1}{2}$ and $\frac{2}{5}$

Solution it is known that $3^2 < 10$

$$\text{Or } \log_{10} 3^2 < \log_{10} 10$$

$$\text{Or } 2 \log_{10} 3 < 1$$

$$\text{Or } \log_{10} 3 < \frac{1}{2} \dots \dots \dots (1)$$

Again it is known that $3^{\frac{5}{2}} > 10$

$$\text{Or } \log_{10} 3^{\frac{5}{2}} > \log_{10} 10$$

$$\text{Or } \frac{5}{2} \log_{10} 3 > 1$$

$$\text{Or } \log_{10} 3 > \frac{2}{5} \dots \dots \dots (2)$$

From (1) and (2) it shows that $\frac{2}{5} < \log_{10} 3 < \frac{1}{2}$

i.e., $\log_{10} 3$ lies between $\frac{1}{2}$ and $\frac{2}{5}$.

12. If $x = \frac{e^y - e^{-y}}{e^y + e^{-y}}$ show that $y = \frac{1}{2} \log_e \frac{1+x}{1-x}$

Solution: Given that $x = \frac{e^y - e^{-y}}{e^y + e^{-y}}$

$$= \frac{1+x}{1-x} = \frac{1 + \frac{e^y - e^{-y}}{e^y + e^{-y}}}{1 - \frac{e^y - e^{-y}}{e^y + e^{-y}}} = \frac{e^y + e^{-y} + e^y - e^{-y}}{e^y + e^{-y} - e^y + e^{-y}} = \frac{2e^y}{2e^{-y}}$$

$$\text{Or } \frac{1+x}{1-x} = e^{2y}$$

$$\text{Or } \log_e \frac{1+x}{1-x} = \log_e e^{2y} = 2y \log_e e = 2y$$

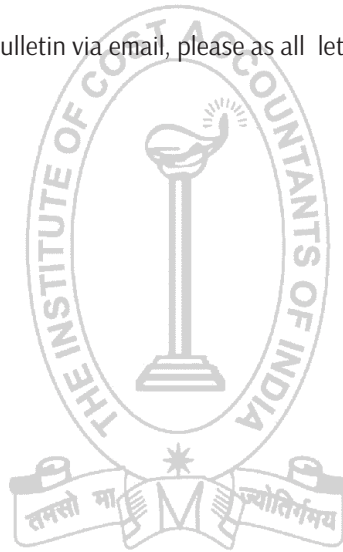
$$\text{Or } y = \frac{1}{2} \log_e \frac{1+x}{1-x}$$

SUBMISSIONS

Give your thoughts on the Student-bulletin. Do you have some news, an achievement, or an aspect of achievement that you would like to share? If so, we would love to hear from you.

e-mail: studies.ebulletin@icmai.in

If you do not think you are getting the e-bulletin via email, please let us know, students should receive it.



Updation of E-Mail Address / Mobile:

Students are advised to update their E-Mail Id and Mobile Numbers timely so that important communications are not missed as the same are sent through bulk mail/SMS nowadays. Students may update their E-mail Id/ Mobile Number instantly after logging into their account at www.icmai.in at request option.

Please put your opinions so that we can make your e-bulletin everything that you want it to be.

Send your Feedback to:

e-mail: studies.ebulletin@icmai.in

website: <http://www.icmai.in>

All rights reserved. No part of this Bulletin may be translated or copied in any form or by any means without the prior written permission of The Institute of Cost Accountants of India.



PRACTICAL ADVICE
ABOUT YOUR STUDIES - FOUNDATION COURSE

**Practical support, information and advice to help you
get the most out of your studies.**

Read the Tips

**Read Study
Notes & MTPs**

**Solve
Exercises given
in Study Notes**

**Assess
Yourself**

**Appear
for
Examination**

Message from the Directorate of Studies

For the smooth and flowless preparation, Directorate of Studies have provided meaningful tips which will help you to gain sufficient knowledge about each subject.

'Tips' are given in this E-bulletin by the knowledge experts, for the smooth encouragement in your preparation. We are sure that all students will definitely be benefitted by those tips and that will help them to brush up their knowledge and also to swim across.

Take the course seriously from the very beginning but don't be panicky. Please try to follow the general guidelines, mentioned below; which may help you in your preparation.

Essentials for Preparation:

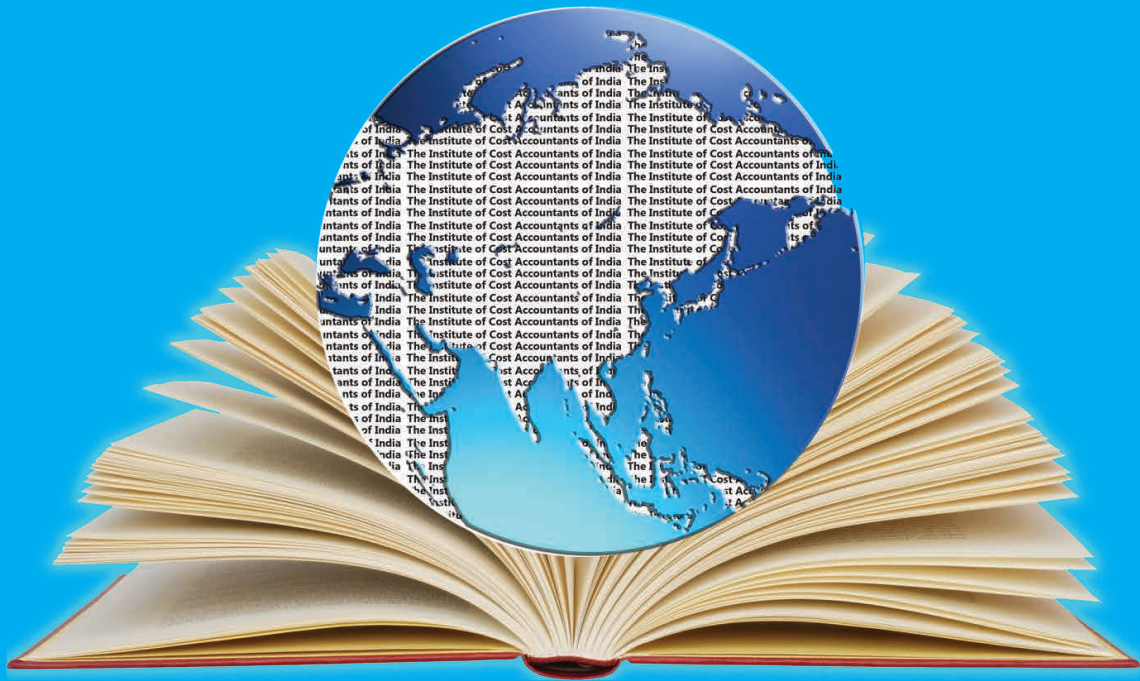
- Conceptual understanding & overall understanding of the subject both should be clear,
- Candidates are advised to go through the study material provided by the institute in an analytical manner,
- Students should improve basic understanding of the subject with focus on core concepts,
- The candidates are expected to give to the point answer, which is a basic pre-requisite for any professional examination,
- To strengthen the answers candidates are advised to give answers precisely and in a structured manner,
- In-depth knowledge about specific terms required.
- Write question numbers correctly and prominently.
- Proper time management is also important while answering.

Be Prepared and Get Success;

Wishing you a very Happy & Prosperous Year ahead!

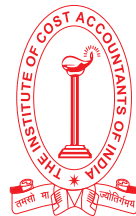
Disclaimer

Although due care and diligence have been taken in preparation and uploading this E-bulletin, the Institute shall not be responsible for any loss or damage, resulting from any action taken on the basis of the contents of this E-bulletin.



www.icmai.in

FOLLOW US ON



DIRECTORATE OF STUDIES
THE INSTITUTE OF COST ACCOUNTANTS OF INDIA
(Statutory body under an Act of Parliament)

Headquarters: CMA Bhawan 12, Sudder Street, Kolkata – 700 016

Tel: +91-33 2252 1031/1034/1035/1492/1602/1619/7373/7143

Delhi Office: CMA Bhawan 3, Institutional Area Lodhi Road, New Delhi - 110003

Phones : +91 11 24666100, 24622156/57/58

Behind every successful business decision, there is always a CMA