DELHI PUBLIC SCHOOL
STEEL TOWNSHIP, ROURKELA

Holiday Home Assignment

Stream – Commerce

Grade – XII

Academic session – 2026-27

ENGLISH CORE
BUSINIESS STUDIES
ACCOUNTANCY
ECONOMICS
APPLIED MATHEMATICS
DATA SCIENCE

ENGLISH CORE (301)

Dear Students,

As part of your holiday assignment, you are required to prepare an innovative project on the chapter The Tiger King from your NCERT textbook. The project is designed as per CBSE guidelines to enhance your analytical, creative, and critical thinking skills.

Project Topic: Power, Prophecy and Irony: A Psychological and Political Exploration of 'The Tiger King'

NOTE: Project Guidelines (15 Pages)

1. Cover Page

- School's Name
- Title of the Project
- Student's Name, Class, Section, Roll Number

2. Acknowledgement

Express gratitude to the principal, teachers, parents, and the school

3. Index

List of contents with page numbers

4. Main Content

a) A Brief Summary of the Chapter

b) Character Sketch of the Tiger King

- Personality traits
- Strengths and flaws

c) Theme analysis

- Satire on authority
- Fate vs free will
- Irony
- Symbolism in the story

d) Creative Section

- Criticism of monarchy OR
- Blind exercise of power

4. Conclusion: Personal reflection and final thoughts

5. Bibliography

- NCERT textbook
- Other references (if used)

Important Instructions:

- The project must be handwritten on project papers
- Maintain neatness and proper presentation
- Paste relevant pictures/images to enhance the content
- Use proper headings, margins, and creativity
- Use Stick File

NOTE: Submission Date: Reopening day after summer break

DELHI PUBLIC SCHOOL
SEC-14, ROURKELA

ENGLISH PROJECT

TOPIC:

NAME:

CLASS:

SECTION:

ROLL NO:

Literature Questions (Answers to be written in a separate notebook)

PART-1

A. Read the following extracts and answer the questions given below.

"My children, this is the last lesson I shall give you. The order has come from Berlin to teach only German in the schools of Alsace and Lorraine. The new master comes tomorrow. This is your last French lesson."

(a) Why is this the "last lesson" for the children?

(b) What does M. Hamel's tone reveal about his feelings?

(c) How does this announcement change Franz's attitude towards school and French?

B. Answer the following questions.

Q1. Why was Franz afraid to go to school that morning?

Q2. What tempted Franz to stay away from school instead of going to class?

Q3. Why were the village elders sitting in the classroom on the last day?

Q4. What impression do you form of M. Hamel from his last lesson?

Q5. How does the order from Berlin affect the villagers emotionally?

Q6. How does Franz react when he realises it is the last French lesson?

Q7. Why does Franz consider his books "old friends" by the end of the lesson?

Q8. What does the line "Vive la France!" symbolise in the story?

Q9. Why does the story end with M. Hamel standing motionless at the window?

Q10. How does Daudet use the classroom setting to highlight the theme of loss?

C. Long Answer type questions.

Q1. Describe how the people in the story suddenly realise the value of their language. Why does this realisation come only when it is on the verge of being taken away?

Q2. Sketch the character of Franz, highlighting how his attitude changes from the beginning to the end of the story. What message does this transformation convey to the reader?

PART-2

A. Read the following extract and answer the questions given below

"Driving from my parents' home to Cochin last Friday morning, I saw my mother, beside me, doze, open-mouthed, her face ashen like that of a corpse and felt that old familiar ache, my childhood's fear…"

(a) Why is the poet's mother described as "as white as a corpse"?

(b) What "old familiar ache" does the poet refer to?

(c) How does this opening image set the mood of the poem?

B. Answer the questions given below.

Q1. Why does the poet compare her mother's face to that of a corpse?

Q2. What contrasting images does the poet use in the poem?

Q3. What does the reference to "young trees sprinting" symbolise?

Q4. Why does the poet say she is smiling and smiling at the time of parting?

Q5. How does the poem present the theme of ageing and mortality?

Q6. What train of thought disturbed the poet during the car journey?

Q7. Why does the poet feel "familiar ache" at the sight of her mother?

Q8. How does the poem shift from a personal emotional moment to a universal fear of death?

Q9. What does the line "see you soon, Amma" reveal about the poet's feelings?

Q10. How does Kamala Das portray the conflict between love and fear in the poem?

C. Answer the following questions.
Q1. Discuss how Kamala Das, in the poem My Mother at Sixty-six, effectively uses contrasting images to express her inner conflict between fear and affection.
Q2. Bring out the poet's emotional journey from beginning to end, and comment on how the poem reflects the universal fear of losing a parent.

PART-3

Read the following passage carefully and answer the questions that follow:
The Balancing Act: Technology and Life
Modern life is deeply intertwined with technology. From the moment we wake up to the moment we go to sleep, we are surrounded by devices that make our lives faster and easier. Smartphones connect us instantly to friends and family across the world. Computers store and process vast amounts of information, while the internet provides answers to almost any question within seconds.
Technology has also transformed education. Online classes, e-books, and educational apps allow students to learn at their own pace, anytime and anywhere. Doctors use advanced machines and software to diagnose illnesses more accurately and quickly. In business, digital tools have made communication and collaboration global and almost instant.
However, this dependence on technology has its drawbacks. Many young people spend more time on social media and video games than on their studies or physical activity. Long hours in front of screens can cause eye strain, poor posture, and sleep problems. Some people feel anxious if they are without their phones for even a short time, a condition often called “nomophobia”.
Another major concern is the decline in face-to-face interaction. While people may have hundreds of online friends, they often lack deep, real-life relationships. Misinformation spreads rapidly online, and privacy is sometimes compromised as personal data is shared across platforms. Cyberbullying and online harassment are also growing problems, especially among teenagers.
Experts agree that the key is balance. Technology in itself is not harmful; it is our use of it that matters. Parents and teachers should guide students to use screens wisely—limiting unnecessary scrolling, encouraging outdoor play, and teaching digital literacy. When used responsibly, technology can open doors to learning, creativity, and connection. Otherwise, it can become a source of distraction, addiction, and isolation.
Answer the following questions.
Q1. What does the passage mainly discuss?
(a) The history of technology
(b) The benefits of smartphones
(c) The impact of technology on modern life and the need for balance
(d) The dangers of cyberbullying only
Q2. According to the passage, how does technology help education?
(a) It makes studying longer and harder
(b) It does not affect learning
(c) It offers online classes, e-books, and apps for self-paced learning
(d) It replaces teachers completely
Q3. What does “nomophobia” refer to in the passage?
(a) Fear of nature (b) Fear of technology

(c) Fear of being without a mobile phone (d) Fear of using the internet
Q4. Which health problem is mentioned as a result of long screen time?
(a) Tooth decay (b) Eye strain (c) Hearing loss (d) Weight gain only
Q5. How does the passage describe online relationships?
(a) Always deeper than real-life relationships
(b) Often more meaningful than real-life friendships
(c) Frequently lacking depth despite large numbers of online friends
(d) Completely useless
Q6. What is one negative effect of the rapid spread of information online?
(a) Faster academic progress (b) Growth in misinformation
(c) Better sleep (d) Decreased screen time
Q7. Why is privacy a concern on digital platforms?
(a) Because people never share personal data
(b) Because personal data is often shared and may be misused
(c) Because technology cannot store data
(d) Because the internet is not advanced
Q8. What role do parents and teachers play in managing technology use?
(a) They should ban all devices
(b) They should encourage unlimited screen time
(c) They should guide students to use screens wisely and teach digital literacy
(d) They should ignore the problem
Q9. According to the passage, which of these is a benefit of technology in medicine?
(a) Longer waiting times (b) More accurate and quicker diagnosis
(c) No need for doctors (d) Removal of all diseases
Q10. What does the passage say about outdoor activities?
(a) They are outdated and unnecessary
(b) They should be encouraged, along with limited screen time
(c) They are only for children
(d) They are more harmful than technology
Q11. Which behaviour on social media is linked to anxiety in the passage?
(a) Using phones occasionally (b) Being without a phone for a short time
(c) Avoiding the internet (d) Sleeping early
Q12. What term is used to describe the balance needed in technology use?
(a) Overuse (b) Dependence (c) Balance (d) Addiction
Q13. How does the passage describe the effect of technology on business?
(a) It has slowed down communication
(b) It has made global communication faster and easier
(c) It has stopped collaboration
(d) It has made business irrelevant
Q14. Which group is particularly mentioned as facing cyberbullying and online harassment?
(a) Elderly people only (b) Teenagers
(c) Scientists (d) Animals
Q15. What is the central message of the passage?
(a) Technology should be completely avoided
(b) Technology is always harmful
(c) Technology is neutral; its impact depends on how humans use it
(d) Only children should use technology

BUSINESS STUDIES (054)

CHAPTER-1 NATURE AND SIGNIFICANCE OF MANAGEMENT

1. 'Management has its own vocabulary of terms and concepts.' Identify the Nature of Management.
   (a) Art (b) Science (c) Profession (d) Discipline
2. The authority-responsibility relationship binds individuals as superiors and subordinates and gives rise to different levels in an organisation is called-
   (a) Delegation (b) Decentralisation
   (c) Levels of Management (d) Accountability
3. Which level of management is responsible for implementing and controlling plans and strategies?
   (a) Top level (b) Middle level
   (c) Supervisory level (d) Operational level
4. Supervisory Management comprises of-
   (a) Foremen (b) Production Manager
   (c) President (d) CEO
5. Who are called as First Line Managers?
   (a) Top Level Managers (b) Middle Level Managers
   (c) Supervisory Managers (d) Operations Managers
6. Strong Ltd. is a well-known cement company in India. It is able to earn sufficient revenues to cover costs. Its capital base, number of employees and production turnover has increased manifolds over the years. The rate of profitability of the business is also good. The employees of the company are happy and satisfied with their remuneration, promotion policy, working conditions etc. As a part of its moral obligation, the company has taken many initiatives for providing employment to physically challenged persons and promoting literacy in the villages adopted by it.
   Identify and explain the different kinds of objectives of arrangement being fulfilled by Strong Ltd. by quoting lines from the above paragraph.
7. Neha is one of the most successful managers of her company, 'Devi Ltd.' She uses her creativity and initiative in handling challenging situations at work. The knowledge gained by her during her student days at a renowned management institute, as well as through her observation and experience over the years is applied by Neha in a skilful manner in the context of the realities of a given situation. She often reads books and other literature in various fields of management to keep her knowledge updated.
   (a) An aspect of the nature of management is highlighted in the above description identify the aspect.
   (b) Explain any three features of the aspect identified in part (a).
8. In Reca Ltd., the purchase department purchased 200 tonnes of raw material for production of pencils ignoring the requisition of 150 tonnes placed by production department. As a

result, there was overproduction of pencils. The extra pencils were not accepted by sales department, consequently extra pencils remained unsold.

(a) Identify the aspect of management which is lacking in the above case.

(b) Explain any two situations when the need for this aspect of management arises.

CHAPTER-2: PRINCIPLES OF MANAGEMENT

1. This principle of management emphasises that workers' training was essential to learn 'best method'. Also, each person should be scientifically selected.
   (a) Functional Foremanship
   (b) Science, Not Rule of Thumb
   (c) Harmony, Not Discord
   (d) Development of Workers to their Greatest Efficiency and Prosperity
2. Through this principle of scientific management, Taylor explained that there is always a possibility of class conflict between managers and workers. So, Taylor called for mental revolution to transform thinking of both management and workers.
   (a) Science, Not Rule of Thumb (b) Harmony, Not Discord
   (a) Functional Foremanship (d) Cooperation, Not Individualism
3. Which principle of scientific management explains that there should be an almost equal division of work and responsibility between workers and management.
   (a) Authority and Responsibility (b) Harmony, Not Discard
   (c) Cooperation, Not Individualism (d) Science, Not Rule of Thumb
4. If this scientific principle of management is followed, then this can result in tremendous saving of human energy as well as wastage of time and materials.
   (a) Science, Not rule of thumb
   (b) Harmony, Not discord
   (c) Cooperation, Not Individualism
   (d) Development of Workers to their Greatest Efficiency and Prosperity
5. The principle resembles military organisation-
   (a) Authority and Responsibility (b) Discipline
   (c) Unity of Command (d) Unity of direction
6. Rakesh is one of the most successful managers of his company, Perfect Ltd. He knows that the principles of management are intended to be applied to all types of organisations, business as well as non-business, small as well as large, public sector as well as private sector.
   (a) One of the points related to the nature of management principles is highlighted in the above description. Identify the point.
   (b) Explain any three other points of the nature of principles of management other than the one identified above.
7. 'Fair deal Ltd.' is a well-known company manufacturing washing machine. The company has the policy of paying proper attention to the training of the managers. The organisation teaches various management principles to the managers whenever required so that they apply them and understand the practical aspects of business through them. Year after year

the organisation is able to increase its revenue. This is because the mangers are able to economically use the funds of the company and increase the output of the workers through various principles of management. The company has decided to donate 10% of their earnings to nearby orphanages.

Identify and explain the three points of importance of principles of management highlighted above by quoting the lines.

8. Rohit is running a departmental store in Gujarat to provide various types of products of daily needs under one roof to the buyers. The employees turnover in his business is extremely high and he is perpetually on a look out for new staff. The fact of the matter is that he lacks managerial skills and assigns work to his employees on ad-hoc basis without letting them settle down in specific work.

   This approach of his creates a sense of insecurity among the employees and they tend to leave the job very quickly. However, he is a very god- fearing person and offers fair wages to his employees so that they can afford a reasonable standard of living.

   (a) Identify and state the principle of Fayol which Rohit is unable to apply and is perpetually on a lookout for new staff.

   (b) "He is a very god-fearing person and offers fair wages to his employees so that they can afford a reasonable standard of living." Name and explain the relevant principle of management which has been brought into effect by Rohit.

CHAPTER – 3: BUSINESS ENVIRONMENT

1. "Just take the universe, subtract from it the subset that represents the organisation, and the remainder is _____."

   (a) Environment (b) External force (c) Internal force (d) General force

2. "Increased life expectancy of people and increased awareness for health care have increased the demand for many health products and services like diet coke, fat free cooking oil etc." Which feature of business environment is highlighted.

   (a) Dynamic (b) Inter-relatedness (c) Complex (d) Relativity

3. 'Business environment keeps on changing whether in terms of technological improvements, shifts in consumer preferences or entry of new competition in the market.' Identify the feature of business environment highlighted.

   (a) Uncertainty (b) Complex (c) Dynamic (d) Relativity

4. 'It is very difficult to predict future happenings with accuracy, especially when environment changes take place too frequently.' It means that business environment is _____.

   (a) Dynamic (b) Uncertain (c) Complex (d) Inter-related

5. Business environment is a _____ phenomenon that is relatively easier to understand in parts but difficult to understand in its totality.

   (a) Totality of external forces (b) Uncertain

   (c) Complex (d) Relative

6. Since business environment consists of numerous interrelated and dynamic forces which arise from different sources, it becomes difficult to comprehend at once what exactly constitutes a given environment. This means business environment is _____.

(a) Complex (b) Dynamic (c) Interrelated (d) Relativity

7. Political conditions in the US may differ from those in India or China. This indicates that business environment is _____.
   (a) Inter-related (b) Complex (c) Dynamic (d) Relative
8. To engage in any type of activity, a business enterprise assembles various inputs like finance, labour, raw material etc. from its environment including government, suppliers and financiers. It means analysis of business environment helps in _____.
   (a) First Mover Advantage (b) Tapping Useful resources
   (c) Planning and policy formulation (d) Coping with rapid changes
9. 'In order to face turbulent market conditions, less brand loyalty, fragmentation, more demanding customers etc. managers must understand and examine the environment and develop suitable courses of action.' Identify the importance of analysing business environment.
   (a) Improving performance (b) Assisting in planning and policy formulation
   (c) Tapping useful resources (d) Coping with rapid changes
10. RBI is a key regulator as it regulates the working of banks.' It is an example of _____ dimension.
   (a) Legal Environment (b) Economic Environment
   (c) Social Environment (d) Political Environment
11. In case of construction companies and automobile manufacturers, low longer-term rates are beneficial as they result in increased spending by consumers for buying homes and cars on borrowed money.
   Identify the business dimension which helped to increase spending power of consumers.
   (a) Social Environment (b) Legal Environment
   (c) Economic Environment (d) Political Environment
12. _____ trends present various opportunities and threats to business environment.
   (a) Economic Environment (b) Legal Environment
   (c) Political Environment (d) Social Environment
13. Health and fitness trend has created a demand for products like organic food but also harmed business in other industries like tobacco and liquor. It is an example of _____dimension.
   (a) Political Environment (b) Technological Environment
   (c) Economic Environment (d) Social Environment
14. Foreign companies were discouraged to invest in India because of bureaucratic and red tape approach. It was not easy, to get permits for doing business in the country. Which dimension was responsible to decrease foreign investment?
   (a) Political Environment (b) Economic Environment
   (c) Social Environment (d) None of these
15. The laws of mining rules and regulations licence required for running the business is an example of.
   (a) Economic Environment (b) Political Environment
   (c) Social Environment (d) Legal Environment

16. Identify the type or dimension of environment in the following cases:

(i) It includes factors like money supply, price level, monetary policy, etc.

(ii) Increased awareness towards health has increased the demand for organic food.

(iii) A stable government builds up confidence among the firms to invest in big projects.

(iv) With changes in demand of consumers, business firms have to change their production schedule.

(v) Nature of relationship of our country with foreign countries influences the business.

(vi) Statuary warnings are essential to be printed on tobacco and cigarette labels.

(vii) Innovations in products and processes affect the production and marketing plans of the business.

(viii) Life expectancy, birth and death rates influence the volume of demand.

(ix) Rates of savings and investments influence the demand for the product.

(x) Consumption habits of people affect the pattern of demand in the economy

(xi) Laws have been enacted to keep a check on advertisements.

(xii) Banks reducing interest rates on housing loans.

(xiii) An increasing number of working women.

(xiv) Booking of air tickets through internet.

(xv) Alcohol beverages are prohibited to be advertised on Television.

CHAPTER-4: PLANNING

1. It requires application of mind involving foresight, intelligence, imagination and sound judgment. Which feature of planning is indicated here?
   (a) It is futuristic (b) It involves decision making
   (c) It is mental exercise (d) It is continuous
2. An employee will retire at the age of 60 years. Which type of plan is it?
   (a) Rule (b) Method (c) Policy (d) Objective
3. Identify the type of plan which has least flexibility
   (a) Strategy (b) Rules (c) Policy (d) Objective
4. "Swachha Bharat Abhiyan" started by government of India is an example of which type of plan?
   (a) Strategy (b) Rules (c) Procedure (d) Programme
5. Rahim wanted to start with a stationery app to help students of schools and colleges to provide stationery to them. He felt that students were not able to get the needed stationery at ease and hence wanted to provide the stationery directly to students in the school. He listed out the various ways of setting up this business and finally selected the best way to set up the business by developing an app. Suggest which step should he take next?
   (a) Developing premises (b) Identifying the alternative course of action
   (c) Implementation of plan (d) Follow up action
6. A plan stating all expenses, revenue and income for a specified period is called
   (a) Cost Sheet (b) Relational structure
   (c) Budget (d) Profit & Loss Account

7. All other managerial functions are performed within the framework of the plans drawn. Identify the related feature of planning
   (a) Planning focuses on achieving objectives
   (b) Planning is pervasive
   (c) Planning is futuristic
   (d) Planning is primary function of management
8. Planning requires logical and systematic thinking rather than guess work or wishful thinking. Identify the related feature of planning
   (a) Planning is futuristic
   (b) Planning is a mental exercise
   (c) Planning establishes standards for controlling
   (d) Planning focuses on achieving objectives
9. Planning cannot foresee everything, and thus, there may be obstacles to effective planning. Identify the related limitation of planning.
   (a) Planning leads to rigidity.
   (b) Planning may not work in a dynamic environment.
   (c) Planning does not guarantee success.
   (d) Planning reduces creativity.
10. It is not always true that just because a plan has worked before, it will work again. Identify the related limitation of planning.
   (a) Planning leads to rigidity.
   (b) Planning reduces creativity.
   (c) Planning may not work in a dynamic environment.
   (d) Planning does not guarantee success.
11. Identify the type of plan in the following cases:
   (i) They are strict and there is no scope for discretion.
   (ii) It is formulated after considering business environment.
   (iii) They are standardised ways of doing repetitive and routine jobs.
   (iv) Library will issue the books for 7 days.
   (v) It shows the expected result in numerical terms.
   (vi) These are the steps to be carried out within a broad policy framework.
   (vii) They are enforced to maintain discipline and to avoid chaos.
   (viii) It serves as a control device to measure actual performance.
   (ix) They must be expressed in specific terms and should have a time limit.
   (x) Girls will be given a rebate of 5% in cut off for admission in the college.
   (xi) It involves preparing oneself for meeting unforeseen factors.
   (xii) It refers to sequence of steps needed to perform an activity.
   (xiii) They are rigid and their violation leads to disciplinary action.
   (xiv) It is a combination of objectives, policies, procedures, rules, etc.
   (xv) FIFO or LIFO can be used for valuation of stock.

ACCOUNTANCY (055)

CHAPTER 1: PARTNERSHIP FUNDAMENTALS

1. Sirya and Riya are partners sharing profits and losses in the ratio 4:1. Mariya was manager who received the salary of ₹4,000 p.m. in addition to a commission of 5% on net profits after charging such commission. Profit for the year is ₹6,78,000 before charging salary. Find the total remuneration of Mariya.
   (A) ₹78,000 (B) ₹88,000 (C) ₹87,000 (D) ₹76,000
2. In a partnership firm, partner A is entitled a monthly salary of ₹7,500. At the end of the year, firm earned a profit of ₹75,000 after charging T's salary. If the manager is entitled a commission of 10% on the net profit after charging his commission, Manager's commission will be:
   (A) ₹7,5000 (B) ₹16,500 (C) ₹8,250 (D) ₹15,000
3. A, B and C are partners sharing profits and losses equally. Their capital balances on March, 31, 2012 are ₹80,000, ₹60,000 and ₹₹40,000 respectively. Their personal assets are worth as follows: A— ₹20,000, B— ₹15,000 and C — ₹10,000. The extent of their liability in the firm would be:
   (A) A — ₹80,000: B — ₹60,000: and C —₹40,000
   (B) A — ₹20,000: B — ₹15,000: and C — ₹10,000
   (C) A — ₹1,00,000: B — ₹75,000: and C — ₹50,000
   (D) Equal
4. X and Y are partners in a partnership firm without any agreement. A has withdrawn ₹50,000 out of his Capital as drawings. Interest on drawings may be charged from A by the firm:
   (A) @ 5% Per Annum (B) @ 6% Per Annum
   (C) @ 6% Per Month (D) No interest can be charged
5. A and B are partners in a partnership firm without any agreement. A devotes more time for the firm as compare to B. A will get the following commission in addition to profit in the firm's profit:
   (A) 6% of profit (B) 4% of profit (C) 5% of profit (D) None of the above
6. Following are essential elements of a partnership firm except:
   (A) At least two persons (B) There is an agreement between all partners
   (C) Equal share of profits and losses (D) Partnership agreement is for some business.
7. Features of a partnership firm are
   (A) Two or more persons are carrying common business under an agreement.
   (B) They are sharing profits and losses in the fixed ratio.
   (C) Business is carried by all or any of them acting tor all as an agent.
   (D) All of the above
8. Which of the following statement is true?
   (A) a minor cannot be admitted as a partner
   (B) a minor can be admitted as a partner, only into the benefits of the partnership
   (C) a minor can be admitted as a partner but his rights and liabilities are same of adult partner
   (D) none of the above
9. In case of partnership the act of any partner is:
   (A) Binding on all partners
   (B) Binding on that partner only
   (C) Binding on all partners except that particular partner

(D) None of the above.

10. Ostensible partners are those who
    (A) do not contribute any capital but get some share of profit for lending their name to the business
    (B) contribute very less capital but get equal profit
    (C) do not contribute any capital and without having any interest in the business, lend their name to the business
    (D) contribute maximum capital of the business.
11. Sleeping partners are those who
    (A) take active part in the conduct of the business but provide no capital. However, salary is paid to them.
    (B) do not take any part in the conduct of the business but provide capital and share profits and losses in the agreed ratio
    (C) take active part in the conduct of the business but provide no capital. However, share profits and losses in the agreed ratio.
    (D) do not take any part in the conduct of the business and contribute no capital. However, share profits and losses in the agreed ratio.
12. The relation of partner with the firm is that of:
    (A) An Owner (B) An Agent (C) An Owner and an Agent (D) Manager
13. What should be the minimum number of persons to form a Partnership:
    (A) 2 (B) 7 (C) 10 (D) 20
14. Liability of partner is:
    (A) Limited (B) Unlimited
    (C) Determined by Court (D) Determined by Partnership Ac
15. Which one of the following is NOT an essential feature of a partnership?
    (A) There must be an agreement
    (B) There must be a business
    (C) The business must be carried on for profits
    (D) The business must be carried on by all the partners
16. Every partner is bound to attend diligently to his in the conduct of the business.
    (A) Rights (B) Meetings (C) Capital (D) Duties
17. Forming a Partnership Deed is:
    (A) Mandatory (B) Mandatory in Writing (C) Not Mandatory (D) none of the above
18. Partnership Deed is also called.
    (A) Prospectus (B) Articles of Association
    (C) Principles of Partnership (D) Articles of Partnership
19. Which of the following is not incorporated in the Partnership Act?
    (A) profit and loss are to be shared equally
    (B) no interest is to be charged on capital
    (C) all loans are to be charged interest @6% p.a.
    (D) all drawings are to be charged interest
20. When is the Partnership Act enforced?
    (A) when there is no partnership deed
    (B) where there is a partnership deed but there are differences of opinion between the partners
    (C) when capital contribution by the partners varies
    (D) when the partner's salary and interest on capital are not incorporated in the partnership deed

21. In the absence of Partnership Deed, the interest is allowed on partner's capital:
    (A) @ 6% p.a. (B) @ 5% p.a. (C) @ 12% p.a. (D) No interest is allowed
22. In the absence of a partnership deed, the allowable rate of interest on partner's loan account will be:
    (A) 6% Simple Interest (B) 6% p.a. Simple Interest
    (C) 12% Simple Interest (D) 12% Compounded Annually
23. A and B are partners in partnership firm without any agreement. A has given a loan of ₹50,000 to the firm. At the end of year loss was incurred in the business. Following interest may be paid to A by the firm:
    (A) @5% Per Annum (B) @ 6% Per Annum
    (C) @ 6% Per Month (D) As there is a loss in the business, interest can't be paid
24. A partner introduced additional capital of ₹30,000 and advanced a loan of ₹40,000 to the firm at the beginning of the year. Partner will receive year's interest:
    (A) ₹4,200 (B) ₹2,400 (C) Nil (D) ₹1,800
25. Which of the following items are recorded in the Profit & Loss Appropriation Account of a partnership firm?
    (A) Interest on Capital (B) Salary to Partner
    (C) Transfer to Reserve (D) All of the above
26. Is rent paid to a partner appropriation of profits?
    (A) It is appropriation of profit
    (B) It is not appropriation of profit
    (C) If partner's contribution as capital is maximum
    (D) If partner is a working partner.
27. In the absence of partnership deed, the following rule will apply:
    (A) No interest on capital (B) Profit sharing in capital ratio
    (C) Profit based salary to working partner (D) 9% p.a. interest on drawings

CHAPTER 2 : NATURE & VALUATION OF GOODWILL

1. What is the nature of goodwill?
2. Which goodwill is recorded in the books and why?
3. Why is valuation of goodwill necessary?
4. Which accounting standard deals with accounting treatment of goodwill?
5. What is the formula to calculate goodwill under weighted average profit method?
6. What is super profit?
7. Name any two items to be added and deducted to calculate adjusted profit?
8. Write the formula of capital employed under both asset and liability side approaches.
9. For valuation of goodwill, Average profit is calculated by _____abnormal gains and _____ abnormal losses.
10. Profits of last 5 years were: ₹20000, ₹30000, ₹25,000, ₹(15,000), ₹40,000; Capital Employed: ₹1,50,000; NRR: 10%. Find super profit.
11. A business earned average profits of ₹1,00,000 during the last few years. The normal rate of return in similar type of business is 10%. The assets of the business were ₹10,00,000 and external liabilities were ₹1, 80,000. Calculate the value of goodwill of the firm by super profit method, if the goodwill is valued at 2.5years' purchase of super profits.
12. A business has earned average profits of Rs.1, 00,000 during the last few years and the normal rate of return in similar business is 10%. Find out the value of goodwill by capitalization of super profit method.
13. Average profit of a business over the last five years was ₹60,000. The normal yield on capital invested in such a business is estimated at 10% pa. Capital invested in the business is ₹5,

00,000. Amount of goodwill, it is based on 3 year's purchase of last 5 years' super profit will be_____.

14. M/s Super tech India has Assets of ₹5,00,000, whereas Liabilities are: Partners capitals – ₹3,50,000, General Reserve – ₹60,000 and Sundry creditors – ₹90,000. If the Normal Rate of Return is 10% and the Goodwill of the firm is valued at ₹90,000 at 2 year's purchase of super profit, calculate average profit.
15. Tangible assets of the firm are ₹14, 00,000 and outside liabilities are ₹4, 00,000. The profit of the firm is ₹1,50,000 and the normal rate of return is 10%. The amount of capital employed will be_____.
16. Capital invested in a firm is ₹5,00,000. Normal rate of return is 10%. Average profits of the firm are ₹64,000 (after an abnormal loss of ₹4,000). Value of goodwill at four times the super profits wills be____.

CHAPTER 3: CHANGE IN PROFIT SHARING RATIO

1. AK, BK and CK are sharing profits in the ratio of 2:1:1. They have decided to share future profits in the ratio of 3:2:1. Find out who is gaining and how much.
2. A and B are partners who share profit equally. They decided to share future profit in the ratio of 3:1. If the goodwill is valued at ₹60,000, A's capital account will be debited by_____.
3. During the revaluation of assets and reassessment liabilities, an unrecorded asset is discovered. Due to this item, Partners' Capital account will be **debited /credited**?
4. Riya and Priya shared profits and losses in the ratio of 3:2. With effect from 1st April, 2026, they agreed to share profits equally. The goodwill of the firm was valued at ₹60,000. What adjustment entry will be passed?
5. Sagar, Ravi and Vayu are partners sharing profits and losses in the ratio of 4:3:3. As per new agreement, Vayu acquires $1/10^{th}$ share, equally from Sagar and Ravi due to change in profit sharing ratio, Ravi's new share will be_____?
6. Eena, Meena and Deeka are partners sharing profits and losses in the ratio of 4:3:2. With effect from 1^{st} April 2026, they decided to share profits and losses in the ratio of 3:2:1. Their balance-sheet showed Workmen Compensation Reserve of ₹84,000. The claim on account of Workmen Compensation is estimated at ₹75,000. Pass necessary journal entry.
7. Sita and Gita are partners sharing profits and losses in the ratio of 3:1. On 1^{st} April, 2026 they decided to change their ratio to 3:2. On that date plant and machinery was valued at ₹99,000. At the time of change in profit sharing ratio, it was found to be overvalued by 10%. At what value the plant and machinery will be shown in new balance-sheet?
8. Revaluation account is also known as ------.
9. Herry, Sherry and Jerry are partners sharing profits and losses in the ratio of 4:3:2. With effects from 1^{st} April 2026, they decided to share profits and losses in the ratio of 3:2:1. Goodwill appeared in their balance-sheet was ₹81,000. Pass necessary journal entry.
10. Varsha, Megha and Bijli are partners sharing profits and losses in the ratio of 3:3:2. With effect from 1^{st} April 2026, they decided to share profits and losses in the ratio of 2:3:3. Their balance-sheet showed Investment Fluctuation Reserve of ₹83,000. The book value of investment was ₹75,000 while Market Value was Rs 64,000. Pass necessary journal entry.
11. Due to change in profit sharing ratio Sita's gain is $1/5^{th}$ while Ram's sacrifice is $1/5^{th}$. They decided to adjust the following: General Reserve ₹20,000; Profit and Loss A/c (Dr balance) ₹30,000 without affecting their book values. Pass an adjustment entry for it.
12. A, B and C are partners in a firm sharing profits in the ratio of 3:3:2. From 1st April 2026, they decided to share profits equally. On that date following balances appeared in their books:

Liabilities	Amount	Assets	Amount
IFR	10,000	Investments at Cost	2,00,000

It was agreed that Investment be valued at ₹1,70,000. What will be the accounting treatment in Revaluation Account?

13. Ganga and Avanthi are partners in the ratio of 3:2. Gokul is admitted as a partner and he takes ¼th of his share from Ganga. Avanthi gives 3/16 from her share to Gokul. What is the share of Gokul?
14. Match the following:

Revaluation A/c	Personal A/c
Partners' Capital A/c	Real A/c
Goodwill	Revaluation a/c
Profit & Loss Adjustment A/C	Nominal A/c

15. Kiya, Tiya and Jiya are partners sharing profits and losses in the ratio of 4:3:2. With effects from 1st April 2026, they decided to share profits and losses in the ratio of 3:2:1. Their balance sheet showed Advertisement Suspense Account of ₹54,000. Pass necessary journal entry.
16. X, Y &Z are partners sharing profits and losses in ratio of 5:3:2. P was admitted for 1/5th share in future profits of the firm. Find new profit sharing ratio.
17. If revised figures of assets and liabilities are not being shown in revised balance-sheet, then what necessary step is to be taken to adjust the effect of such change?

ECONOMICS (030)

Topics: Government Budget, Money & Banking, National Income

SECTION A (1 MARK)
(Very Short Answer Questions)

Government Budget (1–15)

1. Define government budget.
2. What is a fiscal deficit?
3. Define revenue receipts.
4. What are capital receipts?
5. Give one example of direct tax.
6. Give one example of indirect tax.
7. What is a balanced budget?
8. What is a surplus budget?
9. What is a deficit budget?
10. Define revenue deficit.
11. What is primary deficit?
12. What is disinvestment?
13. Define public expenditure.
14. What is plan expenditure?
15. What is non-plan expenditure?

Money & Banking (16–30)

16. Define money.
17. What is legal tender?
18. What is demand deposit?
19. What is time deposit?
20. Define central bank.
21. Name the central bank of India.
22. What is repo rate?
23. What is reverse repo rate?
24. Define CRR (Cash Reserve Ratio).
25. Define SLR (Statutory Liquidity Ratio).
26. What is bank rate?
27. Define credit creation.
28. What is inflation?
29. What is deflation?
30. What is liquidity?

National Income (31–40)

31. Define national income.
32. What is GDP?
33. What is GNP?
34. Define NNP.

35. What is depreciation?
36. Define value added.
37. What is intermediate good?
38. What is final good?
39. Define per capita income.
40. What is real GDP?

SECTION B (3 MARKS)
(Short Answer Questions)

Government Budget (1–10)

1. Explain objectives of government budget.
2. Differentiate between revenue and capital receipts.
3. Explain revenue deficit with formula.
4. Distinguish between fiscal deficit and primary deficit.
5. Explain direct and indirect taxes.
6. What are components of government expenditure?
7. Explain public debt.
8. What is deficit financing?
9. Explain the role of budget in economic stability.
10. Distinguish between developmental and non-developmental expenditure.

Money & Banking (11–20)

11. Explain functions of money.
12. Explain primary functions of central bank.
13. Explain credit creation process.
14. Distinguish between commercial bank and central bank.
15. Explain quantitative tools of monetary policy.
16. Explain qualitative tools of monetary policy.
17. What is money supply?
18. Explain high-powered money.
19. Distinguish between repo rate and bank rate.
20. Explain inflation and its causes.

National Income (21–30)

21. Explain circular flow of income.
22. Distinguish between GDP and GNP.
23. Explain value added method.
24. Explain income method.
25. Explain expenditure method.
26. What are precautions in value added method?
27. Define nominal vs real GDP.
28. What is double counting?
29. Explain factors affecting national income.
30. What are limitations of national income as welfare measure?

SECTION C (6 MARKS)
(Long Answer + Numerical Questions)

Government Budget (1–10)

1. Explain components of government budget in detail.
2. Explain types of deficits with formulas and diagrams.
3. Discuss objectives of fiscal policy.
4. Explain impact of fiscal deficit on economy.

5. Distinguish between revenue and capital expenditure.
6. Explain role of government budget in income redistribution.
7. Explain public debt and its types.
8. Discuss taxation policy in India.
9. Explain budgetary policy during inflation.
10. Explain budget as an instrument of economic growth.

Money & Banking (11–20)

11. Explain functions of central bank in detail.
12. Explain process of credit creation with example.
13. Discuss tools of monetary policy in detail.
14. Explain role of RBI in economic development.
15. Distinguish between narrow money and broad money.
16. Explain inflation and its control measures.
17. Explain banking system in India.
18. Explain role of commercial banks.
19. Explain liquidity trap.
20. Explain monetary policy during recession.

National Income (21–30) (Includes Numericals)

21. Theory
22. Explain methods of calculating national income.
23. Compare value added, income and expenditure methods.
24. Explain difficulties in measuring national income.
25. Explain concept of economic welfare.
26. Explain circular flow in two-sector and three-sector models.

NUMERICAL QUESTIONS:

1. Calculate GDP:
Consumption = 500; Investment = 200; Government Expenditure = 300; Net Exports = (-50)
Calculate NNP:
GNP = 1000; Depreciation = 100
2. Calculate National Income:
NNP at market price = 900; Indirect taxes = 100; Subsidies = 50
3. Calculate Value Added:
Output = 500; Intermediate Consumption = 200
4. Calculate Personal Income:
National Income = 1000; Corporate tax = 100; Undistributed profits = 50;
Transfer payments = 80
5. GDP Calculation (Expenditure Method)
Consumption = 800; Investment = 300; Government Expenditure = 400; Net Exports = –100
Calculate GDP.
6. GNP from GDP
GDP = 1200; Net Factor Income from Abroad (NFIA) = 50
Calculate GNP.
7. NNP at Market Price
GNP = 1500; Depreciation = 200; Find NNP (MP).
8. National Income (NNP at FC)
NNP at MP = 1300; Indirect Taxes = 200; Subsidies = 50

Calculate National Income.

9. Personal Income

National Income = 2000; Corporate Tax = 200; Undistributed Profits = 100;
Transfer Payments = 150

Calculate Personal Income.

10. Disposable Income

Personal Income = 1800; Personal Taxes = 300; Find Disposable Income.

11. Value Added Method

Output = 1000; Intermediate Consumption = 400

Calculate Value Added.

12. Net Value Added at Factor Cost

Gross Value Added = 900; Depreciation = 100; Indirect Taxes = 80; Subsidies = 20

Find Net Value Added at FC.

13. Income Method

Compensation of Employees = 600; Rent = 200; Interest = 150; Profit = 250

Calculate National Income.

14. Expenditure Method with Adjustment

C = 700; I = 300; G = 200; Exports = 150; Imports = 100

Find GDP.

B. Advanced National Income Numericals

15. Mixed Calculation

GDP = 2000; NFIA = –100; Depreciation = 200; Indirect Taxes = 150; Subsidies = 50

Find National Income.

16. Per Capita Income

National Income = 5000; Population = 100

Calculate Per Capita Income.

17. Real GDP

Nominal GDP = 2000; Price Index = 125

Find Real GDP.

18. Double Counting Adjustment

Total Output = 2000; Intermediate Consumption = 800

Find GDP.

19. Personal Disposable Income

Personal Income = 2500; Personal Taxes = 400

Find Disposable Income.

C. Money & Banking Numericals

20. Credit Creation

Initial Deposit = 1000; CRR = 10%

☞ Calculate total credit creation.

21. Money Multiplier

CRR = 20%

☞ Find Money Multiplier.

22. Total Money Supply

High Powered Money = 500; Money Multiplier = 4

☞ Find Money Supply.

23. Deposit Expansion
Initial Deposit = 2000; CRR = 10%
☞ Calculate total deposits created.
24. Currency Deposit Ratio
Currency = 400; Demand Deposits = 600
☞ Find ratio.

D. Government Budget Numericals

25. Fiscal Deficit
Total Expenditure = 2000; Total Receipts (excluding borrowings) = 1500
☞ Calculate Fiscal Deficit.
26. Revenue Deficit
Revenue Expenditure = 1200; Revenue Receipts = 900
☞ Find Revenue Deficit.
27. Primary Deficit
Fiscal Deficit = 600; Interest Payments = 200
☞ Calculate Primary Deficit.
28. Budget Deficit
Total Expenditure = 1800; Total Receipts = 1500
☞ Find Budget Deficit.
29. Tax Revenue Ratio
Tax Revenue = 800; GDP = 4000
☞ Calculate Tax-GDP ratio.

APPLIED MATHEMATICS

PART-I

PROJECT WORK AS PER CBSE NORMS (2026-2027): -

TITLE OF THE PROJECT:

Students you can select any one of the following topics and give the title accordingly.

TOPICS: -

1. Fibonacci sequence. Its history and presence in nature.
2. Use of Venn diagrams in solving practical problems.
3. Prime numbers and divisibility rules.
4. Prepare a questionnaire to collect information about money spent by your friends in a month on activities like travelling, movies, recharging of the mobiles, etc. and draw interesting conclusions
5. Each day newspaper tells us about the maximum temperature, minimum temperature, and humidity. Collect the data for a period of 30 days and represent it graphically. Compare it with the data available for the same time period for the previous year.
6. Weather prediction (prediction of monsoon from past data).
7. Stock price movement and Predicting stock market crash.
8. Predicting mortality of infants.

9. Predicting the outcome of an election – exit polls.
10. Analysis of career graph of a cricketer (batting average for a batsman and bowling average for a bowler). Conclude the best year of his career. It may be extended for other players also – tennis, badminton, athlete.

Points To Be Covered: -

- Acknowledgement
- Index
- Objective
- Introduction
- Importance/Relevance of the topic chosen
- Numerial analysis (Mathematical concepts)
- Must use Statistical tools like bar graph/Pie chart/Histogram/Time series graph etc. to represent the above. Paste or Draw pictures related to the topic.
- Precautionary measures (If required).
- Limitations of measures taken.
- Decorate the file with traditional design/art of any state of your choice.
- Conclusion / Suggestions-

Note- Must write source code, Word limit- 3000 to 4000
Make a stick file to do the project work.

PART-II- PROBLEM SOLVING
LESSON BASED ASSIGNMENT(LBA) - 1
CHAPTER NAME- Matrices & Determinants

	Section A	
1	If A = $\begin{bmatrix} 0 & -i \\ i & 0 \end{bmatrix}$ ($i^2 = -1$) and B = $\begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$, then AB is equal to a) $\begin{bmatrix} 0 & 0 \\ i & 0 \end{bmatrix}$ b) $\begin{bmatrix} 0 & i \\ i & 0 \end{bmatrix}$ c) $\begin{bmatrix} i & -i \\ 0 & 1 \end{bmatrix}$ d) $\begin{bmatrix} i & 0 \\ 0 & -i \end{bmatrix}$	
2	If $\begin{bmatrix} x+y & x+2 \\ 2x-y & 16 \end{bmatrix} = \begin{bmatrix} 8 & 5 \\ 1 & 3y+1 \end{bmatrix}$, then the value of x and y are: a) x = 3, y = 5 b) x = 7, y = 2 c) x = 5, y = 3 d) x = 2, y = 7	
3	If matrix A = [a_{ij}] $ {2$, where $a_{ij} = \begin{cases} 1, if i \neq j \\ 0, if i = j \end{cases}$, then A^3 is equal to: a) I b) A c) J d) O	
4	If A is a square matrix such that $A^2 = I$, then $(A - I)^3 + (A + I)^3 - 7A$ is equal to: a) I + A b) 3A c) I - A d) A	
5	If A = $\begin{bmatrix} 2 & 0 & -3 \\ 4 & 3 & 1 \\ -5 & 7 & 2 \end{bmatrix}$ is expressed as the sum of a symmetric and skew - symmetric matrix, then the symmetric matrix is a) $\begin{bmatrix} 2 & 2 & -4 \\ 2 & 3 & 4 \\ -4 & 4 & 2 \end{bmatrix}$ b) $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ c) $\begin{bmatrix} 2 & 4 & -5 \\ 0 & 3 & 7 \\ -3 & 1 & 2 \end{bmatrix}$ d) $\begin{bmatrix} 4 & 4 & -8 \\ 4 & 6 & 8 \\ -8 & 8 & 4 \end{bmatrix}$	

6	Which of the given values of x and y make the pair of matrices equal? $\begin{bmatrix} 3x+7 & 5 \\ y+1 & 2-3x \end{bmatrix}, \begin{bmatrix} 0 & y-2 \\ 8 & 4 \end{bmatrix}$ a) x = $\frac{-1}{3}$, y = 7 b) y = 7, x = $\frac{-2}{3}$ c) Not possible to find d) $x = \frac{-1}{3}, y = \frac{-2}{3}$	
7	If the order of matrix A is m× p and the order of B is p × n. Then the order of matrix AB is? a) m× p b) m× n c) n× m d) n× p	
8	If $\begin{bmatrix} 1 & 3 & 9 \\ 1 & x & x^2 \\ 4 & 6 & 9 \end{bmatrix}$ is singular matrix, then x = a) 3 or 6 b) 3 or $\frac{3}{2}$ c) 3 d) - 3, $\frac{3}{2}$	
9	If a matrix A is such that $3A^3 + 2A^2 + 5A + I = 0$, then A^{-1} is equal to a) - $(3A^2 + 2A + 5)$ b) $3A^2 + 2A + 5$ c) $3A^2 - 2A - 5$ d) none of these	
10	If A = $\begin{bmatrix} \alpha & \beta \\ \gamma & -\alpha \end{bmatrix}$ is such that $A^2 = I$, then: a) 1 - $\alpha^2 + \beta\gamma = 0$ b) 1 - $\alpha^2 - \beta\gamma = 0$ c) 1 + $\alpha^2 - \beta\gamma = 0$ d) 1 + $\alpha^2 + \beta\gamma = 0$	
11	If A = $\begin{bmatrix} 1 & 2 & -1 \\ -1 & 1 & 2 \\ 2 & -1 & 1 \end{bmatrix}$, then det (adj (adj A)) is a) 14^2 b) 14 c) 14^3 d) 14^4	
12	For what value of k inverse does not exist for the matrix $\begin{bmatrix} 1 & 2 \\ k & 6 \end{bmatrix}$? a) 2 b) 0 c) 3 d) 6	
13	If A is a non - singular matrix, then a) $\lvert AA' \rvert \neq \lvert A^2 \rvert$ b) $\lvert A \rvert + \lvert A' \rvert \neq 0$ c) $\lvert A^{-1} \rvert \neq \lvert A \rvert^{-1}$ d) $\lvert A \rvert \neq \lvert A' \rvert$	
14	If the points (1, 3) (x, 5) and (2, 7) are collinear, then the value of x is a) $\frac{3}{4}$ b) $\frac{3}{2}$ c) 2 d) 1	
15	If A = $\begin{bmatrix} 2 & \lambda & -3 \\ 0 & 2 & 5 \\ 1 & 1 & 3 \end{bmatrix}$, then A^{-1} exists if a) $\lambda = 2$ b) $\lambda \neq 2$ c) $\lambda \neq -2$ d) none of these	
16	If A is an invertible matrix, then which of the following is not true? a) $\lvert A \rvert \neq 0$ b) $\lvert A^{-1} \rvert = \lvert A \rvert^{-1}$ c) $(A^2)^{-1} = (A^{-1})^2$ d) $(A')^{-1} = (A^{-1})'$	
17	If A and B are square matrices of the same order, then (A + B) (A - B) is equal to: a) $A^2 - B^2$ b) $A^2 - BA + B^2 + AB$ c) $A^2 - BA - AB - B^2$ d) $A^2 - B^2 + BA - AB$	
18	If A and B are two matrices such that AB = A and BA = B, then B^2 is equal to: a) A b) B c) O d) I	

19	For any 2× 2 matrix, if A (Adj A) = $\begin{bmatrix}10 & 0\\ 0 & 10\end{bmatrix}$, then |A| is equal to a) 0 b) 100 c) 10 d) 20	
20	The matrix A = $\begin{bmatrix}0 & 0 & 1\\ 0 & 1 & 0\\ 1 & 0 & 0\end{bmatrix}$,then A^6 is equal to: a) I^2 b) zero matrix c) I d) A	
21	What is x if $\begin{bmatrix}1 & 4\\ 2 & x\end{bmatrix}$ is a singular matrix? a) 5 b) 6 c) 8 d) 7	
22	If [x 1] $\begin{bmatrix}1 & 0\\ -2 & 0\end{bmatrix}$ = 0, then x equals: a) - 2 b) - 1 c) 2 d) 0	
23	If B is a non - singular matrix and A is a square matrix, then det (B^{-1} AB) is equal to a) Det (B^{-1}) b) Det (A^{-1}) c) Det (B) d) Det (A)	
24	If A is a non - singular square matrix of order 3 such that A^2 = 3A, then the value of |A | is a) 27 b) - 3 c) 3 d) 9	
25	If $\begin{bmatrix}a & b\\ c & d\\ e & f\end{bmatrix}$ A = $\begin{bmatrix}g & hi\\ j & kl\\ m & no\end{bmatrix}$ then order of matrix A is: a) 2× 3 b) 3× 3 c) 3× 2 d) 2× 2	
26	Out of the following matrices, choose that matrix which is a scalar matrix: a) $\begin{bmatrix}0 & 0\\ 0 & 0\end{bmatrix}$ b) $\begin{bmatrix}0 & 0 & 0\\ 0 & 0 & 0\end{bmatrix}$ c) $\begin{bmatrix}0 & 0\\ 0 & 0\\ 0 & 0\end{bmatrix}$ d) $\begin{bmatrix}0\\ 0\\ 0\end{bmatrix}$	
27	If A = $\begin{bmatrix}2 & 3\\ 5 & -2\end{bmatrix}$ be such that A^{-1} = kA, then k equals a) - 19 b) $\frac{1}{19}$ c) 19 d) $-\frac{1}{19}$	
28	Adjoint of matrix $\begin{bmatrix}1 & 2\\ 3 & 4\end{bmatrix}$ is: a) $\begin{vmatrix}4 & 2\\ 3 & 1\end{vmatrix}$ b) $\begin{vmatrix}4 & -2\\ -3 & 1\end{vmatrix}$ c) $\begin{bmatrix}1 & -2\\ -3 & 4\end{bmatrix}$ d) $\begin{vmatrix}1 & 2\\ 3 & 4\end{vmatrix}$	
29	If A = $\begin{bmatrix}3 & 1\\ -1 & 2\end{bmatrix}$,then A^2 - 5A - 7I is: a) a zero matrix b) an unique matrix c) diagonal matrix d) an identity matrix	
30	If A^2 - A + I = O, then the inverse of A is a) I - A b) A + I c) A^{-2} d) A - I	
31	If $A = \begin{bmatrix}a & b\\ b & a\end{bmatrix}$ and $A^2 = \begin{bmatrix}\alpha & \beta\\ \beta & \alpha\end{bmatrix}$, then a) α = 2ab, β = a^2 + b^2 b) α = a^2 + b^2 , β = 2ab c) α = a^2 + b^2 , β = a^2 - b^2 d) α = a^2 + b^2 , β = ab	
32	If matrix A is of order m× n, and formatrix B, AB and BA both are defined, then order of matrix B is: a) m× m b) m× n c) n× m d) n× n	

33	If A is a square matrix of order 3 such that A (adj A) $\begin{bmatrix} -3 & 0 & 0 \\ 0 & -3 & 0 \\ 0 & 0 & -3 \end{bmatrix}$, then |A| is equal to a) - 6 b) - 3 c) 9 d) 3	
34	A and B are square matrices each of order 3 such that |A| = - 1 and |B| = 3. What is the value of |3AB|? a) - 9 b) - 27 c) - 18 d) - 81	
35	. Let A be a square matrix of order 2× 2, then |KA| is equal to: a) K^3 |A| b) K^2 |A| c) K |A| d) 2K|A|	
36	If A is a square matrix of order 3 and |A| = 2, then the value of | - AA'| is a) 4 b) 2 c) - 4 d) - 2	
37	If A is any square matrix of order 3× 3 such that |A| = 3, then the value of |adj A| is a) 27 b) $\frac{1}{3}$ c) 9 d) 3	
38	Total number of possible matrices of order 2× 3 with each entry 1 or 0 is: a) 6 b) 64 c) 36 d) 32	
39	If Ais a square matrix of order3 such that A (adj A) = $\begin{bmatrix} -2 & 0 & 0 \\ 0 & -2 & 0 \\ 0 & 0 & -2 \end{bmatrix}$, then |adjA| is equal to a) 4 b) - 2 c) - 8 d) - 4	
40	If$A = \begin{bmatrix} 2 & -1 & 3 \\ 4 & 5 & -6 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & -6 \end{bmatrix}$, then a) only BA is defined b) AB and BA both are not defined c) onlyAB is defined d) AB and BA are both defined	
41	If A = $\begin{bmatrix} 1 & 0 & 1 \\ 0 & 0 & 1 \\ a & b & 2 \end{bmatrix}$, then aI + bA + $2A^2$ equals a) ab A b) - A c) none of these d) A	
42	If A and B are two matrices of order 3× m and 3 × n respectively and m = n, then the order of 5A - 2B is: a) m× n b) 3× 3 c) m× 3 d) 3× n	
43	If A, B are two non - singular matrices of same order, then a) AB is non - singular b) $(AB)^{-1} = A^{-1} B^{-1}$ c) AB is singular d) AB is not invertible	
44	If A, B are square matrices of order 3, A is non - singular and AB = O, then B is a: a) non - singular matrix b) singular matrix c) null matrix d) unit matrix	
45	If$A = \begin{bmatrix} \frac{1}{3} & 2 \\ 0 & 2x-3 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 6 \\ 0 & -1 \end{bmatrix}$ and AB = I_2, then the value of x is a) 0 b) 1 c) - 1 d) 2	

46	The matrix A = $\begin{bmatrix} 0 & 0 & 4 \\ 0 & 4 & 0 \\ 4 & 0 & 0 \end{bmatrix}$ is a a) unit matrix b) diagonal matrix c) none of these d) square matrix	
47	The system of linear equations $2x + ky = 7$ $3x + 2y = 7$ will be consistent, if: a) $k = \frac{4}{3}$ b) $k = \frac{3}{4}$ c) $k \neq \frac{4}{3}$ d) $k \neq \frac{3}{4}$	
48	The number of all possible matrices of order 3× 3 with each entry 0 or 1 is: a) 512 b) 27 c) 81 d) 18	
49	If A satisfies the equation x^3 - 5x^2 + 4x + λ = 0, then A^{-1} exists it a) $\lambda \neq$ - 1 b) $\lambda \neq 1$ c) $\lambda \neq 0$ d) $\lambda \neq 2$	
50	If $\begin{vmatrix} 3x & 4 \\ 5 & x \end{vmatrix} = \begin{vmatrix} 4 & -3 \\ 5 & -2 \end{vmatrix}$, then x = a) $3x^2$ - 20 = - 8 + 15 ⇒ $3x^2 = 27 \Rightarrow x^2 = 9 \Rightarrow x = \pm 3$. ∴ Option (c) is the correct answer. b) 3 only c) 3 or - 3 d) - 3 only	
51	If A = [a_{ij}] $ {2$ where $a_{ij} = \begin{cases} 1, & if\, i \neq j \\ 0, & if\, i = j \end{cases}$, then A^2 is equal to a) J b) A c) I d) O	
52	The matrix $\begin{bmatrix} 2 & -1 & 3 \\ \lambda & 0 & 7 \\ -1 & 1 & 4 \end{bmatrix}$ is not invertible for a) λ = 0 b) λ = 1 c) $\lambda \in$ R - {1} d) λ = - 1	
53	If A = $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ a & b & -1 \end{bmatrix}$,then A^2 is equal to a) a unit matrix b) - A c) a null matrix d) A	
54	The value of the determinant $\begin{vmatrix} 1 & 2 & 4 \\ -1 & 3 & 0 \\ 4 & 1 & 0 \end{vmatrix}$ is a) 52 b) - 13 c) 13 d) - 52	
55	If A = $\begin{bmatrix} 2 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 2 \end{bmatrix}$, then A^5 = a) 10A b) 32A c) 16A d) 5A	
56	If Ais a square matrix of order 3 and |A| = 5, then the value of |2A'| is a) 40 b) - 10 c) 10 d) - 40	

57	The area of a triangle with vertices (- 3, 0), (3, 0) and (0, k) is 9 sq. units. Then, the value of k will be a) - 9 b) 6 c) 3 d) 9	
58	If A, B are two n× n non - singular matrices, then a) AB is singular b) $(AB)^{-1} = A^{-1} B^{-1}$ c) $(AB)^{-1}$ does not exist d) AB is non - singular	
59	If A and B are matrices of the same order, then $AB^{T} = B^{T} A$ is a: a) unit matrix b) skew - symmetric matrix c) null matrix d) symmetric matrix	
60	If $\begin{vmatrix} 2x & 5 \\ 8 & x \end{vmatrix} = \begin{vmatrix} 6 & -2 \\ 7 & 3 \end{vmatrix}$, then the value of x is a) 3 b) 6 c) ± 3 d) ± 6	
61	Suppose A, B and C are three square matrices of the same order such that A B is invertible. Assertion (A): If AB = AC, then B = C Reason (R): A is invertible. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.	
62	Assertion (A): Matrix $A = \begin{bmatrix} 0 & -6 & 7 \\ 6 & 5 & -1 \\ -7 & 1 & 0 \end{bmatrix}$ is a skew - symmetric matrix. Reason (R): A matrix A is skew - symmetric if $A' = -A$. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.	
63	For the matrices A' = $\begin{bmatrix} 3 & 4 \\ -1 & 2 \\ 0 & 1 \end{bmatrix}$ and B = $\begin{bmatrix} -1 & 2 & 1 \\ 1 & 2 & 3 \end{bmatrix}$, consider the following statements. Assertion (A): (A + B)' = A' - B' Reason (R): (A - B)' = A' - B' a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.	
64	Assertion (A): Scalar matrix A = $[a_{ij}] = \begin{cases} k, & i = j \\ 0, & i \neq j \end{cases}$, where k is a scalar, is an identity matrix when k = 1. Reason (R): Every identity matrix is not a scalar matrix. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.	

65	Let A be a square matrix. Assertion (A): Every square matrix can be expressed as the sum of symmetric and skew symmetric matrices. Reason (R): (A + A') is symmetric matrix and (A - A') is skew - symmetric matrix. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.	
66	Assertion (A): If $\begin{vmatrix} x^2-4x & x^2 \\ x^2 & x^3 \end{vmatrix} = \begin{vmatrix} -3 & 1 \\ -x+2 & 1 \end{vmatrix}$, then the value of x = 1. Reason (R): Two matrices A = [a $_{ij}$] $ {m$ and B = [b $_{ij}$] $ {m$ of same order m × n are equal, if a $_{ij}$ = b $_{ij}$ for all i = 1, 2, 3, ... m and j = 1, 2, 3, ... n. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.	
67	Assertion (A): If A = $\begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 2 \\ 0 & 0 & 4 \end{bmatrix}$, then |3A| = 27|A| Reason (R): If A is a square matrix of order n, then |kA| = k ^{n} |A|. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.	
68	Assertion (A): If A = $\begin{bmatrix} 2 & 3 & -1 \\ 1 & 4 & 2 \end{bmatrix}$ and B = $\begin{bmatrix} 2 & 3 \\ 4 & 5 \\ 2 & 1 \end{bmatrix}$, then AB and BA both are defined. Reason (R): For the two matrices A and B, the product AB is defined, if number of columns in A is equal to the number of rows in B. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.	
69	Assertion (A): If $\begin{bmatrix} xy & 4 \\ z+5 & x+y \end{bmatrix} = \begin{bmatrix} 4 & w \\ 0 & 4 \end{bmatrix}$, then x = 2, y = 2, z = - 5 and w = 4. Reason (R): Two matrices are equal, if their orders are same and their corresponding elements are equal. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.	

70	Assertion (A): If A is a square matrix of order 3 such that |adj A| = 144, then the value of |A| is $\pm$ 12. Reason (R): If A is an invertible matrix of order n, then |adj A| = |A| $^{n-1}$. a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A). b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A). c) Assertion (A) is true but Reason (R) is false. d) Assertion (A) is false but Reason (R) is true.	
71	Assertion (A): If A = $\begin{bmatrix} 0 & a & -2 \\ -3 & 0 & 4 \\ b & c & 0 \end{bmatrix}$ is a skew - symmetric matrix, then a + b + c = 1. Reason (R): For a skew - symmetric matrix A, A' = - A a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.	
72	Assertion (A): A 2 $\times$ 2 matrix A= [a $_{ij}$] , whose elements are given by a $_{ij}$ = i $\times$ j, is $\begin{bmatrix} 1 & 2 \\ 2 & 4 \end{bmatrix}$. Reason (R): If A is a 4 $\times$ 2 matrix, then the elements in A is 5. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.	
73	Let A and B be symmetric matrices of the same order. Assertion (A): AB - BA is skew - symmetric. Reason (R): AB + BA is symmetric. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.	
74	Assertion (A): If A = $\begin{bmatrix} 2 & 4 \\ 3 & 2 \end{bmatrix}$ and B = $\begin{bmatrix} 1 & 3 \\ -2 & 5 \end{bmatrix}$, then A + B = $\begin{bmatrix} 3 & 7 \\ 1 & 7 \end{bmatrix}$. Reason (R): Two different matrices can be added only if they are of same order. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.	

LESSON BASED ASSIGNMENT(LBA) - 2
CHAPTER NAME- Matrices & Determinants

	Section A	

1	Determine the product $\begin{bmatrix}-4 & 4 & 4\\ -7 & 1 & 3\\ 5 & -3 & -1\end{bmatrix}\begin{bmatrix}1 & -1 & 1\\ 1 & -2 & -2\\ 2 & 1 & 3\end{bmatrix}$ and use it to solve the system of equations: x - y + z = 4, x - 2y - 2z = 9, 2x + y + 3z = 1	[3]
2	If A = $\begin{bmatrix}2 & 3 & 1\\ 1 & 2 & 2\\ -3 & 1 & -1\end{bmatrix}$, find A^{-1} and hence solve the system of equations: 2x + y - 3z = 13, 3x + 2y + z = 4, x + 2y - z = 8	[3]
3	Find x, y satisfying the matrix equation $\begin{bmatrix}x-y & 2 & -2\\ 4 & x & 6\end{bmatrix}+\begin{bmatrix}3 & -2 & 2\\ 1 & 0 & -1\end{bmatrix}=\begin{bmatrix}6 & 0 & 0\\ 5 & 2x+y & 5\end{bmatrix}$	[3]
4	Find the matrix A such that: $\begin{bmatrix}1 & 1\\ 0 & 1\end{bmatrix}A=\begin{bmatrix}3 & 3 & 5\\ 1 & 0 & 1\end{bmatrix}$	[3]
5	A company produces three products every day. Their production on a certain day is 45 tons. It is found that the production of third product exceeds the production of first product by 8 tons while the total production of first and third product is twice the production of second product. Determine the production level of each product using matrix method.	[3]
6	If A = $\begin{bmatrix}1 & -1 & 0\\ 2 & 3 & 4\\ 0 & 1 & 2\end{bmatrix}$ and B = $\begin{bmatrix}2 & 2 & -4\\ -4 & 2 & -4\\ 2 & -1 & 5\end{bmatrix}$ are two square matrices, find AB and hence solve the system of linear equations: x - y = 3, 2x + 3y + 4z = 17, y + 2z = 7	[3]
7	Without using the concept of the inverse of a matrix, find the matrix $\begin{bmatrix}x & y\\ z & u\end{bmatrix}$ such that $\begin{bmatrix}5 & -7\\ -2 & 3\end{bmatrix}\begin{bmatrix}x & y\\ z & u\end{bmatrix}=\begin{bmatrix}-16 & -6\\ 7 & 2\end{bmatrix}$	[3]
8	For the matrices A = $\begin{bmatrix}3 & 2\\ 7 & 5\end{bmatrix}$ and B = $\begin{bmatrix}4 & 6\\ 3 & 2\end{bmatrix}$ verify that $(AB)^{-1} = B^{-1}A^{-1}$.	[3]
9	Use matrix method to solve the following system of equations: x - 2y - 4= 0, - 3x + 5y + 7 = 0	[3]
10	If $\begin{bmatrix}x^2\\ y^2\end{bmatrix}+2\begin{bmatrix}2x\\ 3y\end{bmatrix}=3\begin{bmatrix}7\\ -3\end{bmatrix}$,find the values of x and y.	[3]
11	If A = $\begin{bmatrix}3 & 1\\ -1 & 2\end{bmatrix}$, show that A^2 - 5A + 7I = O. Hence, find A^{-1}.	[3]
12	Solve the system of equations by matrix method: $\frac{2}{x}-\frac{3}{y}+\frac{3}{z}$ = 10 $\frac{1}{x}+\frac{1}{y}+\frac{1}{z}$ = 10 $\frac{3}{x}-\frac{1}{y}+\frac{2}{z}$ = 13	[3]
13	Show that the matrix A = $\begin{bmatrix}1 & 2 & 2\\ 2 & 1 & 2\\ 2 & 2 & 1\end{bmatrix}$ satisfies the equation A^2 - 4A - $5I_3$ = O and hence find A^{-1}.	[3]
14	Cost of a pen and a notebook are₹ 12 and ₹ 27 respectively. On a given day shopkeeper P sells 5 pens and 7 notebooks, whereas shopkeeper Q sells 6 pens and 4 notebooks. Find the money received by both the booksellers using matrix algebra.	[3]

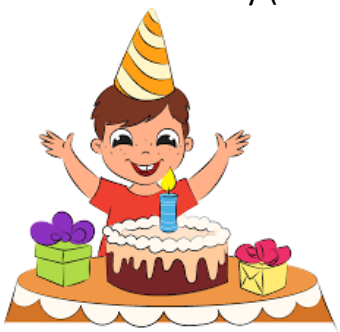
15	If A = $\begin{bmatrix}1 & 0 & 2\\0 & 2 & 1\\2 & 0 & 3\end{bmatrix}$, then show that A is a root of the polynomial f(x) = x^3 - 6x^2 + 7x+ 2.	[3]
16	Find the inverse of A = $\begin{bmatrix}1 & 3 & 3\\1 & 4 & 3\\1 & 3 & 4\end{bmatrix}$ and verify that A^{-1} A = I_3 .	[3]
17	If A = $\begin{bmatrix}1 & 2 & 2\\2 & 1 & 2\\2 & 2 & 1\end{bmatrix}$, then prove that A^2 - 4A - 5I = 0	[3]
18	For the matrix A = $\begin{bmatrix}2 & 4\\1 & -3\end{bmatrix}$, verify that $(A^{-1})' = (A')^{-1}$.	[3]
19	The prices of three commodities P, Q and R are₹ x, y and z per unit respectively. A purchases 4 units of R and sells 3 units of P and 5 units of Q. B purchases 3 units of Q and sells 2 units of P and 1 unit of R. C purchases 1 unit of P and sells 4 units of Q and 6 units of R. In the process A, B and C earn ₹ 6000, ₹ 5000 and ₹ 13000 respectively. If selling the units is positive earning and buying the units is negative earnings, find the price per unit of three commodities by using matrix method.	[3]
20	If A = $\begin{bmatrix}1 & 2\\2 & 1\end{bmatrix}$,and f(x) = x^2 - 2x - 3, show that f(A) = O.	[3]
21	Construct a 4× 3 matrix A = [a_{ij}] whose elementa $_{ij}$ = $2i + \frac{i}{j}$	[3]
22	If A = $\begin{bmatrix}2 & 5\\2 & 1\end{bmatrix}$ and B = $\begin{bmatrix}4 & -3\\2 & 5\end{bmatrix}$, verify that |AB| = |A||B|.	[3]
23	Use matrix method to show that the system of equations x + 3y = 5 2x + 6y = 8 is inconsistent.	[3]
24	The sum of three numbers is 2. If twice the second number is added to the sum of first and third, the sum is 1. By adding second and third number to five times the first number, we get 6. Find the three numbers by using matrices.	[3]
25	Solve: x - y + z = 4 x - 2y - 2z = 9 2x + y + 3z = 1	[3]
26	Compute the adjoint of the matrix A given by A = $\begin{bmatrix}1 & 4 & 5\\3 & 2 & 6\\0 & 1 & 0\end{bmatrix}$ and verify that A (Adj A) = |A| I = (adj A) A.	[3]
27	Find the inverse (if it exists) of the matrix$A = \begin{bmatrix}1 & 2 & -2\\-1 & 3 & 0\\0 & -2 & 1\end{bmatrix}$.	[3]
28	A trust fund has₹ 30,000 that must be invested in two different types of bonds. The first bond pays 5% interest per year, and the second bond pays 7% interest per year. Using matrix multiplication, determine how to divide ₹ 30,000 among the two types of bonds. If the trust fund must obtain an annual total interest of: 1. ₹ 1800	[3]

	2. ₹ 2000	
29	Find matrices X and Y, if 2X - Y = $\begin{bmatrix} 6 & -6 & 0 \\ -4 & 2 & 1 \end{bmatrix}$ and X + 2Y = $\begin{bmatrix} 3 & 2 & 5 \\ -2 & 1 & -7 \end{bmatrix}$	[3]
30	Prove that every square matrix can be uniquely expressed as the sum of a symmetric matrix and a skew - symmetric matrix.	[3]
31	To promote the making of toilets for women, an organisation tried to generate awareness through (i) house calls (ii) letters and (iii) announcements. The cost for each mode per attempt is given below: 1. ₹ 50 2. ₹ 20 3. ₹ 40 The number of attempts made in three villages X, Y and Z are given below: (i) (ii) (iii) X 400 300 100 Y 300 250 75 Z 500 400 150 Find the total cost incurred by the organisation for the three villages separately, using matrices. Write one value generated by the organisation in the society.	[3]
32	A matrix X has a + b rows and a + 2 columns while the matrix Y has b + 1 rows and a + 3 columns. Both matrices XY and YX exist. Find a and b. Can you say XY and YX are of the same type? Are they equal?	[3]
33	If $\begin{vmatrix} 3x & 7 \\ -2 & 4 \end{vmatrix} = \begin{vmatrix} 8 & 7 \\ 6 & 4 \end{vmatrix}$. find the value of x.	[3]
34	If A = $\begin{bmatrix} 2 & -3 & 5 \\ 3 & 2 & -4 \\ 1 & 1 & -2 \end{bmatrix}$, find A $^{-1}$ and hence solve the system of linear equations: 2x - 3y + 5z = 11, 3x + 2y - 4z = - 5, x + y - 2z = - 3	[3]
35	Let A = $\begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix}$, B = $\begin{bmatrix} 5 & 2 \\ 7 & 4 \end{bmatrix}$ and C = $\begin{bmatrix} 2 & 5 \\ 3 & 8 \end{bmatrix}$ .Find a matrix D such that CD - AB = O.	[3]
36	The sales figures for two - car dealers during January showed that dealer A sold 5 Luxury, 3 premium and 4 standard cars, while dealer B sold 7 luxury, 2 premium and 3 standard cars. Total sales over 2 - month period of January - February revealed that dealer A sold 8 luxury, 7 premium and 6 standard cars. In the same 2 - month period, dealer B sold 10 luxury, 5 premium and 7 standard cars. Write 2× 3 matrices summarizing sales data for January and the 2 - month period for each dealer. Hence, find the sales in February for each year.	[5]
37	Following equations are consistent? If consistent, solve the: x+ y - 2z = 4 x - 2y + z = - 2 5x - 5y + z= - 2	[5]

38	Show that the matrix, A = $\begin{bmatrix} 1 & 0 & -2 \\ -2 & -1 & 2 \\ 3 & 4 & 1 \end{bmatrix}$ satisfies the equation, $A^3 - A^2 - 3A - I_3 = O$. Hence, find A^{-1}.	[5]
39	The sum of three numbers is 6. If we multiply the third number by 2 and add the first number to the result, we get 7. By adding second and third numbers to three times the first number, we get 12. Using matrices find the numbers.	[5]
40	If A = $\begin{bmatrix} 1 & -1 & 1 \\ 2 & 1 & -3 \\ 1 & 1 & 1 \end{bmatrix}$, find A^{-1} and hence solve the system of linear equations x + 2y + z = 4, - x + y + z = 0, x - 3y + z = 2	[5]
41	Find the adjoint of the matrix $\begin{bmatrix} -3 & 5 \\ 2 & 4 \end{bmatrix}$. Verify that (adj A) A = |A|I = A (adj A).	[5]
42	Find the integral value of x if [x 4 - 1] $\begin{bmatrix} 2 & 1 & -1 \\ 1 & 0 & 0 \\ 2 & 2 & 4 \end{bmatrix}$ [x 4 - 1] ^{t} = 0.	[5]
43	Two factories decided to award their employees for three values of 1. adaptable to new techniques, 2. careful and alert in difficult situations and 3. keeping calm in tense situations, at the rate of₹ x, ₹ y and ₹ z per person respectively. The first factory decided to honour respectively 2, 4 and 3 employees with a total prize money of ₹ 29000. The second factory decided to honour respectively 5, 2 and 3 employees with the prize money of ₹ 30500. If the three prizes per person together cost ₹ 9500, then a. represent the above situation by a matrix equation and form linear equations using matrix multiplication. b. Solve these equations using matrices.	[5]
44	A mixture is to be made of three foods A, B, C. The three foods A, B, and C contain nutrients P, Q, R as shown below: Ounces per pound of Nutrient Food | P | Q | R A | 1 | 2 | 5 B | 3 | 1 | 1 C | 4 | 2 | 1 How to form a mixture which will have 8 ounces of P, 5 ounces of Q and 7 ounces of R?	[5]
45	Solve the following system of equations, using matrix method: x + 2y + z = 7, x + 3z = 11, 2x - 3y = 1	[5]
46	If A = $\begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$. Verify that $A^3 - 6A^2 + 9A - 4I = O$ and hence find A^{-1}.	[5]

47	Use the product $\begin{bmatrix}1 & -1 & 2\\ 0 & 2 & -3\\ 3 & -2 & 4\end{bmatrix}\begin{bmatrix}-2 & 0 & 1\\ 9 & 2 & -3\\ 6 & 1 & -2\end{bmatrix}$ to solve the system of equations x + 3z = - 9, x + 2y - 2z = 4, 2x - 3y + 4z = - 3.	[5]
48	If $\begin{bmatrix}a-b & 2a+c\\ 2a-b & 3c+d\end{bmatrix}=\begin{bmatrix}-1 & 5\\ 0 & 13\end{bmatrix}$,find the value of b.	[5]
49	If A = $\begin{bmatrix}3 & 2\\ 7 & 5\end{bmatrix}$ and B = $\begin{bmatrix}6 & 7\\ 8 & 9\end{bmatrix}$, verify that $(AB)^{-1} = B^{-1} A^{-1}$.	[5]
50	Express the matrix A = $\begin{bmatrix}3 & 2 & 3\\ 4 & 5 & 3\\ 2 & 4 & 5\end{bmatrix}$ as the sum of a symmetric anda skew - symmetric matrix.	[5]
51	Write the matrix $\begin{bmatrix}7 & -3 & -3\\ -1 & 1 & 0\\ -1 & 0 & 1\end{bmatrix}$ as a sum of a symmetric and a skew symmetric matrix.	[5]
52	If X - Y = $\begin{bmatrix}1 & 1 & 1\\ 1 & 1 & 0\\ 1 & 0 & 0\end{bmatrix}$ and X + Y = $\begin{bmatrix}3 & 5 & 1\\ -1 & 1 & 4\\ 11 & 8 & 0\end{bmatrix}$,find X and Y.	[5]
53	Using matrix method, solve the following system of equations for x, y and z: x - y + z = 4 2x + y - 3z = 0 x + y + z = 2	[5]
54	Express the matrix $\begin{bmatrix}3 & -2 & -4\\ 3 & -2 & -5\\ -1 & 1 & 2\end{bmatrix}$ as the sum of a symmetric and skew - symmetric matrix and verify your result.	[5]
55	If A = $\begin{bmatrix}3 & 1\\ 7 & 5\end{bmatrix}$, find the values of x and y such that $A^2 + xI_2 = yA$.	[5]
56	Solve: x - y + z = 4 x + y + z = 2 2x + y - 3z= 0	[5]
57	A two industries input - output relationship states that industry I require 20 paise worth of its own output and 50 paise worth of industry II for producing output of₹ 1. Industry II requires 30 paise worth of its own output and 40 paise worth of industry I for producing an output of ₹ 1. 1. Write the technology coefficient matrix. 2. Determine the gross output required to satisfy the economy's demand of₹ 180 crores and ₹ 270 crores respectively. 3. Give the interpretation of its row sum and column sum, if any.	[5]
58	Find a 2× 2 matrix A such that $A\begin{bmatrix}1 & -2\\ 1 & 4\end{bmatrix} = 6I_2$	[5]
59	A shopkeeper has 3 varieties of pens A, B and C. Meenu purchased 1 pen of each variety for a total of₹ 21. Jean purchased 4 pens of A variety, 3 pens of B variety and 2 pens of C variety for ₹ 60. While Shikha purchased 6 pens of A variety, 2 pens of B variety and 3 pens of C variety for ₹ 70. Using matrix method find the cost of each pen.	[5]

60	If $\begin{bmatrix} x+y \\ x-y \end{bmatrix} = \begin{bmatrix} 2 & 1 \\ 4 & 3 \end{bmatrix} \begin{bmatrix} 1 \\ -2 \end{bmatrix}$,then write the value of (x, y).	[5]
61	Find the adjoint of the matrix A = $\begin{bmatrix} -1 & -2 & -2 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$ and hence show that A (adj A) = |A| I_3 .	[5]
62	Find A^{-1} , where A = $\begin{bmatrix} 1 & 2 & -3 \\ 2 & 3 & 2 \\ 3 & -3 & -4 \end{bmatrix}$. Hence solve the system of equations: x + 2y - 3z = - 4, 2x + 3y + 2z = 2, 3x - 3y - 4z = 11	[5]
63	If A = $\begin{bmatrix} 1 & 0 & -3 \\ 2 & 1 & 3 \\ 0 & 1 & 1 \end{bmatrix}$,then verify that $A^2 + A = A(A + I)$, where I is the identity matrix.	[5]
64	Express the matrix A = $\begin{bmatrix} 4 & 2 & -1 \\ 3 & 5 & 7 \\ 1 & -2 & 1 \end{bmatrix}$ as the sum of a symmetric and a skew - symmetric matrix.	[5]
65	Using matrix method, solve the following system of equations: x - 2y = 10, 2x + y + 3z = 8, - 2y + z = 7.	[5]
66	Read the following text carefully and answer the questions that follow: Two schools A and B want to award their selected students on the values of Honesty, Hard work and Punctuality. School A wants to award ₹ x each, ₹ y each and ₹ z each for the three respective values to its 3, 2 and 1 students respectively with a total award money of ₹ 2200. School B wants to spend₹ 3100 to award its 4, 1 and 3 students on the respective values (by giving the same award money to the three values as school A). The total amount of award for one prize on each value is ₹ 1200.  1. What is the award money for Honesty? (1) 2. What is the award money for Punctuality? (1) What is the award money for Hard work? (2) OR If a matrix P is both symmetric and skew-symmetric, then what will be the value of |P|? (2)	[4]
67	Read the following text carefully and answer the questions that follow: Raja purchases 3 pens, 2 pencils and 1 mathematics instrument box and pays ₹ 41 to the shopkeeper. His friends, Daya and Anil purchases 2pens,1 pencil, 2 instrument boxes and 2 pens, 2 pencils and 2 mathematical instrument boxes respectively. Daya and Anil pays ₹ 29 and ₹ 44 respectively. Based on the above information answer the following: 1. What will be the cost of one pen? (1) 2. What will be the cost of one pen and one pencil? (1)	[4]

	What will be the cost of one pen and one mathematical instrument box? (2) OR What will be the cost of one pencil and one mathematical instrumental box? (2)	
68	Read the following text carefully and answer the questions that follow: On her birthday, Seema decided to donate some money to the children of an orphanage home. If there were 8 children less, everyone would have got ₹ 10 more. However, if there were 16 children more, everyone would have got ₹ 10 less. Let the number of children be x and the amount distributed by Seema for one child be y (in ₹).  1. What are the equations in terms of x and y? (1) 2. Which of the following matrix equations represent the information given above? (1) How many children who were given some money by Seema? (2) OR How many rupees are given to each child by Seema? (2)	[4]
69	Read the following text carefully and answer the questions that follow: Two schools P and Q decided to award their selected students for the values of discipline and honesty in the form of prizes at the rate of ₹ x and ₹ y respectively. School P decided to award respectively 3, 2 students a total prize money of ₹ 2300 and school Q decided to award respectively 5, 3 students a total prize money of ₹ 3700. 1. Write the matrix equation representing the above situation. (1) 2. Find the value of the determinant of coefficients of x and y. (1) Find the values of x and y respectively (use Cramer's rule). (2) OR Find the inverse of matrix A. (2)	[4]
70	Read the following text carefully and answer the questions that follow: Amit, Biraj and Chirag were given the task of creating a square matrix of order 2. Below are the matrices created by them. A, B, C are the matrices created by Amit, Biraj and Chirag respectively. A = $\begin{bmatrix} 1 & 2 \\ -1 & 3 \end{bmatrix}$, B = $\begin{bmatrix} 4 & 0 \\ 1 & 5 \end{bmatrix}$, C = $\begin{bmatrix} 2 & 0 \\ 1 & -2 \end{bmatrix}$ If a= 4 and b = - 2, based on the above information answer the following: 1. What will be the sum of the matrices A, B and C? (1) 2. What is the value of $(bA)^T$? (1) What is the value of AC - BC? (2) OR What is the value of (a + b) B? (2)	[4]
71	Read the following text carefully and answer the questions that follow:	[4]

	Three friends Ravi, Raju and Rohit were doing buying and selling of stationery items in a market. The price of per dozen of Pen, Notebook and toys are Rupees x, y and z respectively. Ravi purchases 4 dozens of notebooks and sells 2 dozens of pens and 5 dozens of toys. Raju purchases 2 dozens of toy and sells 3 dozens of pens and 1 dozen of notebooks. Rohit purchases one dozen of pens and sells 3 dozens of notebooks and one dozen of toys. In the process, Ravi, Raju and Rohit earn ₹ 1500, ₹ 100 and ₹ 400 respectively.  1. What is the price of one dozen of pens? (1) 2. What is the total price of one dozen of pen and one dozen of notebook? (1) 3. What is the sale amount of Ravi? (2) OR How much is the total amount of purchase made by all three friends? (2)	
72	Read the following text carefully and answer the questions that follow: The management committee of a residential colony decided to award some of its members (say x) for honesty, some (say y) for helping others and some others (say z) for supervising the workers to kept the colony neat and clean. The sum of all the awardees is 12. Three times the sum of awardees for cooperation and supervision added to two times the number of awardees for honesty is 33. The sum of the number of awardees for honesty and supervision is twice the number of awardees for helping.  1. What is the value of x + y + z? (1) 2. What is the value of x - 2y? (1) 3. What is the value of z? (2) OR What is the value of x + 2y? (2)	[4]
73	Read the following text carefully and answer the questions that follow: Two farmers Ramakishan and Gurucharan Singh cultivate only three varieties of rice namely Basmati, Permal and Naura. The sale (in rupees) of these varieties of rice by both the farmers in the month of September and October are given by the following matrices A and B.	[4]

	 September sales (in Rupees) A = $\begin{bmatrix} 10{,}000 & 20{,}000 & 30{,}000 \\ 50{,}000 & 30{,}000 & 10{,}000 \end{bmatrix} \begin{matrix} Ramakishan \\ Gurucharan \end{matrix}$ October sales (in Rupees) B = $\begin{bmatrix} 5{,}000 & 10{,}000 & 6{,}000 \\ 20{,}000 & 10{,}000 & 10{,}000 \end{bmatrix} \begin{matrix} Ramakishan \\ Gurucharan \end{matrix}$ Based on the information given above, answer the following questions: 1. The total sales in September and October for each farmer in each variety can be represented as _____. (1) 2. What is the value of A_{23} ? (1) 3. If Ramkishan receives 2% profit on gross sales, compute his profit for each variety sold in October. (2) OR If Gurucharan receives 2	
74	Read the following text carefully and answer the questions that follow: Two schools Oxford and Navdeep want to award their selected students on the values of sincerity, truthfulness and helpfulness. Oxford wants to award ₹ x each, ₹ y each and ₹ z each for the three respective values to 3, 2 and 1 students respectively with a total award money of 1600. Navdeep wants to spend 2300 to award its 4, 1 and 3 students on the respective values (by giving the same amount to the three values as before). The total amount of the award for one prize on each is ₹ 900.  1. What is the value of x + y + z? (1) 2. What is the value of 4x + y + 3z? (1) 3. What is the value of y? (2) OR What is the value of 2x + 3y? (2)	[4]

NOTE: -

I. Do all the examples, exercises questions (including MCQS and case-studies) of the chapters MATRICES, DETERMINANTS AND PROBABILITIES from ML AGRAWAL in the two notebooks as instructed in the class.

II. Make a separate note-book and solve all the questions of Lesson Based Assignment given above.

III. Must write questions in black and answers in blue pen.

DATE OF SUBMISSION: - REOPENING DAY

DATA SCIENCE (844)

Theme: Data Responsibility to Data Discovery

"Holiday homework in Data Science is not about completion—it's about exploration."

Guidelines for submitting the Holiday HW.

Prepare a stick file comprising of all these questions with answers. For Questions related to visualisations, use MS-Excel. The answers should be handwritten. The MS-Excel outputs should be stuck in the stick file. Use of ChatGPT or any other AI tool is strictly prohibited. Use your creativity.

Q1. Real-Life Case Study - Data Governance Detective

Situation

A popular mobile app collects the following user data:

- Name, Age, Location
- Photos and Contacts
- Daily Activity (steps, sleep)
- Browsing behaviour

Recently, users complained about **data misuse and privacy issues**.

Your Task

Write a **report (300–400 words)** covering importance of Data Governance framework and Ethical guidelines and Data Privacy for the company as a Data Scientist.

Q2. Explore the Data (EDA Project)

Dataset: Student Lifestyle Data

Student	Study Hours	Sleep Hours	Attendance (%)	Marks (%)
Amit	2	5	60	55
Brinda	4	6	70	65
Chinmay	6	7	85	78
David	3	5	68	60
Eshan	7	8	90	88
Farhan	5	6	80	75
Gita	8	7	92	91
Hansal	2	4	58	50

The Tasks to perform using MS-Excel

1. Univariate Analysis

- Analyse any **one variable** and Find:
  - Mean(use =average() function) Median(use median() function), Range (first find maximum value (use max() function) and then find minimum value(use min() function). Subtract maximum value with minimum value to get the range value)
- Draw:
  - Histogram (for only one variable like study hours or any other variable)

2. Bivariate Analysis

- Create a Scatter plot to study relationship between:
  - Study Hours vs Marks
- Comment: Is the relationship positive/negative correlation?

3. Multivariate Analysis

- Analyse how: Sleep + Study Hours affect Marks

4. Data Cleaning Task

Identify and explain:

- Any possible **outliers (study using boxplot) for each column, plot a boxplot and verify**
- Any **missing or unrealistic values**
- Suggest cleaning steps

Visualization Challenge using MS-Excel / Canva. Give proper headings and titles for axes also. Also give your inference related to the visualization in terms of the insights drawn from the charts.

Create **at least 3 charts**:

- Line Graph → Marks trend
- Bar Chart → Attendance comparison
- Scatter Plot → Study vs Marks

Q3. Create an infographic using Canva on the various acts related to Data privacy and Data Governance like GDPR, HIPAA, COPPA, CCPA, DPDP, PDP. (Paste the print out in the stick file).

Q4. Study this latest news report

As of early 2026, India is facing a surge in high-profile data breaches, with the average organizational cost reaching a record ₹22 crore. Significant recent incidents include 2025 leaks exposing over 16 billion login credentials, a massive 2025 breach at Angel One, and Telegram bots selling sensitive Aadhaar/PAN data.

Latest Data Breach & Security Stories (2025-2026):

- **Angel One Breach (Feb 2025):** One of India's largest stockbroking platforms, Angel One, experienced unauthorized access to AWS-hosted resources.
- **16 Billion Credentials Exposed (2025):** A major breach exposed URLs, logins, and passwords for various online services affecting Indian users.
- **Telegram Data Sales (2025/2026):** Reports show Telegram bots selling sensitive Indian user data, including Aadhaar, PAN card, voter ID, and contact details.
- **Government/E-Governance Attacks:** Multiple state-level portals were targeted in 2024–2025, leading to the potential leakage of citizen Aadhaar and bank details.
- **BSNL Data Breach (May 2024):** A major breach at state-owned BSNL was reported.
- **Cyberabad Police Crackdown (May 2026):** Seven bank officials were arrested in 2026 for aiding cyber fraud by facilitating the creation of mule accounts.

Key Trends & Risks:

- **464% Increase in Phishing:** Email-based phishing attacks skyrocketed in 2023–2024, continuing to be a primary threat vector.
- **Ransomware Attacks:** Firms like Polycab and various critical infrastructures have been hit by ransomware, encrypting internal file
- **Insider Threats:** Criminals are increasingly colluding with bank employees to facilitate data theft and fraud.

Task:

Choose any one case from this and inspect and report what happened, what data was leaked and what could be the cause? Prepare a report 100-200 words and create a digital poster to make companies aware about this.

- Angel One breach
- BSNL breach

- Telegram data leak

"Use your holidays to upgrade your thinking, not just complete your tasks."