GEETA DEVI DAV PUBLIC SCHOOL

BHANDARKOLA, SATAR ROAD, DEOGHAR

DIWALI & CHHAT PUJA HOLIDAY HOMEWORK-(2026-27)

CLASS: -XII (SCIENCE, COMMERCE & HUMANATIES)

ENGLISH

Project & Assignment

A. Art Integrated Project -

The story "Journey to the End of the Earth" is significant for understanding Earth's past, present, and future, as it offers insights into geological history, climate change, and the impacts of human interference on the environment.

Keeping the concept of the above story in mind the students are informed to prepare a brochure on "Andaman and Nicobar islands- Emerald, Blue and You". Inscribe the details of the Andaman and Nicobar Coral Islands.

Guidelines:

1. The brochure should be prepared on A4 sheets and the presentation should be eyecatching.
2. Steps to be considered while working on the project:

(a)Browse the information about the topic.

(b) Add some relevant pictures. You can draw or paste the same. Give a suitable title to the brochure.

(c) Prepare it for presenting in the class.

Assignment:

Read the following chapters and make a PPT on any one.

a) Poets and Pancakes
b) Interview Guidelines:

1. The PPT must be done digitally first and then take a print out of the same.
2. The hard copy (the printed copy) of the PPT must be submitted in the school.
3. Students must be able to demonstrate and discuss the PPT whenever asked in the classroom.

MATHEMATICS

1. **Activity Work**
   - Complete Activities Nos. 8, 9 and 10 in your Mathematics Activity Notebook.
2. **Practice Work**
   - Practise at least five years' worth of previous CBSE Board Examination Sample Question Papers.

Important Instructions

- Complete all the assigned work neatly and sincerely.
- Ensure that your work is well-presented.
- Submit all assignments immediately after the holidays.
- Make the most of your holidays by learning something new!

BIOLOGY

Think Beyond the Textbook

Q1. Answer the following questions with scientific explanations:
a. Why is DNA replication called semiconservative replication?
b. Why is PCR an important tool in molecular biology?
c. How does vaccination help develop immunity?
d. Why are restriction enzymes called molecular scissors?
e. Why is the genetic code considered universal?
f. How does the ozone layer protect living organisms?
g. Why is biodiversity essential for ecosystem stability?

Q2.Application-Based Learning

Case Study 1: Genetic Engineering

A farmer wants to cultivate crops that are resistant to insect pests. Explain how biotechnology can help achieve this objective.

PHYSICS

SECTION A: NCERT EXERCISES

Q.1. Electromagnetic Waves
Complete all NCERT exercise questions from the chapter *Electromagnetic Waves*.

Q.2. Wave Optics
Complete all NCERT exercise questions from the chapter *Wave Optics*.

Instructions: Solve all questions neatly in your Physics notebook, showing proper formulas, calculations, and diagrams wherever required.

SECTION B: RECENT CBSE SAMPLE PAPER QUESTIONS

Q.3. Solve questions **only from the latest available CBSE Class XII Physics sample paper** covering Chapters 1–10.

- Attempt only questions belonging to Chapters 1–10.
- Include MCQs, Assertion–Reason, numerical problems, short-answer questions, case-study-based questions, and long-answer questions wherever available.
- Mention the sample paper year and question number for each answer.
- Do not include questions from chapters outside the prescribed range.

SECTION C: IMPORTANT DERIVATIONS

Q.4. Derivation of Lens Maker's Formula
Derive the Lens Maker's Formula for a thin lens in air. Explain the terms involved and state the assumptions used.

Q.5. Derivation of the Angle of Deviation Through a Prism
Derive the expression: $\delta = i + e - A$, where i is the angle of incidence, e is the angle of emergence, A is the angle of the prism, and δ is the angle of deviation.

Also derive the formula for the refractive index of the prism material at minimum deviation.

GENERAL INSTRUCTIONS

- Complete all questions in your Physics notebook.
- Write answers in proper sequence with question numbers.
- Draw neat and labelled diagrams wherever necessary.
- Show complete steps in all numerical problems and derivations.
- Maintain neatness and submit the assignment on time.

CHEMISTRY

1.Prepare the investigatory project .

2. Write the mechanism of :

(a) S_N1 and S_N2 reaction

(b) Conversion of Ethanol to ethene

(c) Conversion of Ethene to ethanol

(d) Conversion of Ethanol to diethyl ether

3. Distinguish between the following pair of organic compounds –

(a) Formic acid and Ethanoic acid

(b) Ethanol and methanol

(c) Pentan-2-one and Pentan-3-one

4. Write and learn all the formulas from chapter 1,2 and 3.

5. Answer all NCERT intext and exercise questions from the chapter – Aldehydes , Ketones and Carboxylic acids

6. Explain the following reactions with suitable examples:

(a) Cannizzaro's reaction

(b) Etard's reaction

(c) Stephen's reduction

(d) Dow's process

(e) Crossed Aldol condensation

Complete all questions in a separate Chemistry notebook

ACCOUNTANCY

PRACTICAL FOR BOARD EXAMINATION 2026-27

- TOPIC: SPECIFIC PROJECT

  Visit any Company form of organisation and record all its business transactions accordingly in the form of following:

  # Comparative Statements
  # Common Size Statements
  # Accounting Ratio
  # Cash Flow Statement

Balance Sheet

(If there will be none of the above in your project then you can solve any questions from each topic from illustrations)

You can take clue from Project no. 9 form your Part B book

- General Instructions:

- *Project should be submitted in the same Project file which you have already used for comprehensive project*. File should be covered with black chart paper and subject name along with its code [eg. ACCOUNTANCY (055)] should be properly mentioned. Minimum one theme based picture related to subject should be pasted on the cover of the file. File should be protected by transparent plastic cover for its durability.
- The project should be hand written.
- The following pages should be printed out:
    a. Front page (Name of School, Logo of School, Session, Topic, Name of student, Class , Class Roll no., Board Roll No., Signature of Internal, Signature of External and Remarks)
    b. Index (There should be five columns: Sl.no., Content/topic, Page no., External sign, Internal sign)
    c. Acknowledgement (Content, Signature of Internal and Signature of External)
    d. Certificate (Content, Internal sign and External Sign)
    e. Graphs (if required)
    Hand drawn graph can also be accepted.
- Introduction
- Content (Comparative Statements, Common size statements, Cash Flow Statement, Accounting ratio and Balance Sheet)
- Bibliography

BUSINESS STUDIES.

PRACTICAL FOR BOARD EXAMINATION 2026-27

- **TOPIC: MARKETING MANAGEMENT OR ANY CHAPTER OF YOUR OWN CHOICE**
  Implementations of various theories of your chosen chapter in the firm which you have visited and analysed.
- General Instructions:

- Project should be submitted in the same Project file which you have already used . File should be covered with black chart paper and subject name along with its code [eg. BUSINESS STUDIES (054)] should be properly mentioned. Minimum one theme based picture related to subject should be pasted on the cover of the file. File should be protected by transparent plastic cover for its durability.
- The project should be hand written.
- The following pages should be printed out:

a. Front page (Name of School, Logo of School, Session, Topic, Name of student, Class , Class
Roll no., Board Roll No., Signature of Internal, Signature of External and Remarks)
b. Index (There should be five columns: Sl.no., Content/topic, Page no., External sign, Internal sign)
c. Acknowledgement (Content, Signature of Internal and Signature of External)
d. Certificate (Content, Internal sign and External Sign)
e. Colour Photographs related to your project (Min. Five)

- Introduction
- Main topic related Content (based on case study of a firm including colour pictures and graphs in minimum 15 pages)
- Conclusion
- Bibliography

ECONOMICS

Unit 1: Determination of Income and Employment

Multiple Choice Questions (1 Mark)

Q1. The value of the investment multiplier is k = 1 / (1 - MPC). If the Marginal Propensity to Consume (MPC) is 0.8, the value of the multiplier will be:

(A) 2 (B) 5 (C) 1.25 (D) 10

Q2. If an economy is in equilibrium where AD = AS, which of the following is true?

(A) Planned savings = Planned investment
(B) Unplanned inventory accumulation is zero
(C) S = I
(D) All of the above

Q3. True or False: The value of the Average Propensity to Save (APS) can never be less than zero. Give reason.

Short Answer Questions (3-4 Marks)

Q4. Explain the meaning of Involuntary Unemployment. How is it different from voluntary unemployment?

Q5. Can an economy be in equilibrium when there is involuntary unemployment in the economy? Explain.

Q6. Distinguish between Average Propensity to Consume (APC) and Marginal Propensity to Consume (MPC) using numerical or algebraic expressions.

Numerical Questions (3-4 Marks)

Q7. In an economy, the consumption function is given as: C = 100 + 0.75Y (where C is consumption expenditure and Y is national income). Calculate the equilibrium level of national income if planned investment is ₹ 2,000 crores.

Q8. If an increase in investment of ₹ 125 crores leads to a rise in national income by ₹ 500 crores, calculate the value of the Marginal Propensity to Consume (MPC).

Long Answer Questions (6 Marks)

Q9. Explain the equilibrium level of income and output in an economy using the Savings-Investment (S - I) approach. Use a well-labeled diagram to support your explanation.

Unit 2: Government Budget and the Economy

Multiple Choice Questions (1 Mark)

Q1. Which of the following is a revenue receipt of the government?

(A) Recovery of loans
(B) Corporation tax
(C) Disinvestment
(D) Borrowings from abroad

Q2. Fiscal deficit is equal to:

(A) Total Expenditure - Total Receipts excluding borrowings
(B) Revenue Expenditure - Revenue Receipts
(C) Capital Expenditure - Capital Receipts
(D) Primary Deficit - Interest Payments

Short Answer Questions (3-4 Marks)

Q3. Distinguish between Revenue Receipts and Capital Receipts in a government budget, giving two examples of each.

Q4. Explain the 'allocation of resources' objective of a government budget.

Q5. Why are subsidies treated as revenue expenditure by the government? Give reasons.

Long Answer Questions (6 Marks)

Q6. What is Fiscal Deficit? What are its major implications? Explain the measures that a government can take to control fiscal deficit.

Unit 3: Foreign Exchange Rate

Multiple Choice Questions (1 Mark)

Q1. When the price of a foreign currency rises in terms of domestic currency, it is called:

(A) Appreciation of domestic currency
(B) Depreciation of domestic currency
(C) Devaluation

(D) Revaluation

Q2. Flexible exchange rate system is also known as:

(A) Pegged exchange rate system
(B) Managed floating
(C) Floating rate system
(D) Fixed exchange rate system

Short Answer Questions (3-4 Marks)

Q3. Explain the effect of appreciation of the domestic currency on the exports of a country.

Q4. Why is there an inverse relationship between the demand for foreign exchange and the foreign exchange rate? Explain with reasons.

Q5. Differentiate between Devaluation and Depreciation of a currency.

Unit 4: Balance of Payments (BoP)

Multiple Choice Questions (1 Mark)

Q1. Import of machinery is recorded in the Balance of Payments account under:

(A) Current Account (Visible items)
(B) Capital Account
(C) Current Account (Invisible items)
(D) Official Reserve Account

Q2. Which of the following transactions is recorded on the credit side of the Balance of Payments account?

(A) Import of goods
(B) Foreign direct investment (FDI) received from abroad
(C) Lending to abroad
(D) Purchase of foreign securities

Short Answer Questions (3-4 Marks)

Q3. Distinguish between Balance of Trade and Balance of Payments.

Q4. What are autonomous and accommodating transactions in the Balance of Payments account? Explain.

Q5. "A country facing a deficit in its Balance of Payments can finance it through official reserve transactions." Discuss.

Numerical / Application-Based Questions (3 Marks)

Q6. Calculate the Balance of Trade from the following data:

Component	Amount (₹ in crores)
Export of goods	600
Import of goods	800
Export of services	200
Import of services	150

GEOGRAPHY

Create a project work on the given topic .

Project Topic: Urbanisation and Its Impact on the Environment in India

Main Project Question

“How does rapid urbanisation affect the environment, natural resources, and quality of life of people in India?”

Questions

1.What are the major causes of urbanisation in India?
2.How does urbanisation affect land use and vegetation?
3.What are the major environmental problems caused by urbanisation?
4.How does urbanisation affect water resources and air quality?
5.What problems do people face in rapidly growing cities?
6.What measures can be taken to promote sustainable urban development?

Project Details

Aim: To study the impact of urbanisation on the environment and human life.
Method: Survey, observation, maps, photographs and secondary data.
Conclusion: To suggest ways to make Indian cities cleaner, greener and more sustainable

HISTORY

CHOOSE ANY ONE

PROJECT 1: The Revolt of 1857 - Rebels and the Raj (Theme 11)

Objective: To understand how 1857 was represented differently by British and Indians.

Chapter Coverage:
1. Introduction - When and where it started
2. Pattern of revolt - Meerut to Delhi
3. Causes - Political, Economic, Social, Military
4. Leaders - Rani Lakshmibai, Nana Sahib, Bahadur Shah Zafar, Shah Mal, Maulvi Ahmadullah Shah
5. Rumours & Prophecies - greased cartridges, chapattis, bone dust
6. Vision of Unity - Hindu-Muslim unity, Ishtahars
7. Failure and British Repression
8. Visual Representations - British paintings vs Nationalist art
9. Conclusion - Was it a mutiny or First War of Independence?

Sources to use: NCERT Ch-10, National Archives images, Punch magazine cartoons.

PROJECT 2: Partition of India Through Oral Sources (Theme 13 - Mahatma Gandhi)
CBSE's Most Recommended Project

Objective: To study Partition experiences through interviews and oral history.

Chapter Coverage:
1. Why oral history is important for Partition
2. Brief background of Partition 1947
3. Interview of 2-3 elders who witnessed Partition / watched documentary
4. Their experiences - migration, loss, rehabilitation
5. Role of Gandhiji during 1946-48 - Noakhali, Bihar, Delhi
6. Writings of Saadat Hasan Manto / Urvashi Butalia's book "The Other Side of Silence"

7. Gendered aspect of Partition - abduction of women
8. Conclusion - Lessons of Partition today

Method: You can interview your grandparents/neighbours and add transcript. This project always gets full marks.

PROJECT 3: Mohenjodaro - An Early Urban Centre (Theme 1 - The Harappan Civilization)
Best for Map Work and Archaeology

Objective: To reconstruct Harappan life through archaeological evidence.

Chapter Coverage:
1. Discovery of Harappa by Daya Ram Sahni & Mohenjodaro by R.D. Banerjee
2. Town Planning - Citadel, Lower Town, Great Bath, drainage
3. Social & Economic life - seals, beads, weights, craft production
4. Script and writing - undeciphered script issue
5. End of civilization - different theories (flood, climate change, Aryan invasion)
6. John Marshall and Cunningham's interpretation problems
7. Map: Mark Harappa, Mohenjodaro, Lothal, Dholavira, Kalibangan
8. Present condition - threat to heritage

To Include: Photos of Great Bath, seals, DK-G Area, handmade sketches.

PROJECT 4: Vijayanagara Empire - Hampi Through Foreign Travellers (Theme 7)
Best for Architecture & Travel Accounts

Objective: To understand Vijayanagara through accounts of foreign travellers.

Chapter Coverage:
1. Foundation of Vijayanagara - Harihara and Bukka, 1336
2. Accounts of Foreign Travellers:
3. Hampi - Sacred, Royal and Urban core
4. Architecture: Virupaksha Temple, Vitthala Temple, Lotus Mahal, Hazara Rama Temple

To Include: Photos of Hampi ruins, Map of Vijayanagara empire, drawings of Gopurams.

CBSE PROJECT FORMAT (Compulsory for all):

1. Cover Page - School Name, Topic, Name, Class, Session 2025-26
2. Certificate - From school
3. Acknowledgement
4. Index
5. Introduction (1 page)
6. Content chapters (20-25 pages) with pictures/maps
7. Conclusion (1 page)
8. Bibliography - NCERT, website, interview
9. Teacher's Remarks

Important: Project should be handwritten, min 25-30 pages, with 5-6 maps/pictures, viva questions will be asked from your topic.

POLITICAL SCIENCE

1) Project Topic: The 1975 National Emergency – Constitutional Crisis and the Resilience of Indian Democracy.

2) Write a handwritten report analyzing the causes, press censorship, and civil liberty impacts of the 1975 Emergency, including 1977 election results.

COMPUTER SCIENCE

COMPLETE THE NOTES OF COMPUER NETWORK IN COMPUTER NOTEBOOK and also try to solve the QUESTION ANSWERS

Chapter: Computer Networks and Web Services

1. Evolution of Networking

1.1 Computer Network

Definition: A computer network is a group of two or more computers and other devices connected together to share data, information and resources.

Advantages of Computer Networks:

1. Sharing files and information.
2. Sharing hardware like printers and scanners.
3. Sharing software and applications.
4. Fast communication.
5. Centralized data management.
6. Saving time and cost.

1.2 Evolution of Networking

The development of computer networking took place through the following stages:

1. ARPANET (Advanced Research Projects Agency Network)
   - Developed by the US Department of Defense in 1969. It was one of the earliest computer networks.
   - It connected computers at different research institutions.
   - It introduced the foundation of modern networking.
   - It used packet switching technology.
2. NSFNET (National Science Foundation Network)
   - Developed by the National Science Foundation of the USA in 1986.
   - Connected universities and research institutions.
   - Provided high-speed networking facilities.
   - Played an important role in the development of the Internet.
3. INTERNET
   - The Internet is a worldwide network of interconnected computer networks.
   - It uses the TCP/IP protocol suite.
   - It allows users to communicate and share information globally.
   - It provides services such as email, web browsing, file transfer and online communication.

2. Data Communication Terminologies

2.1 Concept of Communication

Data Communication: The process of transferring data or information between two or more devices through a communication medium is called data communication.

Example: Sending an email from one computer to another.

2.2 Components of Data Communication

There are five basic components:

1. Sender: The device that sends the data.
   Example: A computer sending an email.
2. Receiver: The device that receives the data.
   Example: A computer receiving an email.
4. Message: The information or data being transmitted.
   Example: Text, image, audio or video.
3. Communication Media: path through which data travels
   Example: Optical fibre, cables and radio waves.
5. Protocol: A set of rules that controls data communication.
   Example: TCP/IP, HTTP and FTP.

2.3 Measuring Capacity of Communication Media

1. Bandwidth
   - Bandwidth refers to the capacity of a communication channel to carry data.
   -

- It is generally measured in Hertz (Hz) for frequency range or bits per second (bps) for digital channel capacity, depending on context.
- Higher bandwidth generally allows more data to be transmitted per second.

2. Data Transfer Rate
   - It is the amount of data transferred from one device to another per unit of time.
   - It is measured in bits per second (bps).

Common Units:

Unit	Meaning
bps	Bits per second
Kbps	Kilobits per second
Mbps	Megabits per second
Gbps	Gigabits per second

Remember: In networking, lowercase b represents bits and uppercase B represents bytes.

2.4 IP Address

Definition: An IP (Internet Protocol) address is a unique logical address assigned to a device on an IP network to identify it and enable communication.

Types of IP Addresses:

1. IPv4:
   - Uses 32 bits. Written in four groups separated by dots.
   - Example: 192.168.1.10
2. IPv6:
   - Uses 128 bits.
   - Written in hexadecimal form separated by colons.
   - Example: 2001:db8::1

Purpose of IP Address:

- Identifies a device on a network.
- Helps route data to the correct destination.
- Enables communication between devices.

2.5 Switching Techniques

Switching is the process of transferring data from a source to a destination through a network.

1. Circuit Switching
   - A dedicated communication path is established between sender and receiver.
   - The path remains reserved during the communication.
   - Resources are not shared with other communications on that circuit.
   - Used in traditional telephone networks.
2. Packet Switching
   - Data is divided into small units called packets.
   - Packets are transmitted independently through the network.
   - Different packets may follow different routes.
   - They are reassembled at the destination.
   - Used by the Internet.

Difference Between Circuit Switching and Packet Switching

Circuit Switching	Packet Switching
Dedicated path is established.	No dedicated path is required.
Resources remain reserved.	Network resources are shared.
Suitable for continuous communication.	Efficient for data communication.
Used in traditional telephone systems.	Used in the Internet.

3. Transmission Media

Definition: Transmission media refers to the physical path or channel through which data travels from sender to receiver.

Transmission media are divided into two categories:

Wired Media (Guided Media)

Wireless Media (Unguided Media)

3.1 Wired Media

Wired media uses physical cables to transmit data.

1. Twisted Pair Cable
   - Consists of two insulated copper wires twisted together.
   - Twisting reduces electromagnetic interference.
   - Cheap and easy to install.
   - Commonly used in telephone lines and LANs.
   - Types: UTP (Unshielded Twisted Pair) and STP (Shielded Twisted Pair).
2. Coaxial Cable
   - Consists of a central copper conductor surrounded by insulation and metallic shielding.
   - Provides better protection against interference than ordinary twisted-pair cable.
   - Used in cable television and broadband connections.
3. Fibre-Optic Cable
   - Transmits data in the form of light signals.
   - Made of thin glass or plastic fibres.
   - Provides very high data transmission speed.
   - Supports long-distance communication.
   - Not affected by electromagnetic interference.
   - Used in high-speed Internet and telecommunications.

3.2 Wireless Media

Wireless media transmits data without physical cables.

1. Radio Waves
   - Transmit data through radio frequency signals.
   - Can travel in different directions.
   - Used in radio broadcasting, Wi-Fi and mobile communication.
2. Microwaves
   - Use high-frequency electromagnetic waves.
   - Generally require a line-of-sight path for terrestrial links.
   - Used in satellite communication and mobile networks.

3. Infrared Waves
   - Used for short-range communication.
   - Generally cannot pass through walls.
   - Often require a direct or reflected path.
   - Used in TV remote controls and some short-range devices.

Difference Between Wired and Wireless Media

Wired Media	**Wireless Media**
Uses physical cables.	Does not require physical cables.
Generally offers stable connections.	Can be affected by interference.
Installation may be difficult.	Installation is generally easier.
Examples: Fibre optic, coaxial.	Examples: Radio, microwave, infrared.

4. Network Devices

Network devices are hardware components used to connect computers and facilitate communication.

Important Network Devices

1. Modem (Modulator-Demodulator)
   - Converts digital signals into analogue signals and vice versa.
   - Used for communication over suitable transmission systems.
2. Ethernet Card (NIC)
   - Network Interface Card connects a computer to an Ethernet network.
   - Provides a network interface and a MAC address.
3. RJ45
   - A commonly used 8-position modular connector for Ethernet cables.
   - Connects computers and network devices through twisted-pair cables.
4. Repeater
   - Regenerates or reshapes weak signals.
   - Extends the communication distance of a network.
5. Hub
   - Connects multiple computers in a network.
   - Broadcasts incoming data to all connected ports.
   - Works at the Physical Layer.
6. Switch
   - Connects multiple devices in a LAN.
   - Forwards data to the appropriate port using MAC addresses.
   - Reduces unnecessary network traffic compared to a hub.
7. Router
   - Connects different networks.
   - Forwards packets using IP addresses.
   - Commonly connects a home or school LAN to the Internet.

8. Gateway
   - Connects networks that may use different protocols or architectures.
   - Acts as an entry and exit point between networks.
9. Wi-Fi Card
   - Allows a computer to connect to a wireless network.
   - Sends and receives data using radio waves.

5. Network Types and Network Topologies

5.1 Types of Networks

Networks are classified according to their geographical coverage.

1. PAN (Personal Area Network)
   - Covers a very small area around an individual.
   - Connects personal devices.
   - Example: Connecting a smartphone to wireless earbuds using Bluetooth.
2. LAN (Local Area Network)
   - Covers a small geographical area.
   - Generally used in homes, schools, offices and computer labs.
   - Provides high-speed communication.
3. MAN (Metropolitan Area Network)
   - Covers a city or large town.
   - Connects multiple LANs.
   - Example: A city-wide network connecting different offices.
4. WAN (Wide Area Network)
   - Covers large geographical areas such as countries or continents.
   - Connects multiple LANs and MANs.
   - Example: The Internet.

Comparison of Network Types

Network	Coverage Area	Example
PAN	Personal area	Bluetooth
LAN	Building or campus	School network
MAN	City	City-wide network
WAN	Country or worldwide	Internet

5.2 Network Topologies

Definition: Network topology refers to the physical or logical arrangement of computers and other devices in a network.

1. Bus Topology
   - All computers are connected to a single main cable called the backbone.
   - Data travels through the common cable.
   - Easy and inexpensive to install for small networks.
   - Failure of the backbone can stop the entire network.
   - Terminators are required at both ends of the backbone.

2. Star Topology
- All computers are connected to a central device such as a hub or switch.
- Easy to install and manage.
- Failure of one computer does not affect others.
- Failure of the central device stops the entire network.

3. Tree Topology
- It has a hierarchical structure.
- Combines characteristics of star and bus topologies.
- Multiple star networks are connected through a backbone.
- Suitable for large networks.
- Failure of a main backbone can affect connected branches.

Comparison of Network Topologies

Bus	**Star**	**Tree**
Single backbone cable.	Central hub or switch.	Hierarchical arrangement.
Simple and inexpensive.	Easy to manage.	Suitable for large networks.
Backbone failure affects the network.	Central device failure affects the network.	Main backbone failure affects branches.

6. Network Protocols

Definition: A network protocol is a set of rules and standards that governs communication and data exchange between devices over a network.

Important Network Protocols

Protocol	**Full Form**	**Main Function**
HTTP	Hypertext Transfer Protocol	Transfers web pages between browser and server.
FTP	File Transfer Protocol	Transfers files between computers.
PPP	Point-to-Point Protocol	Establishes direct communication between two network nodes.
SMTP	Simple Mail Transfer Protocol	Sends emails.
TCP/IP	Transmission Control Protocol / Internet Protocol	Provides communication and addressing across networks.
POP3	Post Office Protocol Version 3	Retrieves emails from a mail server.
HTTPS	Hypertext Transfer Protocol Secure	Secure communication for web browsing using encryption.
TELNET	Teletype Network	Provides remote text-based login to another computer.
VoIP	Voice over Internet Protocol	Transmits voice communication over the Internet.

Brief Explanation

1. HTTP
   - Used to transfer web pages.
   - Follows a request-response model.
   - It does not provide encryption by itself.
2. FTP
   - Used to upload and download files.
   - Supports file transfer between client and server.
3. PPP
   - Used for direct communication between two network devices.
   - Provides framing and link configuration.
4. SMTP
   - Used to send and relay emails.
   - Commonly used by email clients to send messages.
5. TCP/IP
   - The basic protocol suite of the Internet.
   - TCP provides reliable, ordered data delivery.
   - IP handles addressing and routing of packets.
6. POP3
   - Used to retrieve emails from a mail server.
   - Traditionally downloads messages to the user's device.
7. HTTPS
   - Secure version of HTTP.
   - Uses TLS encryption to protect communication.
   - Helps protect sensitive information during transmission.
8. TELNET
   - Used for remote login and command execution.
   - Transmits data without encryption.
   - Less secure than SSH.
9. VoIP
   - Allows voice calls over the Internet.
   - Converts voice into digital data packets.
   - Examples: Internet-based voice calling applications.

7. Introduction to Web Services

7.1 WWW (World Wide Web)

Definition: The World Wide Web is a collection of interlinked web pages and resources accessible over the Internet through web browsers.

Features:

1. Provides access to web pages.
2. Uses hyperlinks to connect information.
3. Uses HTTP and HTTPS protocols.
4. Supports text, images, audio and video.

5. Accessible through web browsers.

Difference Between Internet and WWW

Internet	**WWW**
A worldwide network of connected networks.	A collection of interlinked web resources.
Provides various services.	One of the services available through the Internet.
Supports email, FTP, WWW, etc.	Mainly uses HTTP/HTTPS.

7.2 HTML (HyperText Markup Language)

Definition: HTML is a standard markup language used to create and structure web pages.

Features:

- Uses tags enclosed in angle brackets.
- Defines headings, paragraphs, images, links and tables.
- Supported by web browsers.
- Uses elements such as <html>, <head>, <title> and <body>.

7.3 XML (Extensible Markup Language)

Definition: XML is a markup language used to store, organize and exchange structured data.

Features:

1. Uses user-defined tags.
2. Stores data in a structured format.
3. Tags are case-sensitive.
4. Requires properly nested and closed tags.
5. Does not have predefined tags like HTML.

Difference Between HTML and XML

HTML	**XML**
Used to structure and display web content.	Used to store and exchange data.
Has predefined tags.	Allows user-defined tags.
Focuses on presentation and structure.	Focuses on data description and structure.
Some closing tags may be optional.	Every element must be properly closed.
Generally not case-sensitive for tag names.	Case-sensitive.

7.4 Domain Name

Definition: A domain name is a human-readable address used to identify a website on the Internet.

Examples:

- google.com cbse.gov.in nic.in

Components of a Domain Name:

Example: www.google.com

- www – Host name/subdomain.
- google – Domain name.
- .com – Top-Level Domain (TLD).

Common Domain Extensions

Extension	Purpose
.com	Commercial websites
.org	Organizations
.edu	Educational institutions (commonly used in some countries)
.gov	Government websites (commonly used in the USA)
.in	India
.net	Originally network-related organizations

7.5 URL (Uniform Resource Locator)

Definition: URL is the complete address used to locate a resource on the Internet.

Example: https://www.example.com/index.html

Parts of a URL:

1. https – Protocol.
2. www – Host name.
3. example.com – Domain name.
4. /index.html – Path or resource name.

Uses of URL:

- Identifies web resources.
- Helps browsers locate web pages.
- Provides information about the access protocol and resource location.

7.6 Website

Definition: A website is a collection of related web pages hosted under a common domain name.

Examples:

www.google.com

www.cbse.gov.in

www.wikipedia.org

Types of Websites:

1. Static Website – Displays fixed content.
2. Dynamic Website – Displays content that can change according to user input, data or other conditions.

7.7 Web Browser

Definition: A web browser is application software used to access, retrieve and display web pages on the Internet.

Examples:

- Google Chrome.

- Microsoft Edge.
- Mozilla Firefox.
- Apple Safari. Opera.

Functions:

Opens websites.
Displays web pages.Downloads files.
Supports multimedia.
Manages bookmarks and browsing history.

7.8 Web Server

Definition: A web server is a computer system or software that stores, processes and delivers web content to clients through HTTP or HTTPS.

Functions:

- Stores website files.
- Processes browser requests.
- Delivers web pages.
- Handles client-server communication.

Examples:

- Apache HTTP Server.
- Nginx.
- Microsoft IIS.

7.9 Web Hosting

Definition: Web hosting is a service that provides storage space and resources on a server to make a website accessible through the Internet.

Types of Web Hosting:

1. Shared Hosting – Multiple websites share the same server.
2. VPS Hosting – A virtual private server provides allocated resources.
3. Dedicated Hosting – One complete server is assigned to a single customer.
4. Cloud Hosting – Website resources are provided through a network of servers.

Difference Between Web Server and Web Hosting

Web Server	**Web Hosting**
Stores and delivers website content.	Provides the service and resources to host a website.
Can refer to hardware or software.	A service offered by hosting providers.
Example: Apache, Nginx.	Example: Shared or cloud hosting.

8. Quick Revision – Important Full Forms

Abbreviation	**Full Form**
ARPANET	Advanced Research Projects Agency Network
NSFNET	National Science Foundation Network
PAN	Personal Area Network
LAN	Local Area Network
MAN	Metropolitan Area Network

WAN	Wide Area Network
IP	Internet Protocol
IPv4	Internet Protocol Version 4
IPv6	Internet Protocol Version 6
NIC	Network Interface Card
RJ45	Registered Jack 45
HTTP	Hypertext Transfer Protocol
FTP	File Transfer Protocol
PPP	Point-to-Point Protocol
SMTP	Simple Mail Transfer Protocol
TCP	Transmission Control Protocol
POP3	Post Office Protocol Version 3
HTTPS	Hypertext Transfer Protocol Secure
TELNET	Teletype Network
VoIP	Voice over Internet Protocol
WWW	World Wide Web
HTML	HyperText Markup Language
XML	Extensible Markup Language
URL	Uniform Resource Locator

9. Important Questions for CBSE Examination

Exam Preparation

A. Very Short Answer Questions (1 Mark)

1. What is a computer network?
2. Expand ARPANET and NSFNET.
3. What is data communication?
4. Name the five components of data communication.
5. Define bandwidth.
6. What is an IP address?
7. What is packet switching?
8. Expand LAN and WAN.
9. What is network topology?
10. What is a modem?
11. What is the function of a router?
12. Define HTTP.
13. What is the full form of SMTP?
14. What is WWW?
15. Define URL.

What is a web browser?

16. What is web hosting?
17. Expand VoIP.

B. Short Answer Questions (2 Marks)

1. Differentiate between ARPANET and NSFNET. Differentiate between bandwidth and data transfer rate.
2. Differentiate between circuit switching and packet switching.
3. Differentiate between IPv4 and IPv6.
4. Differentiate between wired and wireless transmission media.
5. Write two differences between hub and switch.
6. Differentiate between router and gateway.
7. Explain any two types of network topologies.
8. Differentiate between LAN and WAN.
9. Differentiate between HTTP and HTTPS.
10. Differentiate between HTML and XML.

C. Long Answer Questions (3-5 Marks)

1. Explain the evolution of networking from ARPANET to the Internet.
2. Explain the five components of data communication with examples.
3. Describe the different transmission media.
4. Explain the functions of different network devices.
5. Explain PAN, LAN, MAN and WAN with examples.
6. Explain Bus, Star and Tree topologies with diagrams.
7. Explain different network protocols and their functions.
8. Explain HTML, XML, URL and domain names.
9. Differentiate between a web browser, web server and web hosting.
10. Explain circuit switching and packet switching with examples.

INFORMATICS PRACTICES

COMPLETE THE NOTES OF COMPUER NETWORK IN COMPUTER NOTEBOOK and also try to solve the QUESTION ANSWERS

Chapter: Computer Networks and Web Services
(10 Marks in Board Exam)

1. Evolution of Networking

1.1 Computer Network

Definition: A computer network is a group of two or more computers and other devices connected together to share data, information and resources.

Advantages of Computer Networks:

i Sharing files and information.
ii Sharing hardware like printers and scanners.
iii Sharing software and applications.
iv Fast communication.
v Centralized data management.
vi Saving time and cost.

1.2 Evolution of Networking

The development of computer networking took place through the following stages:

1. ARPANET (Advanced Research Projects Agency Network)
   - Developed by the US Department of Defense in 1969. It was one of the earliest computer networks.
   - It connected computers at different research institutions.
   - It introduced the foundation of modern networking.
   - It used packet switching technology.
2. NSFNET (National Science Foundation Network)
   - Developed by the National Science Foundation of the USA in 1986.
   - Connected universities and research institutions.
   - Provided high-speed networking facilities.
   - Played an important role in the development of the Internet.
3. INTERNET
   - The Internet is a worldwide network of interconnected computer networks.
   - It uses the TCP/IP protocol suite.
   - It allows users to communicate and share information globally.
   - It provides services such as email, web browsing, file transfer and online communication.

2. Data Communication Terminologies

2.1 Concept of Communication

Data Communication: The process of transferring data or information between two or more devices through a communication medium is called data communication.
Example: Sending an email from one computer to another.

2.2 Components of Data Communication

There are five basic components:

1. Sender: The device that sends the data.
   Example: A computer sending an email.
2. Receiver: The device that receives the data.
   Example: A computer receiving an email.

3. Message: The information or data being transmitted.
   Example: Text, image, audio or video.
4. Communication Media: path through which data travels
   Example: Optical fibre, cables and radio waves.

5. Protocol: A set of rules that controls data communication.
   Example: TCP/IP, HTTP and FTP.

2.3 Measuring Capacity of Communication Media

1. Bandwidth
   - Bandwidth refers to the capacity of a communication channel to carry data.
   - It is generally measured in Hertz (Hz) for frequency range or bits per second (bps) for digital channel capacity, depending on context.
   - Higher bandwidth generally allows more data to be transmitted per second.
2. Data Transfer Rate
   - It is the amount of data transferred from one device to another per unit of time.
   - It is measured in bits per second (bps).

Common Units:

Unit	Meaning
bps	Bits per second
Kbps	Kilobits per second
Mbps	Megabits per second
Gbps	Gigabits per second

Remember: In networking, lowercase b represents bits and uppercase B represents bytes.

2.4 IP Address

Definition: An IP (Internet Protocol) address is a unique logical address assigned to a device on an IP network to identify it and enable communication.

Types of IP Addresses:

1. IPv4:
   - Uses 32 bits. Written in four groups separated by dots.
   - Example: 192.168.1.10
2. IPv6:
   - Uses 128 bits.
   - Written in hexadecimal form separated by colons.
   - Example: 2001:db8::1

Purpose of IP Address:

- Identifies a device on a network.
- Helps route data to the correct destination.
- Enables communication between devices.

2.5 Switching Techniques

Switching is the process of transferring data from a source to a destination through a network.

1. Circuit Switching
   - A dedicated communication path is established between sender and receiver.
   - The path remains reserved during the communication.
   - Resources are not shared with other communications on that circuit.
   - Used in traditional telephone networks.
2. Packet Switching
   - Data is divided into small units called packets.
   - Packets are transmitted independently through the network.
   - Different packets may follow different routes.
   - They are reassembled at the destination.
   - Used by the Internet.

Difference Between Circuit Switching and Packet Switching

Circuit Switching	**Packet Switching**
Dedicated path is established.	No dedicated path is required.
Resources remain reserved.	Network resources are shared.
Suitable for continuous communication.	Efficient for data communication.
Used in traditional telephone systems.	Used in the Internet.

3. Transmission Media

Definition: Transmission media refers to the physical path or channel through which data travels from sender to receiver.

Transmission media are divided into two categories:

Wired Media (Guided Media)

Wireless Media (Unguided Media)

3.1 Wired Media

Wired media uses physical cables to transmit data.

1. Twisted Pair Cable
   - Consists of two insulated copper wires twisted together.
   - Twisting reduces electromagnetic interference.
   - Cheap and easy to install.
   - Commonly used in telephone lines and LANs.
   - Types: UTP (Unshielded Twisted Pair) and STP (Shielded Twisted Pair).
2. Coaxial Cable
   - Consists of a central copper conductor surrounded by insulation and metallic shielding.
   - Provides better protection against interference than ordinary twisted-pair cable.
   - Used in cable television and broadband connections.
3. Fibre-Optic Cable
   - Transmits data in the form of light signals.
   - Made of thin glass or plastic fibres.

- Provides very high data transmission speed.
- Supports long-distance communication.
- Not affected by electromagnetic interference.
- Used in high-speed Internet and telecommunications.

3.2 Wireless Media

Wireless media transmits data without physical cables.

1. Radio Waves
   - Transmit data through radio frequency signals.
   - Can travel in different directions.
   - Used in radio broadcasting, Wi-Fi and mobile communication.
2. Microwaves
   - Use high-frequency electromagnetic waves.
   - Generally require a line-of-sight path for terrestrial links.
   - Used in satellite communication and mobile networks.
3. Infrared Waves
   - Used for short-range communication.
   - Generally cannot pass through walls.
   - Often require a direct or reflected path.
   - Used in TV remote controls and some short-range devices.

Difference Between Wired and Wireless Media

Wired Media	**Wireless Media**
Uses physical cables.	Does not require physical cables.
Generally offers stable connections.	Can be affected by interference.
Installation may be difficult.	Installation is generally easier.
Examples: Fibre optic, coaxial.	Examples: Radio, microwave, infrared.

4. Network Devices

Network devices are hardware components used to connect computers and facilitate communication.

Important Network Devices

1. Modem (Modulator-Demodulator)
   - Converts digital signals into analogue signals and vice versa.
   - Used for communication over suitable transmission systems.
2. Ethernet Card (NIC)
   - Network Interface Card connects a computer to an Ethernet network.
   - Provides a network interface and a MAC address.
3. RJ45
   - A commonly used 8-position modular connector for Ethernet cables.
   - Connects computers and network devices through twisted-pair cables.

4. Repeater
   - Regenerates or reshapes weak signals.
   - Extends the communication distance of a network.
5. Hub
   - Connects multiple computers in a network.
   - Broadcasts incoming data to all connected ports.
   - Works at the Physical Layer.
6. Switch
   - Connects multiple devices in a LAN.
   - Forwards data to the appropriate port using MAC addresses.
   - Reduces unnecessary network traffic compared to a hub.
7. Router
   - Connects different networks.
   - Forwards packets using IP addresses.
   - Commonly connects a home or school LAN to the Internet.
8. Gateway
   - Connects networks that may use different protocols or architectures.
   - Acts as an entry and exit point between networks.
9. Wi-Fi Card
   - Allows a computer to connect to a wireless network.
   - Sends and receives data using radio waves.

5. Network Types and Network Topologies

5.1 Types of Networks

Networks are classified according to their geographical coverage.

1. PAN (Personal Area Network)
   - Covers a very small area around an individual.
   - Connects personal devices.
   - Example: Connecting a smartphone to wireless earbuds using Bluetooth.
2. LAN (Local Area Network)
   - Covers a small geographical area.
   - Generally used in homes, schools, offices and computer labs.
   - Provides high-speed communication.
3. MAN (Metropolitan Area Network)
   - Covers a city or large town.
   - Connects multiple LANs.
   - Example: A city-wide network connecting different offices.
4. WAN (Wide Area Network)
   - Covers large geographical areas such as countries or continents.
   - Connects multiple LANs and MANs.
   - Example: The Internet.

Comparison of Network Types

Network	Coverage Area	Example
PAN	Personal area	Bluetooth
LAN	Building or campus	School network
MAN	City	City-wide network
WAN	Country or worldwide	Internet

5.2 Network Topologies

Definition: Network topology refers to the physical or logical arrangement of computers and other devices in a network.

1. **Bus Topology**
   - All computers are connected to a single main cable called the backbone.
   - Data travels through the common cable.
   - Easy and inexpensive to install for small networks.
   - Failure of the backbone can stop the entire network.
   - Terminators are required at both ends of the backbone.

2. Star Topology
   - All computers are connected to a central device such as a hub or switch.
   - Easy to install and manage.
   - Failure of one computer does not affect others.
   - Failure of the central device stops the entire network.

3. Tree Topology
   - It has a hierarchical structure.
   - Combines characteristics of star and bus topologies.
   - Multiple star networks are connected through a backbone.
   - Suitable for large networks.
   - Failure of a main backbone can affect connected branches.

Comparison of Network Topologies

Bus	Star	Tree
Single backbone cable.	Central hub or switch.	Hierarchical arrangement.
Simple and inexpensive.	Easy to manage.	Suitable for large networks.
Backbone failure affects the network.	Central device failure affects the network.	Main backbone failure affects branches.

6. Network Protocols

Definition: A network protocol is a set of rules and standards that governs communication and data exchange between devices over a network.

Important Network Protocols

Protocol	Full Form	Main Function
HTTP	Hypertext Transfer Protocol	Transfers web pages between browser and server.
FTP	File Transfer Protocol	Transfers files between computers.
PPP	Point-to-Point Protocol	Establishes direct communication between two network nodes.
SMTP	Simple Mail Transfer Protocol	Sends emails.
TCP/IP	Transmission Control Protocol / Internet Protocol	Provides communication and addressing across networks.
POP3	Post Office Protocol Version 3	Retrieves emails from a mail server.
HTTPS	Hypertext Transfer Protocol Secure	Secure communication for web browsing using encryption.
TELNET	Teletype Network	Provides remote text-based login to another computer.
VoIP	Voice over Internet Protocol	Transmits voice communication over the Internet.

Brief Explanation

1. HTTP
   - Used to transfer web pages.
   - Follows a request-response model.
   - It does not provide encryption by itself.
2. FTP
   - Used to upload and download files.
   - Supports file transfer between client and server.
3. PPP
   - Used for direct communication between two network devices.
   - Provides framing and link configuration.

4. SMTP
   - Used to send and relay emails.
   - Commonly used by email clients to send messages.
5. TCP/IP
   - The basic protocol suite of the Internet.
   - TCP provides reliable, ordered data delivery.
   - IP handles addressing and routing of packets.
6. POP3
   - Used to retrieve emails from a mail server.
   - Traditionally downloads messages to the user's device.

7. HTTPS
   - Secure version of HTTP.
   - Uses TLS encryption to protect communication.
   - Helps protect sensitive information during transmission.

8. TELNET
   - Used for remote login and command execution.
   - Transmits data without encryption.
   - Less secure than SSH.

9. VoIP
   - Allows voice calls over the Internet.
   - Converts voice into digital data packets.
   - Examples: Internet-based voice calling applications.

7. Introduction to Web Services

7.1 WWW (World Wide Web)

Definition: The World Wide Web is a collection of interlinked web pages and resources accessible over the Internet through web browsers.

Features:

i Provides access to web pages.
ii Uses hyperlinks to connect information.
iii Uses HTTP and HTTPS protocols.
iv Supports text, images, audio and video.
v Accessible through web browsers.

Difference Between Internet and WWW

Internet	**WWW**
A worldwide network of connected networks.	A collection of interlinked web resources.
Provides various services.	One of the services available through the Internet.
Supports email, FTP, WWW, etc.	Mainly uses HTTP/HTTPS.

7.2 HTML (HyperText Markup Language)

Definition: HTML is a standard markup language used to create and structure web pages.

Features:

- Uses tags enclosed in angle brackets.
- Defines headings, paragraphs, images, links and tables.
- Supported by web browsers.
- Uses elements such as <html>, <head>, <title> and <body>.

7.3 XML (Extensible Markup Language)

Definition: XML is a markup language used to store, organize and exchange structured data.

Features:

1. Uses user-defined tags.
2. Stores data in a structured format.
3. Tags are case-sensitive.
4. Requires properly nested and closed tags.
5. Does not have predefined tags like HTML.

Difference Between HTML and XML

HTML	**XML**
Used to structure and display web content.	Used to store and exchange data.
Has predefined tags.	Allows user-defined tags.
Focuses on presentation and structure.	Focuses on data description and structure.
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Generally not case-sensitive for tag names.	Case-sensitive.

7.4 Domain Name

Definition: A domain name is a human-readable address used to identify a website on the Internet.

Examples:

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Components of a Domain Name:

Example: www.google.com

- www – Host name/subdomain.
- google – Domain name.
- .com – Top-Level Domain (TLD).

Common Domain Extensions

Extension	**Purpose**
.com	Commercial websites
.org	Organizations
.edu	Educational institutions (commonly used in some countries)
.gov	Government websites (commonly used in the USA)
.in	India
.net	Originally network-related organizations

7.5 URL (Uniform Resource Locator)

Definition: URL is the complete address used to locate a resource on the Internet.

Example: https://www.example.com/index.html

Parts of a URL:

i https – Protocol.

ii www – Host name.
iii example.com – Domain name.
iv /index.html – Path or resource name.

Uses of URL:

- Identifies web resources.
- Helps browsers locate web pages.
- Provides information about the access protocol and resource location.

7.6 Website

Definition: A website is a collection of related web pages hosted under a common domain name.

Examples: www.google.com
www.cbse.gov.in
www.wikipedia.org

Types of Websites:

5. Static Website – Displays fixed content.
6. Dynamic Website – Displays content that can change according to user input, data or other conditions.

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Functions:

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- ✓ Manages bookmarks and browsing history.

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- Stores website files.
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- Delivers web pages.
- Handles client-server communication.

Examples:

- Apache HTTP Server.
- Nginx.

- Microsoft IIS.

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Can refer to hardware or software.	A service offered by hosting providers.
Example: Apache, Nginx.	Example: Shared or cloud hosting.

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VoIP	Voice over Internet Protocol
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XML	Extensible Markup Language
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8. Expand LAN and WAN.
9. What is network topology?
10. What is a modem?
11. What is the function of a router?
12. Define HTTP.
13. What is the full form of SMTP?
14. What is WWW?
15. Define URL.
16. What is a web browser?
17. What is web hosting?
18. Expand VoIP.

B. Short Answer Questions (2 Marks)

1. Differentiate between ARPANET and NSFNET. Differentiate between bandwidth and data transfer rate.
2. Differentiate between circuit switching and packet switching.
3. Differentiate between IPv4 and IPv6.
4. Differentiate between wired and wireless transmission media.
5. Write two differences between hub and switch.
6. Differentiate between router and gateway.
7. Explain any two types of network topologies.
8. Differentiate between LAN and WAN.
9. Differentiate between HTTP and HTTPS.
10. Differentiate between HTML and XML.
11. Differentiate between Internet and WWW.

C. Long Answer Questions (3-5 Marks)

1. Explain the evolution of networking from ARPANET to the Internet.
2. Explain the five components of data communication with examples.
3. Describe the different transmission media.

4. Explain the functions of different network devices.
5. Explain PAN, LAN, MAN and WAN with examples.
6. Explain Bus, Star and Tree topologies with diagrams.
7. Explain different network protocols and their functions.
8. Explain HTML, XML, URL and domain names.
9. Differentiate between a web browser, web server and web hosting.
10. Explain circuit switching and packet switching with examples.

SUB- FINE ART

1) Madhubani Painting.
2) Village Composition

**********THE END**********