9. Credit Scheme for 'O' Level (IT) Under DOEACC Scheme

9.1. Course Introduction

A credit system based on the AICTE norms has been introduced for indicating the efforts required to pass a specific level of course under the DOEACC Scheme. Award of credit to a student will facilitate measurement/comparison of study hours including Theory Lectures, Tutorials and Practical Assignments put in a given module/paper/subject under the Scheme with similar course in IT in India and abroad. This will also facilitate other Universities/ Apex Accrediting bodies to consider academic and professional equivalence of NIELIT courses running under DOEACC Scheme. This will also help students/organizations to transfer credits from NIELIT to other academic bodies and vice-versa for ensuring continuity in education. Following table gives the number of hours of theory lectures, tutorials and practicals per week to be attended and the credits earned by the student:-

9.2. Calculation of Credits

Sr. No.	Module Code	Module Name	No. of Lecture Theory Hours	No. of Tutorial/ Practical /Project Hours	Theory Credits	Practical Credits	Total Credits
			(A)	(B)	(C=(A)/ 15)	(D= ((B) /2* 15)	(E= (C) + (D))
1.	M1-R5	Information Technology Tools and Network Basics	48	72	3	2	5
2.	M2-R5	Web Designing & Publishing	48	72	3	2	5
3.	M3-R5	Programming and Problem Solving through Python	48	72	3	2	5
4.	M4-R5	Internet of Things and its Application	48	72	3	2	5
5.	PJ1-R5	Project		40		1	1
6.		**Total Credits**					**21**

Notes
1. One credit is defined as one hour of theory lecture and 2 hours of tutorials/ practical/project every week for one semester consisting of 15 weeks.
2. Total number of credits earned in a module is calculated using AICTE formula (as applicable to Under Graduate Courses in IT namely C=L + (T+P)/2 where L, T and P indicate number of hours per week for Lectures, Tutorials and Practicals. Hours spent during Project development is considered under Tutorials and Practicals.
3. The credit scheme has been implemented since July, 2003 examinations.
4. Fractions in Credits have been rounded to nearest integer.

10. Examination Pattern

The theory examination for each module under the fifth revised syllabus would be for a duration of three hours and the total marks for each subject would be 100. One Practical examination of three hours duration and 100 marks would be conducted. The first examination with the revised syllabus will be held in July 2020, for which the teaching will commence from January 2020 session.

Dates for the various activities related with examinations will be announced on NIELIT website, well in advance of the examinations.

Laboratory/ Practical work will be conducted at Institutions / organizations, which are running the course. NIELIT will be responsible for holding the examination for theory and practical both for the students from Accredited Centers and direct candidates.

10.1. Pass Percentage

To qualify a module, a candidate must have obtained at least 50% in each theory and practical examination. A successful project complete certificate is mandatory for student to qualify 'O' Level course. Following table shows the marks distribution.

Module Code	Module	Maximum Marks
M1-R5	Information Technology Tools and Network Basics	100
M2-R5	Web Designing & Publishing	100
M3-R5	Programming and Problem Solving through Python	100
M4-R5	Internet of Things and its Applications	100
PR1-R5	Practical based on M1-R5, M2-R5, M3-R5 and M4-R5	100
PJ1-R5	Project (Certificate only to qualify 'O' Level-IT)	-
	Total Maximum Marks	500

The marks will be translated into grades, while communicating results to the candidates. The gradation structure is as below:-

Pass Percentage	Grade
Failed (<50)	F
>= 50% to < 55%	D
>= 55% to < 65%	C
>= 65% to < 75%	B
>= 75% to < 85%	A
>=85%	S

10.2. Award of Certificates

The students would be eligible for the award of 'O' Level (IT) certificate on successfully qualifying the Theory Examinations of all modules, Practical Examination and the Project. The 'O' Level (IT) Certificate was recognized as equivalent to Foundation Level Course

by the Government of India for the purpose of employment vide Notification No. 43 & 49 dated 1st March, 1995 and 10th April, 1996 issued by the Ministry of Human Resources and Development, Government of India and is currently aligned at NSQF (National Skill Qualifications Framework) level 5.

10.3. Registration

Registration is a pre-requisite for appearing in 'O' Level(IT) examinations. A candidate can register at only one level at a time to appear for the examination. Registration is only for candidates and not for institutes. Candidate has to register with NIELIT through online portal.

10.4. Eligibility Criteria

The eligibility criteria for registration at 'O' Level is as follows:

10.4.1. Students from Institutes conducting accredited courses:

10+2 or ITI Certificate (One Year) after class 10 followed, in each case, by a NIELIT accredited 'O' Level course.

Or

Successful completion of the second year of a Government recognized polytechnic engineering diploma course after class 10, followed by an accredited 'O' Level course concurrently during the third year of the said polytechnic engineering diploma course. The certificate of 'O' level will be awarded only after successful completion of the polytechnic engineering diploma.

10.4.2. Direct Applicants

10+2 or ITI Certificate (One Year) after class 10, followed in each case, by one-year relevant experience. Relevant experience connotes job experience in IT, including teaching in a recognized institution as a faculty member, excludes coaching.

Or

A pass in the NCVT-DP&CS (data Preparation & Computer Software) Examination, conducted by DGE&T(Govt. of India)

For getting registered, a candidate fulfilling the eligibility criteria should apply online through NIELIT portal. Registration fee is also to be paid online. Registration fee once paid is not reimbursable or adjustable against any other payment.

Registration Application can be submitted online throughout the year, however cut off dates are specified for submitting Registration Application for each examinations for the convenience of processing and allotting Registration Numbers.

Cut off Dates for Registration	
January Examination	**July Examination**
Preceding 30th June	Preceding 31st December

Accredited Institutes are allowed to submit the Registration Application Form of their candidates online one month beyond the cut off dates.

10.5. Auto-upgradation:

The candidates successfully completing all papers (Theory, Practical and Project) of a particular Level in a particular Examination and wish to appear in the next Examination for immediate higher Level are exempted from the above cut off dates. Such candidates can fill up examinations Form and Registration Forms for higher Levels subject to following conditions:-

a) Combined Registration fee and Examination fee is paid online.

b) The facility is available to the candidates appearing through Accredited Institutes and not for direct applicants. However, the facility is available to a candidate who might have completed lower level as a direct candidate and wishing to appear for immediate higher level through Accredited Institutes.

c) The facility is also not available to the those candidates who might be appearing through Accredited institute but have cleared lower level prior to the preceding exam (e.g. if a candidate has passed 'O' Level Exam in Jan, 2019, he would be eligible for this facility in case he wishes to appear for 'A' Level Examinations in July, 2019 through Accredited Institute. If, however, he had passed 'O' Level prior to Jan., 2019 Exams, this facility would not be available to him).

d) This facility would also not be available to the candidate opting for Level jumping (e.g. from 'O' to 'B' or 'A' to 'C' Levels).

Once registered at a particular level, the registration is valid for ten consecutive examinations for 'O' Level, reckoned from the specific examination as indicated in the Registration allocation letter issued to the candidates.

Registration, by itself, does not entitle a candidate to appear for an examination at the Level concerned, unless all conditions, stipulated in the examination application form, and in any other notification, relevant to the examination are fulfilled by the candidate.

10.6. Re-registration:

Candidates who are not able to clear the level within the validity period of initial registration, are allowed to re-register for once, at the same level for another full term i.e. 5 years to clear the left over papers by submitting filled in Registration application and full Registration fee within one year of the expiry of the validity period of existing Registration.

11. Practical Examination Scheme

The Practical Examination will be conducted by the NIELIT in reputed Institutions for all candidates. The accredited institutes are obliged to facilitate the conduct of Practical Examinations and arrange infrastructure, support of its faculty and staff for the conduct of Practical Examination at their Centre. The practical examination scheme is as follows.

Number of Practical Examination	One
Duration of Practical Examination	Three hour duration including viva-voce
Max. Marks	100 = 80(Practical) + 20(Viva Voce)

Grading	Marks obtained by the students will be translated into the Grades as per the structure given Section 10.1.
Date(s)	Date(s) for practical examination will be announced on NIELIT website.

Only practical fees as decided from time to time by NIELIT are payable and institutes are not allowed to charge any fee from the candidates for facilitating the practical examination separately.

12. Hardware Requirement

12.1. Minimum Computer Configuration Recommended

Processor   :   1 GHz or higher
RAM   :   4 GB or higher
HDD   :   100 GB or higher free space
Monitor   :   SVGA or of latest technology
Mouse   :   Operating System compatible
Keyboard   :   Standard
NIC   :   Standard
Optical Drive   :   Standard
Speaker, Mic, Webcam   :   Standard
                                  :
Printer   :   Standard

Projector   :   Standard
Modem/DSL   :   Standard
Scanner   :   Standard

Sufficient number of computers are standard networking are part of satisfying criteria for accreditation.

12.2. Networking

NIC   :   Standard
RJ-45 Connector   :   Standard
Crimping Tools   :   Standard
UTP/STP/Coaxial Fiber Optic   :
Cables and their connectors   :   Standard
8/16 port Switch   :   Standard
Wi-Fi Router   :   Standard

12.3. Others

Arduino UNO or equivalent board sensors and motors

13. Software Requirement

Sr. No.	Particular	Software

1.	Operating System	Linux /Ubuntu 16 or higher
2.	NOS	Linux
3.	Software Package	Any relevant word processing/spreadsheet/ presentation like Libre Office 6.0
4.	Complier/Interpreter	Python
5.	Antivirus	Standard
6.	Internet and Web Publishing Tools	Standard Browser and publishing tools
7.	IoT	Arduino IDE, Any open source Tool

14. Parity Table Between Revision IV and Revision V of 'O' Level (IT) Syllabus

Previous Syllabus		Revised Syllabus	
Module Code (Revision IV)	**Revision IV (Module)**	**Module Code (Revision V)**	**Revision V (Module)**
M1-R4	IT Tools and Business System	M1-R5	Information Technology Tools and Network Basics
M2-R4	Internet Technology and Web Design	M2-R5	Web Designing & Publishing
M3-R4	Programming and Problem Solving Through 'C' Language	M3-R5	Programming and Problem Solving through Python
M4.1-R4	Application of .NET Technology	M4-R5	Internet of Things and its Applications
M4.2-R4	Introduction to Multimedia		
M4.3-R4	Introduction to ICT Resources		

1. The above table shows the equivalence between the modules of old syllabus and revised syllabus (Revision IV and V).
2. Candidates would not be allowed to appear in the equivalent papers of the Revision V (new syllabus), if they have already passed the relevant papers in earlier revision.
3. Candidates would have to pass a total of 4 papers, successfully completed project and pass one practical in order to qualify 'O' Level in Revision V syllabus.
4. In case, the candidate has cleared examination as per Revision II and/or Revision III, the equivalency of Revision II with III and Revision III with IV will be done before the equivalency with Revision V is done.
5. Candidates would be allowed exemption in equal number of papers which they have passed in earlier syllabi prior to Revision V.

15. Syllabus of Information Technology Tools and Network Basics (M1-R5)

15.1.   Introduction

The module is designed to equip a student to use computers for professional as well as day to day use. It provides theoretical background as well as in-depth knowledge of Software/ packages.

15.2.   Objectives

After completing the module, the incumbent will be able to:

➢ Acquire confidence in using computers in Office and General Life

➢ Identify the basic components of computers and terminology

➢ Understand file management

➢ Create documents using word processor, spreadsheet & presentation software

➢ Understand computer networks and browse the Internet, content search, email and collaborate with peers

➢ Use e-Governance applications and use computer to improve existing skills and learn new skills

➢ Understanding Social Networking platform

➢ Using the Internet for Digital Financial services

➢ Develop knowledge about FutureSkills

➢ Understand the various financial services and be aware of the various schemes started by Government.

15.3.   Duration

120 Hours - (Theory: 48hrs + Practical: 72 hrs)

15.4.   Outline of Module

Module Unit	Duration (Theory) in Hours	Duration (Practical) in Hours	Learning Objectives
1. Introduction to Computer	4	6	After completion of this unit of module, the Learner will be able to • Identify computers, IT gadgets and explain their evolution and applications. • Get familiar with various input, output and hardware components of a computer along with storage devices. • Get familiar with various types of software, utilities used for computer and mobile apps.

2.	Introduction to Operating System	4		6	After learning this unit, Learner will be: • Well acquainted with Operating System and its applications for both desktop and mobile devices. • Able to identify various desktop screen components and modify various properties, date, time etc. • Able to add and remove new program and features, manage files and folders. • Well versed with printing and know various types of file extensions.
3.	Word Processing	6		9	After completion of this unit, Learner will have in depth knowledge of • Word Processing, their usage, details of word processing screen. • Opening, saving and printing a document including pdf files. • Document creation, formatting of text, paragraph and whole document. • Inserting Header and Footer on the document. • Finding text on a word document and correcting spellings. • Inserting and manipulating tables, enhancing table using borders and shading features. • Preparing copies of a document labels etc. for sending various recipients using Mail Merge.
4.	Spreadsheet	8		12	After completion of this unit, Learner will have good hands-on practice on • Basic Knowledge of Spreadsheet Processing,

				their usage, details of Spreadsheet screen. • Opening, saving and printing a Spreadsheet. • Spreadsheet creation, inserting and editing data in cells, sorting and filtering of data. • Inserting and deleting rows /columns. • Applying basic formulas and functions. • Preparing chart to represent the information in a pictorial form.
5. Presentation	6		9	After completion of this unit, Learner will have good hands-on practice on • Basic Knowledge of presentations. • Opening/saving a presentation and printing of slides and handouts. • Manipulating slides to enhance the look of the slides as well as whole presentation by inserting a picture, objects, multimedia formatting etc. • Running a slide show with various transitions.
6. Introduction to Internet and WWW	6		9	After completion of this unit, Learner will be able to • Gather knowledge of various types of networks and topologies • Get an overview of the Internet, its applications and various browsers available to access the Internet. • Connect to the Internet using various modes of connections/devices available.

				• Get knowledge of device identification on local network as well as on the Internet for both Desktop and Mobile Devices. • Can search Information on the Internet on various topics. • Download and print web pages.
7. E-mail, Social Networking and e-Governance Services	6		9	After completion of this unit, Learner will be able to • Create an email account, compose an email, reply an email and send the email along with attachments • Get familiar with Social Networking, Instant Messaging and Blogs. • Get familiar with e-Governance Services, e-Commerce and Mobile Apps.
8. Digital Financial Tools and Applications	4		6	After completion of this unit, Learner will be able to • Know the Digital Financial Tools. • Get Knowledge of the Internet Banking Modes. • Use the Digital Locker and will be able to store documents in Digital Locker.
9. Overview of FutureSkills& Cyber Security	4		6	After completion of this unit, Learner will be familiar with the • Latest trends and technologies in upcoming fields in IECT. • Need of Cyber Security and will be able to secure their PC and Mobile devices by using basic security features.

15.5.   Marks Distribution

Module Unit	Written Marks (Max.)
1. Introduction to Computer, Introduction to Operating System	10
2. Word Processing	20
3. Spreadsheet	20
4. Presentation	20
5. Introduction to Internet and WWW, E-mail, Social Networking and e-Governance Services	20
6. Digital Financial Tools and Applications, Overview of FutureSkills& Cyber Security	10
7. Total	100

15.6. Detailed Syllabus

(i) Introduction to Computer

Computer and Latest IT gadgets, Evolution of Computers & its applications, IT gadgets and their applications, Basics of Hardware and Software, Central Processing Unit, Input devices, Output devices, Computer Memory & storage, Application Software, Systems Software, Utility Software, Open source and Proprietary Software, Mobile Apps.

(ii) Introduction to Operating System

Operating System, Basics of Operating System, Operating Systems for Desktop and Laptop, Operating Systems for Mobile Phone and Tablets, User Interface for Desktop and Laptop, Task Bar, Icons & shortcuts, running an application, Operating System simple setting, using mouse and changing its properties, changing system date and time, changing display properties, to add or remove Program and its features, adding, removing &sharing Printers, File and Folder management, types of file extensions.

(iii) Word Processing

Word Processing Basics, Opening Word Processing Package, Title Bar, Menu Bar, Toolbars & Sidebar, Creating a New Document, Opening and Closing Documents, Opening Documents, Save and Save As, Closing Document, Using The Help, Page Setup, Page Layout, Borders, Watermark, Print Preview, Printing of Documents, PDF file and Saving a Document as PDF file, Text Creation and manipulation, Document Creation, Editing Text, Text Selection, Cut, Copy and Paste, Font, Color, Style and Size selection, Alignment of Text, Undo & Redo, AutoCorrect, Spelling & Grammar, Find and Replace, Formatting the Text, Creating and using user defined Styles, Paragraph Indentation, Bullets and Numbering, Change case, Header & Footer, Table Manipulation, Insert & Draw Table, Changing cell width and height, Alignment of Text in cell, Delete / Insertion of Row, Column and Merging & Splitting of Cells, Border and Shading,

Mail Merge, Table of Contents, Indexes, Adding Comments, Tracking changes, Macros

(iv) Spreadsheet

Elements of Spread Sheet, Creating of Spread Sheet, Concept of Cell Address [Row and Column] and selecting a Cell, Entering Data [text, number, date] in Cells, Page Setup, Printing of Sheet, Saving Spreadsheet, Opening and Closing, Manipulation of Cells & Sheet, Modifying / Editing Cell Content , Formatting Cell (Font, Alignment, Style), Cut, Copy, Paste & Paste Special, Changing Cell Height and Width, Inserting and Deleting Rows, Column, AutoFill, Sorting & Filtering, Freezing panes, Formulas, Functions and Charts, Using Formulas for Numbers (Addition, Subtraction, Multiplication & Division), AutoSum, Functions (Sum, Count, MAX, MIN, AVERAGE),Sort, Filter, Advanced Filter, Database Functions (DSUM, DMIN,DMAX, DCOUNT, DCOUNTA), What-if Analysis, Pivot table Charts (Bar, Column, Pie, Line), Data Validation.

(v) Presentation

Creation of Presentation, Creating a Presentation Using a Template, Creating a Blank Presentation, Inserting & Editing Text on Slides, Inserting and Deleting Slides in a Presentation, Saving a Presentation, Manipulating Slides, Inserting Table , Adding Pictures, Inserting Other Objects, Resizing and Scaling an Object, Creating & using Master Slide, Presentation of Slides , Choosing a Set Up for Presentation, Running a Slide Show, Transition and Slide Timings, Automating a Slide Show, Providing Aesthetics to Slides & Printing, Enhancing Text Presentation, Working with Color and Line Style, Adding Movie and Sound, Adding Headers, Footers and Notes, Printing Slides and Handouts

(vi) Introduction to Internet and WWW

Basic of Computer Networks, Local Area Network (LAN), Wide Area Network (WAN), Network Topology , Internet, Concept of Internet & WWW, Applications of Internet, Website Address and URL, Introduction to IP Address, ISP and Role of ISP, Internet Protocol, Modes of Connecting Internet (HotSpot, Wifi, LAN Cable, BroadBand, USB Tethering), Identifying and uses of IP/MAC/IMEI of various devices, Popular Web Browsers (Internet Explorer/Edge, Chrome, Mozilla Firefox, Opera etc.), Exploring the Internet , Surfing the web, Popular Search Engines, Searching on Internet, Downloading Web Pages, Printing Web Pages

(vii) E-mail, Social Networking and e-Governance Services

Structure of E-mail, Using E-mails, Opening Email account, Mailbox: Inbox and Outbox, Creating and Sending a new E-mail, Replying to an E-mail message, Forwarding an E-mail message, Searching emails, Attaching files with email, Email Signature, Social Networking & e-Commerce, Facebook, Twitter, Linkedin, Instagram, Instant Messaging (Whatsapp, Facebook Messenger, Telegram), Introduction to Blogs, Basics of E-commerce, Netiquettes, Overview of e-Governance Services like Railway Reservation, Passport,

eHospital [ORS], Accessing e-Governance Services on Mobile Using "UMANG APP", Digital Locker

(viii)   Digital Financial Tools and Applications

Digital Financial Tools, Understanding OTP [One Time Password]and QR [Quick Response] Code, UPI [Unified Payment Interface], AEPS [Aadhaar Enabled Payment System], USSD[Unstructured Supplementary Service Data], Card [Credit / Debit], eWallet, PoS [Point of Sale], Internet Banking, National Electronic Fund Transfer (NEFT), Real Time Gross Settlement (RTGS), Immediate Payment Service (IMPS), Online Bill Payment

(ix) Overview of Futureskills and Cyber Security

Introduction to Internet of Things (IoT), Big Data Analytics, Cloud Computing, Virtual Reality, Artificial Intelligence, Social & Mobile, Blockchain Technology, 3D Printing/ Additive Manufacturing, Robotics Process Automation, Cyber Security, Need of Cyber Security, Securing PC, Securing Smart Phone

15.7.   Reference Books/Study Material

1. Libre Offce, Getting Started Guide by LibreOffice Documentation Team
2. Computer Networking by Ed Tittel, McGRaw Hills Companies
3. OpenOffice.org for DUMMIES by Gurdy Leete, Ellen Finkelstein and Mary Leete

16.   Syllabus of Web Designing and Publishing (M2-R5)

16.1. Introduction to Module

This module is designed to start web designing, irrespective of knowledge currently the students have in this area. The businesses, nowadays, are heavily relying on web based applications. The purpose of this module is to provide skill to students in designing layouts of web sites. By the end of this module, students will be able to describe the structure and functionality of the World Wide Web, create web pages using a combination of HTML, CSS, and JavaScript and Angular JS. The students will also learn how to design and integrate multimedia objects in web site. Further, the student will learn how web sites are published.

16.2. Objective

After completing the module, the student will be able to:
➢ Design and create effective web pages

➢ Integrate graphics in web pages

➢ Integrate various tools and techniques like HTML, CSS, JavaScript, Angular JS etc.

➢ Design and edit images using tools

➢ Embed the images in web pages

16.3. Duration

120 Hours - (Theory: 48hrs + Practical: 72 hrs)

16.4. Outline of Module

Module Unit	Duration (Theory) in Hours	Duration (Practical) in Hours	Learning Objectives
Introduction to Web Design	2	3	After completing this unit, Learner will be able to • Know the types of web site. • Know the role of front end and back end application. • Understand the concept of client side scripting and server side scripting
Editors	2	3	After completing this unit, learner will be able to • Use different editors available for writing code. • Understand working of editors.
HTML Basics	10	15	After completing this unit, Learner will be able to develop static website using different HTML Controls.
Cascading Style Sheets (CSS)	10	15	After completing this unit, Learner will be able to understand the • Purpose of CSS. • Role of CSS in web sites. • Roles of effects in Web site.
CSS Framework	6	9	After completing this unit, Learner will be able to use CSS Framework to develop web site effectively.
JavaScript and Angular JS	10	15	After completing this unit, Learner will be able to • Apply client side scripting.

			• Adding validations and checks on forms (web pages).
Photo Editor	6	9	After completing this unit, Learner will be able to edit images and embed in web pages.
Web Publishing and Browsing	2	3	The Learner will finally be able to publish the web sites.

16.5. Marks Distribution

Module Unit	Written Marks (Max.)
1 Introduction to Web Design and Editors, HTML Basics	25
2 Cascading Style Sheets (CSS)	20
3 CSS Framework	15
4 JavaScript and Angular Js	20
5 Photo Editor, Web Publishing and Browsing	20
6 Total	100

16.6. Detailed Syllabus

(i) Introduction to Web Design

Introduction of Internet, WWW, Website, Working of Websites, Webpages, Front End, Back End, Client and Server Scripting Languages, Responsive Web Designing, Types of Websites (Static and Dynamic Websites).

(ii) Editors

Downloading free Editors like Notepad++, Sublime Text Editor, Making use of Editors, File creation and editing, saving.

(iii)HTML Basics

HTML: Introduction, Basic Structure of HTML, Head Section and Elements of Head Section, Formatting Tags: Bold, Italic, Underline, Strikethrough, Div, Pre Tag Anchor links and Named Anchors Image Tag, Paragraphs, Comments, Tables: Attributes –(Border, Cellpadding, Cellspacing , height , width), TR, TH, TD, Rowspan, Colspan Lists : Ordered List , Unordered List , Definition List, Forms, Form Elements, Input types, Input Attributes, Text Input Text Area, Dropdown, Radio buttons , Check boxes, Submit and Reset Buttons Frames: Frameset, nested Frames.
HTML 5 Introduction, HTML5 New Elements: Section, Nav, Article, Aside, Audio Tag, Video Tag, HTML5 Form Validations: Require Attribute, Pattern

Attribute, Autofocus Attribute, email, number type, date type , Range type, HTML embed multimedia, HTML Layout, HTML Iframe

(iv) CSS

Introduction to CSS, Types of CSS, CSS Selectors: Universal Selector, ID selector, Tag Selector, Class Selector, Sub Selector, Attribute Selector, Group Selector, CSS Properties: Back Ground properties, Block Properties, Box properties, List properties, Border Properties, Positioning Properties, CSS Lists CSS Tables, CSS Menu Design CSS Image Gallery,

(v) CSS Framework

Web Site Development using W3.CSS Framework, W3.CSS Intro, W3.CSS Colors, W3.CSS Containers, W3.CSS Panels, W3.CSSBorders, W3.CSSFonts, W3.CSS Text, W3.CSS Tables, W3.CSS List, W3.CSSImages, W3.CSS Grid

(vi) JavaScript and Angular JS

Introduction to Client Side Scripting Language, Variables in Java Script, Operators in JS, Conditions Statements, JS Popup Boxes, JS Events, Basic Form Validations in JavaScript. Introduction to Angular JS: Expressions, Modules and Directives.

(vii) Photo Editor

Features of Photo Editing:Tools: Selection Tools, Paint Tools, Transform Tools, Text Tool, Layers, Brightness/ Contrast, Improve Colors and tone, Filters.

(viii) Web Publishing and Browsing

Overview, SGML (Standard Generalized Markup Language), Web hosting Basics, Documents Interchange Standards, Components of Web Publishing, Document management, Web Page Design Considerations and Principles, Search and Meta Search Engines, WWW, Browser, HTTP, Publishing Tools.

16.7. Reference Books/Study Material

1. HTML5, Black Book, Kagent Learning Solution Inc, 2014
2. Mastering HTML, CSS &JavaScript Web Publishing by Lemay Laura, BPB publications
3. HTML & CSS: The Complete Reference by Thomas Powell
4. Web Design, McGraw –hill
5. Learning Angular JS by Brad Dayley, Pearson

17.   Syllabus of Programming and Problem Solving Through Python Language (M3-R5)

17.1. Introduction to Module

Python is easy to use, powerful and versatile programming language, making it a great choice for developers. Python is used widely in different areas likes building Raspberry Pi applications, writing script program for desktop applications,

configuring servers, developing machine learning& data analytics applications and developing web applications.

17.2. Objectives

The objectives of this module are to make the learners understand the programming language concepts like Data Types, Loops, Functions; Python Lists, Strings, Tuples, Dictionaries, Elementary Data Handling using Pandas, NumPy etc.

After completion of this course, the learner is expected to analyze the real life problem and write a program in Python to solve the problem. The main emphasis of the module will be on writing algorithm to solve problems and implement in Python. After completion of the module, the learner will be able to

- ➢ Draw flow charts for solving different problems
- ➢ Develop efficient algorithms for solving a problem
- ➢ Use the various constructs of Python viz. conditional, iteration
- ➢ Write programs making judicious use of Lists, Strings, Tuples, Dictionaries wherever required
- ➢ Manage data using NumPy
- ➢ Handle files and create Modules in Python

17.3. Duration

120 Hours - (Theory: 48hrs + Practical: 72 hrs)

17.4. Outline of Module

Module Unit	Duration (Theory) in Hours	Duration (Practical) in Hours	Learning Objectives
1. Introduction to Programming	2	3	After completion of this unit of module, Learner will be able to • Understand the concept of Programming. • Understand evolution of Programming.
2. Algorithm and Flowcharts to solve problems	6	9	After completion of this unit of module, Learner will be able to • Understand the concepts and purposes of algorithm and flowchart. • Use algorithm and flowchart to solve problem independent of language. • Gain knowledge of different constructs of algorithm and flowchart.

3.	Introduction to Python	2	3	After completion of this unit of module, candidate will be able to • Understand features of Python that make it one the most popular languages in the industry. • Understand structure of Python problem. • Understand the areas where Python is used.
4.	Operators, Expressions and Python Statements	10	15	After completion of this unit of module, Learner will be able to • Use the basic operators and expressions available in Python in developing program. • Understand and use various Python statements like conditional constructs, looping constructs in writing Python program.
5.	Sequence data types	6	9	After completion of this unit of module, Learner will be able to • Work with various built-in Sequence datatypes and their use • Understand the concept of mutable and immutable objects
6.	Functions	10	15	After completion of this unit of module, Learner will be able to • Apply the in-built functions available in Python in solving different problems. • Work with modular approach using user defined functions.
7.	File Processing	6	9	After completion of this unit of module, Learner will be able to work with files and reading /writing onto files.
8.	Modules	2	3	After completion of this unit of module, Learner will be able to • Understand the concept of modules and importing,

			loading and reloading of modules in programs.
9. NumPy Basics	4	6	After completion of this unit of module, Learner will be able to • Work on NumPy array manipulation to access data and subarrays and to split, reshape, join arrays etc
Total	48	72	

17.5. Marks Distribution

Module Unit	Written Marks (Max.)
1. Introduction to Programming, Algorithm and Flowcharts to solve problems	20
2. Introduction to Python, Operators, Expressions and Python Statements, Sequence data types	30
3. Functions, File Processing, Modules	40
4. NumPy Basics	10
5. Total	100

17.6. Detailed Syllabus

(i) Introduction to Programming

The basic Model of computation, algorithms, flowcharts, Programming Languages, compilation, testing & debugging and documentation.

(ii) Algorithms and Flowcharts to Solve Problems

Flow Chart Symbols, Basic algorithms/flowcharts for sequential processing, decision based processing and iterative processing. Some examples like: Exchanging values of two variables, summation of a set of numbers, Decimal Base to Binary Base conversion, Reversing digits of an integer, GCD (Greatest Common Divisor) of two numbers, Test whether a number is prime, factorial computation, Fibonacci sequence, Evaluate 'sin x' as sum of a series, Reverse order of elements of an array, Find largest number in an array, Print elements of upper triangular matrix, etc.

(iii) Introduction to Python

Python Introduction, Technical Strength of Python, Introduction to Python Interpreter and program execution, Using Comments, Literals, Constants, Python's Built-in Data types, Numbers (Integers, Floats, Complex Numbers, Real, Sets), Strings (Slicing, Indexing, Concatenation, other operations on

Strings), Accepting input from Console, printing statements, Simple 'Python' programs.

(iv) Operators, Expressions and Python Statements

Assignment statement, expressions, Arithmetic, Relational, Logical, Bitwise operators and their precedence, Conditional statements: if, if-else, if-elif-else; simple programs, Notion of iterative computation and control flow –range function, While Statement, For loop, break statement, Continue Statement, Pass statement, else, assert.

(v) Sequence Data Types

Lists, tuples and dictionary, (Slicing, Indexing, Concatenation, other operations on Sequence datatype),concept of mutability, Examples to include finding the maximum, minimum, mean; linear search on list/tuple of numbers, and counting the frequency of elements in a list using a dictionary.

(vi) Functions

Top-down approach of problem solving, Modular programming and functions, Function parameters, Local variables, the Return statement, DocStrings, global statement, Default argument values, keyword arguments, VarArgs parameters.

Library function-input(), eval(),print(), String Functions: count(), find(), rfind(), capitalize(), title(), lower(), upper(), swapcase(), islower(), isupper(), istitle(), replace(), strip(), lstrip(), rstrip(), aplit(), partition(), join(), isspace(), isalpha(), isdigit(), isalnum(), startswith(), endswith(), encode(), decode(), String: Slicing, Membership, Pattern Matching, Numeric Functions: eval(), max(), min(), pow(), round(), int(), random(), ceil(), floor(), sqrt(), Date & Time Functions, Recursion.

(vii) File Processing

Concept of Files, File opening in various modes and closing of a file, Reading from a file, Writing onto a file, File functions-open(), close(), read(), readline(), readlines(),write(), writelines(),tell(),seek(), Command Line arguments.

(viii) Scope and Modules

Scope of objects and Names, LEGB Rule
Module Basics, Module Files as Namespaces, Import Model, Reloading Modules.

(ix) NumPy Basics

Introduction to NumPy, ndarray, datatypes, array attributes, array creation routines, Array From Existing Data, Array From Numerical Ranges, Indexing & Slicing.

17.7. Reference Books/Study Material

1. Python Programming- A modular Approach (with Graphics, database, Mobile and Web Applications by Sheetal Taneja and Naveen Kumar, Pearson.

2. Python Network Programming Cookbook by Pradeeban Kathiravelu, Dr. M. O. Faruque Sarkar, PACKT.
3. Head First Python by Paul Berry, O'Reilly
4. Dive into Python by Mark Pilgrim, APress
5. Beginning Programming with Python Dummies by John Paul Meuller.

18.   Syllabus of Internet of Things and its Applications (M4-R5)

18.1. Introduction

The module is designed to equip the students to understand the basics of connected world that is Internet of Things (IoT) and its applications. IoT primarily refers to the connected and smarter world having physical and virtual objects with some unique identities. IoT applications span across domains of industrial control, retail, energy, agriculture, etc.

This module provides the theoretical and practical aspects of interfacing sensors and actuators, making informed world of Things speaking to each other. The different type of communication modes and models are discussed in detail. The in-depth knowledge of software and packages is provided to make applications in IoT paradigm.

18.2. Objective

After completing the module, the learner will be able to:
- Understand how connected devices work together to update other applications.
- Acquire knowledge to interface sensors and actuators with microcontroller based Arduino platform.
- Writing C programs in Arduino IDE .
- Understand the Communication between microcontroller and PC using serial communication.
- Build IoT based applications and understand how data flows between things.
- Understand how electronic devices control electrical appliances working at 220v AC.
- Understand security aspect of IoT devices.
- Enhance skill set towards better personality development.

18.3. Duration

120 Hours - (Theory: 48hrs + Practical: 72 hrs)

18.4. Outline of Module

Module Unit	Duration (Theory) in Hours	Duration (Practical) in Hours	Learning Objectives
1. Introduction to IoT – Applications/Dev	4	6	After completion of this unit of module, Learner will be able to

ices, Protocols andCommunication Model				• Understand various IoT Applications, protocols, architecture, etc. • Understand the characteristics of IoT devices. • Know about Physical Design/Logical Design, Functional blocks of IoT and Communication Models.
2. Things and Connections	4		6	After completing this unit, Learner will be able to understand • Closed loop/ feedback loop system. • The use of sensors, actuators and controllers in the IoT process flow. • TCP/IP Versus OSI models. • Wired and wireless connectivity.
3. Sensors, Actuators and Microcontrollers	8		12	After completing this unit, Learner will be able to understand • The role of Sensors, transducers in measuring physical quantities. • Working and characteristics of actuators. • Role and use of microcontroller in building various electronic devices.
4. Building IoT Applications	20		30	After completing this unit, Learner will be able to understand

				• Working of microcontroller and hardware prototyping Arduino platform. • The role of 'C' language in building IoT applications. • Built-in Data-type, operators-expressions • Conditional statements and loops. • Arrays, functions. • Digital, analog pins of Arduino. • Interfacing sensors, actuator. • Using ArduBlock GUI tool.
5. Security and Future of IoT Ecosystem		4	6	After completing this unit, Learner will be able to understand • Need of security in IoT. • Various basic concept of security. • Security levels. • Need of powerful CPU for Future IoT eco system.
6. Soft skills-Personality Development		8	12	After completing this unit, Learner will be able to understand • Role of positive personality and determinants of personality. • Self-esteem. • Communication and writing skills.

18.5. Marks Distribution

Module Unit	Written Marks (Max.)

1. Introduction to IoT – Applications/Devices, Protocols and Communication Model	10
2. Things and Connections	10
3. Sensors, Actuators and Microcontrollers	15
4. Building IoT Applications	40
5. Security and Future of IoT Ecosystem	5
6. Soft skills-Personality Development	20
7. Total	100

18.6. Detailed Syllabus

(i) Introduction to Internet of Things – Applications/Devices, Protocols andCommunication Model

Introduction - Overview of Internet of Things(IoT), the characteristics of devices and applications in IoT ecosystem, building blocks of IoT, Various technologies making up IoT ecosystem, IoT levels, IoT design methodology, The Physical Design/Logical Design of IoT, Functional blocks of IoT and Communication Models, Development Tools used in IoT.

(ii) Things and Connections

Working of Controlled Systems, Real-time systems with feedback loop e.g. thermostat in refrigrator, AC, etc.Connectivity models – TCP/IP versus OSI model, different type of modes using wired and wireless methodology, The process flow of an IoT application.

(iii)Sensors, Actuators and Microcontrollers

Sensor - Measuring physical quantities in digital world e.g. light sensor, moisture sensor, temperature sensor, etc.

Actuator – moving or controlling system e.g. DC motor, different type of actuators

Controller – Role of microcontroller as gateway to interfacing sensors and actuators, microcontroller vs microprocessor, different type of microcontrollers in embedded ecosystem.

(iv)Building IoT applications

Introduction to Arduino IDE – writing code in sketch, compiling-debugging, uploading the file to Arduino board, role of serial monitor.

Embedded 'C' Language basics - Variables and Identifiers, Built-in Data Types, Arithmetic operators and Expressions, Constants and Literals, assignment.

Conditional Statements and Loops - Decision making using Relational Operators, Logical Connectives - conditions, if-else statement, Loops: while loop, do while, for loop, Nested loops, Infinite loops, Switch statement.

Arrays – Declaring and manipulating single dimension arrays
Functions - Standard Library of C functions in Arduino IDE, Prototype of a function: Formal parameter list, Return Type, Function call.

Interfacing sensors – The working of digital versus analog pins in Arduino platform, interfacing LED, Button, Sensors-DHT, LDR, MQ135, IR. Display the data on Liquid Crystal Display(LCD), interfacing keypad

Serial communication – interfacing HC-05(Bluetooth module)
Control/handle 220V AC supply – interfacing relay module.

(v) Security and Future of IoT Ecosystem

Need of security in IoT - Why Security? Privacy for IoT enabled devices- IoT security for consumer devices- Security levels, protecting IoT devices

Future IoT eco system - Need of power full core for building secure algorithms, Examples for new trends - AI, ML penetration to IoT

(vi) Soft skills-Personality Development

Personality Development - Determinants of Personality- self-awareness, motivation, self-discipline, etc., building a positive personality, gestures.

Self-esteem - self-efficacy, self-motivation, time management, stress management, Etiquettes & manners.

Communication and writing skills- objective, attributes and categories of communication, Writing Skills – Resume, Letters, Report, Presentation, etc. Interview skills and body language.

18.7. Use-case for building IoT based Applications

A. Using Arduino and sensors/actuators
i. Interfacing Light Emitting Diode(LED)- Blinking LED :
This use case will be used for familiarizing the GPIO peripheral of atmega micro controller. The LED will be used as a device and GPIO will work as output mode.
ii. Interfacing Button and LED – LED blinking/glow when button is pressed
This use case will help to understand the GPIO in two different modes, Input - Button and LED - output mode.
iii. Interfacing Light Dependent Resistor (LDR) and LED, displaying automatic night lamp

This use case will help to understand ADC peripheral and how to read analog data from sensors.

iv. Interfacing Temperature Sensor(LM35) and/or humidity sensor (e.g. DHT11)
This use case will help to connect traditional environmental monitoring sensors (Temperature and humidity) to the Arduino development board. Also use the suitable libraries for implementing these case studies.

v. Interfacing Liquid Crystal Display(LCD) – display data generated by sensor on LCD
This case study will demonstrate how to provide local display unit with Arduino micro controller. Use suitable libraries for implementing these case studies.

vi. Interfacing Air Quality Sensor-pollution (e.g. MQ135) - display data on LCD, switch on LED when data sensed is higher than specified value.
This use case will help to understand how to use traditional smart pollution management sensors with Arduino platform for developing applications as a part of smart city projects.

vii. Interfacing Bluetooth module (e.g. HC05)- receiving data from mobile phone on Arduino and display on LCD
This use case will help to understand the connectivity solution to Arduino to a gadget like mobile phone. Bluetooth is used as connectivity solution in this application.

viii. Interfacing Relay module to demonstrate Bluetooth based home automation application. (using Bluetooth and relay).
This use case will enable the IoT node capability of Arduino development boards by integrating actuator (relay connected to GPIO) to Arduino board and remote connectivity (Using Bluetooth) using a mobile phone with the help of a readily available Bluetooth serial application.

18.8. Reference Books/Study Material

1. Macro Schwartz, "Internet of Things with Arduino- Cookbook", Packt 2016
2. Arshdeep Bajga and Vijay Madisetti, "Internet of Things- A Hands-on Approach" Universities Press, 2014
3. Massimo Banzi, "Getting started with Arduino", 2nd Edition, Oreilly, 2011 [Make:Makezine.com]
4. Macro Schwartz, "Internet of Things with Arduino", Open Home Automation
5. Michael Margolis, "Arduino Cookbook", Oreilly, 2011

19. Sample Practical Assignments

19.1. Information Technology Tools and Network Basics (M1-R5)

i. Do the following settings
   a. Display pointer trails
   b. Change the normal pointer of a mouse to another pointer
   c. Set the date advanced by 2 months
   d. Reset the system date & time
   e. Set the system time late by 2 hrs: 40 minutes.

      f.   Set the Yesterday date and time in your Operating System.

ii. Do the followings
   a. Interchange the functions of left and right mouse buttons.
   b. Change the wallpaper of your computer and set it to a paint brush file made by you.
   c. Change the screen saver of your computer and change it to 'marquee'
   d. Set your name as the text and wait time should be 2 minutes.

iii. Create the following folders under the specified locations using windows.
   a. NIELIT on desktop
   b. R1 on the c: i.e. root
   c. D2 on desktop
   d. R2 on the c:
   e. Create a folder NIELIT-1 under the D1 folder
   f. Create a folder D2-1 under the D2 folder
   g. Copy this D2-1 folder and paste it under R1 folder.
   h. Delete the folder D2-1 from R1 folder
   i. Create the folder R1-1 under R1 folder
   j. Copy R1-1 folder under the R2 folder
   k. Rename folder R1-1 under R2 folder as 'subfolder of R2'
   l. From the c: copy all files to folder R2
   m. Delete all the files from the folder R2
   n. Recover all the deleted files

iv. Create a document in Word on a topic of your choice. Format the document with various fonts (minimum 10, maximum 12) and margins (minimum 1.5, maximum 3). The document should include
   a. A bulleted or numbered list
   b. A table containing name, address, basic pay, department as column heading
   c. A picture of lion using clip art gallery
   d. An example of word art
   e. A header with student name & date
   f. A footer with pagination

v. Create a document with the text given below and save it as **First**

A Read only Memory is a memory unit that performs the read operation only, it does not have a write capability. This implies that binary information stored in a ROM is made permanent during the hardware production of the unit and cannot be altered by writing different words into it. Whereas a RAM is a general-purpose device whose contents can be altered during the computational process, a ROM is restricted to reading words that are permanently stored within the unit. The binary information to be stored specified by the designer, is then embedded in the unit to form the required interconnection pattern.

Do the following
   a. Count the occurrences of the word "ROM" in the above document.
   b. Replace ROM with Read Only Memory in the entire document
   c. Underline the text Read Only Memory
   d. Make an auto correct entry for ROM and it should be replaced by Read Only
   e. Memory

vi. Use the file First to perform the following operations
  a. Make the first line of document bold.
  b. Make the second line italic.
  c. Underline the third line.
  d. Align the fourth line to center.
  e. Make the font color of first line as red.
  f. Change the font style of fifth line to Arial.
  g. Change the second line to 18 points.
  h. Insert the date & time at the start of document.

vii. Use the document saved earlier and perform the page setting as follows.
  a. Top Margin 1.3"
  b. Bottom margin 1.4"
  c. Left margin 1.30"
  d. Right margin 1.30"
  e. Gutter margin 1.2"
  f. Header 0.7"
  g. Footer 0.7"
  h. Paper size executive
  i. Orientation landscape

viii. Create a table in word as shown below with following fields.

Roll No	Name	Marks		Total
		Physics	Chemistry	Marks
1.	Ritu	78	88	166
2.	Amit	90	92	182
3.	Rakesh	67	78	145
4.	Rohit	50	50	100
5.	Niti	60	65	125
6.	Garima	89	67	156

ix. Do the followings.
  a. In the total marks column, entries should be calculated using formulas and it is the sum of marks in physics and marks in chemistry.
  b. Insert a new row at the end of the table and also find grand total using formula.
  c. Sort the table based on total marks
  d. The date and heading should be center aligned
  e. Heading should be in bold and underlined

x. Below is given a letter and some addresses. This letter is to be sent to all these addresses. User mail merge

Addresses are:

1) Amit, H No 424 sector 8D,Lajpat Nagar, New Delhi
2) Rohit, H No 444, Sector 125C,Chandigarh
3) Jyoti, H NO 550, Sector 16A, Gomti Nagar, Lucknow

The Letter is

To

<<Name>>

<<Address>>

Dear <<Name>>

You are advised to appear for an interview on the <<Date>>at 9:00 A.M with your original documents.

Yours Sincerely

ABC Limited,

Industrial Phase –7, New Delhi.

xi. Make a template for the bio-data with the following format
Bio-Data

Name :

Father's Name :

Date of Birth :

Age :

Address :

Educational Qualification

Sr No Qualification Board Percentage

Work Experience:

xii. Type the following data using spreadsheet tool and save the file as First

A	B	C	D	E
513				
501				
504				
513				
511				
516				
532				
504				
432				

501				
510				
517				
479				
494				
498				

Do the following

(a) Highlight column A and copy it to column C
(b) Sort the data in column C in ascending order
(c) What is the lowest number in the list (use a function)
(d) Copy the data in column A to column E and sort it in descending order
(e) What is the highest number in the list (use a function)
(f) How many numbers in this list are bigger than 500 (use a database function)
(g) How many numbers in column A are between 520 and 540 inclusive
(use a database function),

xiii. Type the following data in spreadsheet and save it as Second.

A	B	C	D
370	70.5		
61166	53.5		
684	65		
449	76.5		
643	70		
1551	71		
616	60.5		
403	51.5		

Do the following

(a) Complete column C for finding product x * y
(b) Find sum of x column at the end of data
(c) Find sum of y column at the end of data
(d) Find sum of x * y column at the end of data
(e) Find sum of x^2
(f) Find sum of y^2

xiv. Enter the following data using spreadsheet tool and save it in Grade

Name	Marks1	Marks2	Marks3	Total	Percentage
Amit	80	70	80		
Renu	70	60	90		
Rajeev	87	89	65		
Munish	76	67	44		

Sanjeev	98	76	78		
Anita	65	76	87		

Do the following.
(a) Compute the total marks and percentage of each student by entering appropriate
formula.
(b) Compute the grades based on following criteria
If percentage >= 90 then grade = A
If percentage >= 80 and <90 then grade = B
If percentage >= 70 and <80 then grade = C
If percentage >= 60 and <70 then grade = D
If percentage < 60 then grade = E
(c) Draw a border around the worksheet
(d) Change the font size of heading to 14 points and underline it and hide column c
(e) Increase the width of column A to 15 characters
(f) Right Align the values in column B, C, F

xv. A university maintains a year wise result for four courses and then generates an average report as given below.

Sr. No.	Year	Course1	Course2	Course3	Course4	Average
1	2013	650	675	666	456	
2	2014	600	700	656	765	
3	2015	677	655	765	400	
4	2017	400	400	400	400	
5	2018	560	760	467	737	
Total						

(a) Complete the report to calculate the course wise average in row 6
(b) Provide formula to calculate year wise average in column G
(c) Generate a column chart to compare data.

xvi. A person wants to start a business and he has four schemes to invest money according to profit and years. Find out which scheme is the most profitable using scenario manager.

Investment Amount	Percentage for profit	No. of years
20000	10	6
40000	20	5
14000	30	4
12000	15	5

xvii. A company records the details of total sales (in Rs.) Item and month wise in the following format

Sector	Jan	Feb	March	April
PCs	12000	17000	15000	20000

Laptops	14000	18000	15000	16000
Printers	15000	18000	13000	12000
Scanners	16000	15000	14000	23000

(a) Enter the data using spreadsheet and save it as sector
(b) Using appropriate formula, calculate total sale for each sector
(c) Create a 3-D column chart to show sector wise data for all four months
(d) Create a 3-D pie chart to show sales in Jan in all sectors

xviii. Type the following data and save it in employee file using spreadsheet tool.

Name	Department	Designation	Salary	Address
Anju	TRG	MD	100000	CHD
Amit	TRG	AD	200000	MOHALI
Renu	BILL	MD	300000	CHD
Anita	BILL	AD	20000	MOHALI
Shivani	S/W	MD	10000	CHD

Do the following
  a) Count the total no. of employees department wise
  b) List the name of employees whose designation is 'MD'
  c) List the name and department of employees whose address is Chandigarh
  d) List the name of employees whose salary is greater than 5000
  e) List the Address of employees whose department is 'TRG'

xix. Set up a new presentation of three slides.
  1. **On the master slide:**
  a) Apply a theme of your choice to the master slide.
  b) Include an automated page number in the bottom left of the footer
  c) Place a clipart image of a pen or pencil as a logo in the top right corner.
  2. **Add the following text in slide 1**
     Heading: Hothouse Design (Red, 25 point, Arial font, Left Aligned)
  3. **On the second slide type the following text where font="Arial" size="20"**

     Earlier in the year we started to analyze the sales profile for the stationery business stream within Hothouse. The areas of initial investigation were selected as the management of our sales team, our customer base, website effectiveness, and an analysis of our most successful product lines.
  4. **On the third slide where font="Arial" size="20"**
     Possible timings for these bonuses include:
     • Weekly
     • Monthly
     • Quarterly
     • Annually.
xx. Set up a new presentation consisting of 3 slides

1. **On the first slide**
a) Type Telephone Analysis for the title, using any word Art option.
b) Insert any appropriate image below the title and apply an Animation effect to the image.
c) Insert a Sound from the Clip Organizer.

2. **On the second slide:**
a) create a pie chart using the following data:

Call type	Minutes
International	1640
Peak Rate	7842
Cheap Rate	1543
Internal	16805

b) Insert the chart title "Telephone Analysis".

3. **On the third slide:**
Enter the following text: (font style="Times new roman", font size= "24")
As you can see that our vast majority of calls are internal. These figures are the average values per day for all departments, using a monitoring period of 2 weeks.

4. Use the same transitional effect between each slide.

5. Play a slide show.

xxi. Set up a new presentation consisting of 4 slides

1. **On the first slide**
d) Include an automated slide number left aligned.
e) Enter the heading **New Website**.
f) Enter the sub heading **Proposed Web Pages.**
g) Insert any appropriate image below the sub heading and apply an Animation effect to the image.
h) Create the following hyperlink http://www.google.com on the image
i) Insert a Sound from the Clip Organizer.

2. **On the second slide:**
c) **create a pie chart** using the following data:

Type of Trip	2008 Dives
Go deep	2512
Wreck Week	12680
Shark Experience	940
Cave Dives	353

3. **On the third slide:**
Enter the following text: (font style=Times New Roman, font size= 24)
During the development of this new website, we have realized that the proposed design brief may need to be amended.

4. **On the fourth slide:**
   Insert a Movie from a File on Your Computer
5. Use a picture as background in all your slides.
6. Use the same transitional effect between each slide.
7. Play a slide show.

xxii. Write a paragraph on each of followings.
   a) List five popular Browser Names.
   b) What are Cookies, and Why Should I Enable Them?
   c) How to delete History in Web Browser?

xxiii. Write a paragraph on each of followings.
   a) What is difference between IPv4 and IPv6 Address?
   b) How to set IP IPv4 address in your computer?
   c) What is gateway?

xxiv. Write a paragraph on each of followings.
   a) What is MPIN?
   b) What are the requirements for using UPI App?
   c) Explain the Work of BHIM App. How to install in Mobile.
   d) What is the difference between RTGS and IMPS Service?

xxv. Write a paragraph on each of followings.
   a) What is IOT; List the name of some IOT related device which we use in our daily life.
   b) What is Big Data Analytics? Where it is used.
   c) What is Robotics;

19.2. Web Designing and Publishing (M2-R5)

i. Create an HTML file (e.g. first_page.html) that specifies a page that contains a heading and two paragraphs of text. As the texts in the heading and paragraphs you can use any texts you like

ii. Write a HTML program to design a form which should allow to enter your personal data (Hint: make use of text field, password field, e-mail, lists, radio buttons, checkboxes, submit button)

iii. Write html code to generate following output.
   1.Coffee
   2.Tea
   3.Black Tea
   4.Green Tea
   5.Milk

iv. Write HTML Code to demonstrate the use of Anchor Tag for the Following:-
   1. Creating a web link that opens in a new window.
   2. Creating a web link that opens in the same window.
   3. C Reference within the same html document.
   4. Reference to some image.

     5. Making an image a hyperlink to display second image

v. Create an html page with following specifications

Title should be about my City. Place your City name at the top of the page in large text and in blue color. Add names of landmarks in your city each in a different color, style and typeface. One of the landmark, your college name should be blinking. Add scrolling text with a message of your choice

vi. Create an html page with 7 separate lines in different colors. State color of each line in its text.

vii. Create an html page containing the polynomial expression as follows :

$a^0 + a^1x + a^2x^2 + a^3x^3$

viii. Write a HTML code to generate following output

First Frame: Name and address		
Second frame Bulleted list of qualifications	Third frame Links to favourite sites	
Fourth frame Scrolling message	Fifth frame Blinking reminders	Sixth frame Image

ix. Create an html page with red background with a message "warning" in large size blinking. Add scrolling text "read the message" below it.

x. Write a HTML page to print Hello world in bold & Italic Form.

xi. Design a HTML page to display a picture. The picture should be removed from the screen after a mouse click on the picture.

xii. Create a HTML Document with JavaScript code that has three Textboxes and a button. The details should be accepted using textboxes are principal, rate of interest, and duration in years. When user clicks the OK Button a message box appears showing the simple interest of principal amount.

xiii. Write a HTML Script to insert a hyperlink. Create a hyperlink in html which when clicked links to www.google.com in a new window

xiv. Create a HTML file which displays three images at LEFT, RIGHT and CENTER respectively in the browser.

xv. Create table with ROWSPAN and COLSPAN attribute of TABLE in HTML(Prepare timetable of your class). Include CELLSPACING & CELL PADDING.

xvi. Create a web page, divide the web page into four frames. In one frame create three links that will display different HTML forms in the remaining three frames respectively. Write a program in Java Script to print factorial.

xvii. With CSS use the shorthand background property to set background image to eg."xyz.png", show it once, in the top right corner.

xviii. Write a program in javascript to generate series of prime numbers.

xix. `Write a JavaScript program to display the current day and time in the following format.
Sample Output:Today is: Tuesday.
Current time is: 10 PM: 30:38

xx. Write a program to sum and multiply of two numbers using JavaScript.

xxi. Write a program to redirect, popup and print function in JavaScript.

xxii. Create your first "Hello world" application in AngularJS.

xxiii. HTML page which has a title of "Event Registration" and has references to important libraries such as Bootstrap, Jquery and Angular.

xxiv. Write a code to display the words "AngularJS" in both text format and in a text box when the page is viewed in the browser.

xxv. Create a sample form program that collects the first name, last name, email, user id, password and confirms password from the user. All the inputs are mandatory and email address entered should be in correct format. Also, the values entered in the password and confirm password textboxes should be the same. After validating using JavaScript, in output display proper error messages in red color just next to the textbox where there is an error.

19.3. Programming and Problem Solving Through Python (M3-R5)

i. Write a program to print all Armstrong numbers in a given range. Note: An Armstrong number is a number whose sum of cubes of digits is equal to the number itself. E.g. 370=33+73+03

ii. Write a function to obtain sum n terms of the following series for any positive integer value of X
X +X3 /3! +X5 /5! ! +X7 /7! + …

iii. Write a function to obtain sum n terms of the following series for any positive integer value of X
1+x/1!+x2/2!+x3/3!+…

iv. Write a program to multiply two numbers by repeated addition e.g.
6*7 = 6+6+6+6+6+6+6

v. Write a program to compute the wages of a daily laborer as per the following rules :-
Hours Worked Rate Applicable Upto first 8 hrs Rs100/-
  a) For next 4 hrs Rs30/- per hr extra
  b) For next 4 hrs Rs40/- per hr extra
  c) For next 4 hrs Rs50/- per hr extra
  d) For rest Rs60/- per hr extra

vi. Accept the name of the labourer and no. of hours worked. Calculate and display the wages. The program should run for N number of labourers as specified by the user.

vii. Write a function that takes a string as parameter and returns a string with every successive repetitive character replaced by ?e.g. school may become scho?l.

viii. Write a program that takes in a sentence as input and displays the number of words, number of capital letters, no. of small letters and number of special symbols.

ix. Write a Python program that takes list of numbers as input from the user and produces a cumulative list where each element in the list at any position n is sum of all elements at positions upto n-1.

x. Write a program which takes list of numbers as input and finds:
   a) The largest number in the list
   b) The smallest number in the list
   c) Product of all the items in the list

xi. Write a Python function that takes two lists and returns True if they have at least one common item.

xii. Write a Python program to combine two dictionary adding values for common keys.
d1 = {'a': 100, 'b': 200, 'c':300}
d2 = {'a': 300, 'b': 200, 'd':400}
Sample output: Counter({'a': 400, 'b': 400, 'd': 400, 'c': 300})

xiii. Write a program that takes sentence as input from the user and computes the frequency of each letter. Use a variable of dictionary type to maintain and show the frequency of each letter.

xiv. Apply recursive call to do the following:
   a) Product of two numbers using repetitive addition
   b) Print Fibonacci series upto term n

xv. Write a program to input two numbers as input and compute the greatest common divisor

xvi. Write a function that takes two filenames f1 and f2 as input. The function should read the contents of f1 line by line and write them onto f2.

xvii. Write a function that reads the contents of the file f3.txt and counts the number of alphabets, blank spaces, lowercase letters, number of words starting with a vowel and number of occurrences of a work "hello".

xviii. Write a program to replace 'a' with 'b', 'b' with 'c',....,'z' with 'a' and similarly for 'A' with 'B','B' with 'C', ..., 'Z' with 'A' in a file. The other characters should remain unchanged.

xix. Write a NumPy program to find the most frequent value in an array.

xx. Take two NumPy arrays having two dimensions. Concatenate the arrays on axis 1.

19.4. Internet of Things and Its Applications (M1-R5)

i. Write a program to Blink default Light Emitting Diode(LED) on Arduino board with the delay of 2 sec.

ii. Write a program to interface LEDs on pin no. 10,11,12,13 and blink alternatively at the delay of 1 sec.

iii. Write a program to run pattern(s) on LEDs connect at pins 10,11,12,13.
Pattern example :

on, off, off, off off, on off, off off, off, on, off off, off, off, on

on, on, off, off off, on, on, off off, off, on, on

iv. Write a program to interface buzzer with Arduino board to buzz on/off with the delay of 1sec.

v. Write a program to interface LED and Buzzer with Arduino board, so that buzzer is put on whenever LED is on and Buzzer is put off when LED is off.

vi. Write a program to interface Button and LED, so that LED blinks/glow when button is pressed.

vii. Write a program to interface Button, buzzer and LED, whenever the button is pressed the buzzer gives beep for 100ms and LED status is toggled.

viii. Write a program to interface LEDs at pins 10,11,12,13 and buttons at pins 7,8. When first time button at pin 7(increment button) is pressed first LED at pin 10 is switched on, when second time button is pressed the next LED at 11 is switched on. Similarly, when the button at pin 8 (decrement button) is pressed the LEDs are switched off sequentially.

ix. Write a program to interface LEDs at pins 10,11,12,13 and button at pins 7. The press of button changes the pattern of LED glow. (considering four patterns of LED glow)

x. Write a program to interface Light Dependent Resistor (LDR) and display the values read on the Serial monitor after delay of 2 seconds each.

xi. Write a program to interface Light Dependent Resistor (LDR) and LED with Arduino board. Whenever there is sufficient light falls on LDR the LED is off and when there is dark around LDR the LED is put on.

xii. Write a program to interface LEDs at any two PWM pins and exhibit LED fading.

xiii. Write a program to interface LED at PWM pin and LDR, in such a way that when the light intensity falling on LDR rises the LED glow should be reduced and after a threshold value the LED should be put off. (representing smart street light concept)

xiv. Write a program to interface LEDs at any two PWM pins and button, to exhibit LED fading at the click of button

xv. Write a program to interface any analog (pollution) sensor and display the values read on Serial monitor.

xvi. Write a program to interface LCD with Arduino board and display 'Hello world' on it .

xvii. Write a program to interface keypad with Arduino board and display the key pressed on Serial monitor.

xviii. Write a program to interface LCD and keypad with Arduino board and display the key pressed from keypad on LCD.

xix. Write a program to interface LCD and keypad (4 X 4) , to exhibit the functionality of a basic calculator.

1	2	3	4
5	6	7	8
9	0	+	-
/	*	**Clear**	**enter**

xx. Write a program using LCD, LEDs, Buzzer and keypad to simulate a password based security lock system. User enters 4-digit password and if the password is correct buzzer and Green LED is put on. But if the password is incorrect Red LED is put on. After three incorrect attempts Red LED along with buzzer blinks continuously.

xxi. Write a program to interface LCD and DHT11, displaying the value read from sensor DHT on LCD.

xxii. Write a program to interface DHT11 or any other temperature sensor, DC Motor, to exhibit a real life situation that whenever temperature rises above a threshold value the DC motor(representing fan) starts and when temperature falls below a value, the motor stops.

xxiii. Write a program to interface LCD and Bluetooth module, to exhibit the values received from mobile handset via Bluetooth on LCD.

xxiv. Write a program to interface LED and Bluetooth module, to switch on the LED if 1 is passed through Bluetooth and switch off the LED if 0 is send.

xxv. Write a program to interface Relay and Bluetooth module to switch on AC load (5W LED bulb, table lamp, etc) connected to relay if 1 is passed through Bluetooth and switch off the AC Load if 0 is send.

20. **Sample Question Paper: Information Technology Tools and Network Basics (M1-R5)**

> 1. There are **TWO PARTS** in this Module/Paper. **PART ONE** contains **FOUR** questions and **PART TWO** contains **FIVE** questions.
> 2. **PART ONE** is to be answered in the **TEAR-OFF ANSWER SHEET** only, attached to the question paper, as per the instructions contained therein. **PART ONE** is **NOT** to be answered in the answer book.
> 3. Maximum time allotted for **PART ONE** is **ONE HOUR**. Answer book for **PART TWO** will be supplied at the table when the answer sheet for **PART ONE** is returned. However, candidates, who complete **PART ONE** earlier than one hour, can collect the answer book for **PART TWO** immediately after handing over the answer sheet for **PART ONE**.

TOTAL TIME: 3 HOURS   TOTAL MARKS: 100
                                                     (PART ONE: 40; PART TWO: 60)
                                    PART ONE
                  (Answer all the questions; each question carries ONE mark)

1. **Each question below gives a multiple choices of answers. Choose the most appropriate one.**

   1.1. The gutter margin is added to
        (a) Left Margin when printing
        (b) Right Margin when printing
        (c) Left and Top when printing
        (d) Top and Bottom for printing

   1.2.The following view is not available in the View Tab for slides
        (a) Slide Sorter
        (b) Notes Page
        (c) Print View
        (d) Reading View

   1.3. The printer on which output is printed by light beam and particles of ink
        a) Character Printer
        b) Laser Printer
        c) Beam Printer
        d) Line Printer

   1.4.The symbol used to make a cell address as absolute
        (a) #
        (b) $
        (c) %

(d) !

1.5.Which option help us to send same letter to different persons
     (a) Mail Merge
     (b) Macros
     (c) Multiple Letter
     (d) Template

1.6. The option used to join number of cells and place the contents in the middle of the joined cell
     (a) Format Cell dialog box and click merge cells
     (b) Format cell dialog box click merge cell and then center
     (c) Right click the selected cells select format cell and merge and center
     (d) Formatting Tool Bar and click merge and center

1.7. The main page of a website is called
     (a) Main Page
     (b) Home Page
     (c) Index Page
     (d) Bookmark

1.8.Which of the following does not have any limit on the money transfer digitally
     (a) IMPS
     (b) NEFT
     (c) UPI
     (d) RTGS

1.9. Which of the following is not a search engine
     (a) Yahoo
     (b) Bing
     (c) Google
     (d) Windows

1.10.   When a Test Box object is deleted from a slide
     (a) The object is deleted but a text box and text is left on the slide
     (b) The text box and text both are deleted.
     (c) The text box is deleted and the text is pasted on the slide
     (d) The text is deleted and the text box is pasted

2. Each statement below is either TRUE or FALSE. Identify and mark them accordingly in the answer book.

   2.1. Freeware is software that is available at no monetary cost.
   2.2. CTRL + H key is used to hide the window.
   2.3. Maximum number of lines supported by Drop Cap is 10.
   2.4. Now() function is used to get current date only.
   2.5. Sort and Filter option is available in the Home Tab Only.

2.6. The text of a cell can be moved to separate cells.

2.7. Animation does not exist in slide layout.

2.8. Hyperlinks cannot be inserted in slides.

2.9. IMPS enables user to transfer money 24x7.

2.10. Hacking a computer is illegal and punishable by law.

3. Match the words and phrases in column X with the nearest in meaning in column Y.

Column A	Column B
3.1. Linux	1) F7
3.2. To go to first slide of the presentation	2) BCC
3.3. Open Source Software	3) Operating System
3.4. A security and privacy threat	4) Placeholders
3.5. A collection of worksheets	5) CTRL+HOME
3.6. Short cut key to check spelling and grammar error	6) Formula Bar
3.7. The objects on a slide that holds text	7) Linux
3.8. Copy formatting from one place and apply to another	8) Worm
3.9. To keep addresses hidden while copying mail	9) Format Painter
3.10. The actual contents of the cell are shown in	10) CTRL + PgUp
	11) Workbook

4. Fill in the blanks in 4.1 to 4.10 below, by choosing appropriate words and phrases given in the list below:

(a) Encryption	(b)CTRL + Space	(c) Flipcart	(d) Cookies
(e) Basic Code	(f) ESC	(g) Name Box	(h) CTRL + M
(i) 63	(j) MS SQL	(k) Formula Bar	(l) RAM

4.1	The _____ loses its contents when the power is switch off.
4.2	_____ is an e-commerce website
4.3	The current cell address is displayed in the _____
4.4	. _____ is scrambling of text to secure it during transmission.
4.5	The maximum number of columns supported by a table in a document_____
4.6	_____ .is the key used to insert new slide in a presentation.
4.7	_____ is the information stored on a user's computer when he visit a website

4.8	A slide show can be stopped by pressing_____ key.
4.9	_____ is a language used to build macros in a document
4.10	_____ is the short cut key to highlight entire column

PART TWO
(Answer any FOUR questions)

5.

    (a) Describe the AutoCorrect Feature with example.

    (b) What is the difference between primary memory and secondary memory? Briefly explain various types of primary and secondary storage devices.

    (c) Write a short note on slide Handout Master.

            (4+8+3)

6.

    (a) Define Network Topology. Explain the various types of topologies.

    (b) Define cell referencing. Explain different types of cell referencing with example.

            (7+8)

7.

    (a) Explain in detail the Bookmark and Hyperlinks feature.

    (b) What are the advantages of presentation package? Give example of one such package. How can we create a transition and animation in a presentation?

            (7+8)

8

    (a) Briefly explain the different types of instant messaging services available.

    (b) What are the different types of charts options available? Briefly explain the procedure to create a pie chart.

    (c) Define e-mail. Explain the advantages and disadvantages of e-mail.

            (5+5+5)

9. Briefly explain the following(Any three):

    (a) Cache Memory

    (b) Internet of Things

    (c) Compiler and Interpreter

    (d) Internet Banking

    (e) Netiquette

            (5*3=15)

21. Sample Question Paper: Web Designing and Publishing (M2-R5)

1. There are **TWO PARTS** in this Module/Paper. **PART ONE** contains **FOUR** questions and **PART TWO** contains **FIVE** questions.
2. **PART ONE** is to be answered in the **TEAR-OFF ANSWER SHEET** only, attached to the question paper, as per the instructions contained therein. **PART ONE** is **NOT** to be answered in the answer book.
3. Maximum time allotted for **PART ONE** is **ONE HOUR**. Answer book for **PART TWO** will be supplied at the table when the answer sheet for **PART ONE** is returned. However, candidates, who complete **PART ONE** earlier than one hour, can collect the answer book for **PART TWO** immediately after handing over the answer sheet for **PART ONE**.

Time: 3 Hrs   **M. Marks: 100**

(PART ONE:40 marks, PART TWO:60 marks)

PART-ONE

(Answer all Questions. Each question carries ONE mark)

1. Answer the following multiple choice questions (1 to 10)   **1x10=10**

Note: For each question, four choices are given, Choose the most appropriate option.

1.1 Text within STRONG tag is displayed as _____
   (a) Indented
   (b) Italic
   (c) list
   (d) Bold

1.2 TD tag is used for _____
   (a) Table row
   (b) Table Records
   (c) Table heading
   (d) Row Heading

1.3 The extension of JavaScript file is
   (a) .html
   (b) .js
   (c) .css
   (d) .ajs

1.4 "Yahoo", "Infoseek" and "Lycos" are _____?
   (a) Search Engines
   (b) News groups
   (c) Browsers
   (d) None of the above

1.5 What is a search engine?

(a) Program that search documents
(b) A program that searches engines for specified keywords
(c) A machinery engine that search data
(d) A hardware component

1.6 HTML document start and end with which tag pairs?
   (a) HTML
   (b) Web
   (c) Body
   (d) Head

1.7 <HR> tag is used for
   (a) Line Break
   (b) Horizontal row
   (c) Heading
   (d) Underline

1.8 What is the full form of HTML?
   (a) Hyphenation text markup language
   (b) Hyper text markup language
   (c) Hyper text marking language
   (d) Hyphenation test marking language

1.9 What does the CSS stands for?
   (a) Creating Style Sheets
   (b) Cascading Style Sheets
   (c) Computer Style Sheets
   (d) Colorful Style Sheets

1.10   What is the full form of HTTP?
   (a) Hyphenation text test program
   (b) Hypertext transfer protocol
   (c) Hypertext transfer package
   (d) None of the above

2) Fill in the blanks with appropriate words given below:

1x10=10

a) <select>	b) <p>	c) both Header & Body	d) loosely
e) ol	(f) <script>	(g) ☐	h) Create Flash movies
i) Header	j) var obj = {};	k) <input type="checkbox1" />	l) Selects the color at the cursor

2.1   _____ is a html list that lists the items with numbers.

2.2   Correct HTML for making a checkbox is _____ .

2.3   Correct HTML for making a drop-down list is _____ .

2.4   Inside HTML _____ tag we put the JavaScript code.

2.5   We cannot _____ with Photoshop.

2.6   Eyedropper tool _____ .

2.7   _____ start a new paragraph.

2.8   SCRIPT tag can be placed within _____ .

2.9   JavaScript is _____ typed language.

2.10   With _____ you create a new object in JavaScript.

3) State which of the following is True or False:- 1x10=10

3.1   The extension of CSS file is .cs.

3.2   The use of Forms in HTML to collect user's input.

3.3   Using< P> tag will end the current paragraph.

3.4   TITLE tag can appear inside body tag.

3.5   In Photoshop "B" is the keyboard shortcut for Blur

3.6   Clicking and holding the mouse button on a toolbar icon Shows additional tools related to that tool in photo editor.

3.7   JavaScript can be used to validate input data in HTML forms before sending the content to the server.

3.8   HTML tag for the biggest heading <h6>

3.9   HTML for creating a hyperlink :

       Google.com

3.10   <table><tr><tt>are all <table>tags?.

4) Match the following: **1x10=10**

4.1	FTP	1.	Forms
4.2	M	2.	File Transfer Protocol
4.3	H1….H6	3.	Case Sensitive

4.4	TITLE tag must be within	4.	Hyper Text Transfer Protocol
4.5	<TD>	5.	Cascading Style Sheet
4.6	collect user's input	6.	Shows additional tools related to that tool
4.7	CSS	7.	Marquee Tool
4.8	JavaScript	8.	Head
4.9	HTTP	9.	Cascading System file
4.10	Clicking and holding the mouse button on a toolbar icon		10. Headings
			11. File transmission Protocol
			12. Table Data

PART TWO

(Answer any FOUR Questions)

Q5.
   a) What is Website? What are different types of Websites?
   b) What is a Responsive Website?
   c) What is browser? Name any three browser.

(5+5+5)

Q6.
   a) What are rowspan and colspan attributes? Explain with example.
   b) What is the difference between Ordered list and unordered list. Explain with example.
   c) Write a JavaScript function to find sum of first 20 even natural numbers.   (4+5+6)

Q7.
   a) Explain three different ways to implement CSS on web page.
   b) Explain different types of Selectors in CSS with example.   (7+8)

Q8.
   a) What is Angular Js? How does it work with HTML?
   b) Explain any three Selection Tools in Photo Editor with their significance and properties.

(7+8)

Q9.
   a) What are the techniques to use W3.CSS Framework?
   b) What are the classes used for creating responsive Design in W3.CSS framework?

(8+7)

22. Sample Question Paper: Programming and Problem Solving Through Python (M3-R5)

> 1. There are **TWO PARTS** in this Module/Paper. **PART ONE** contains **FOUR** questions and **PART TWO** contains **FIVE** questions.
> 2. **PART ONE** is to be answered in the **TEAR-OFF ANSWER SHEET** only, attached to the question paper, as per the instructions contained therein. **PART ONE** is **NOT** to be answered in the answer book.
> 3. Maximum time allotted for **PART ONE** is **ONE HOUR**. Answer book for **PART TWO** will be supplied at the table when the answer sheet for **PART ONE** is returned. However, candidates, who complete **PART ONE** earlier than one hour, can collect the answer book for **PART TWO** immediately after handing over the answer sheet for **PART ONE**.

TOTAL TIME: 3 HOURS   TOTAL MARKS: 100
                                                (PART ONE: 40; PART TWO: 60)

PART ONE
(Answer all the questions; each question carries ONE mark)

1. **Each question below gives a multiple choices of answers. Choose the most appropriate one.**

1 Choose the most appropriate from given options and fill in the OMR Sheet:

1.1 The _____ provides pictorial representation of given problem.
  (a) Algorithm
  (b) Flowchart
  (c) Pseudocode
  (d) All of these

1.2 _____ is a procedure or step by step process for solving a problem.
  (a) Algorithm
  (b) Flowchart
  (c) Pseudocode
  (d) All of these

1.3 The _____ symbol is used at the beginning of a flow chart.
  (a) Circle
  (b) Rectangle
  (c) Diamond
  (d) None of these

1.4 What will be the output of the following code:
  Print type(type(int))
  (a) type 'int'
  (b) type 'typpe'

(c) error

(d) 0

1.5 what is the output of the following code:

    L=['a','b','c','d']

Print "".join[l]

(a) Error

(b) None

(c) abcd

(d) ['a','b','c','d']

1.6 np.eye() is used for creating:

(a) Identity Matrix

(b) Upper triangle Matrix

(c) Lower Triangle Matrix

(d) None of the above

1.7 What is the output of the code print(9//2)

(a) 4.5

(b) 4.0

(c) 4

(d) Error

1.8 What is the output of the following program :

    i = 0

    while i< 3:

    print i

    i++

    print i+1

(a) 0 2 1 3 2 4

(b) 0 1 2 3 4 5

(c) Infinite loop

(d) 0 1 2 3

1.9 Debugging is used to:

(a) Find errors from the program

(b) Check the functionality of the program

(c) Black box testing

(d) All of the above

1.10 The function which reads one line from standards input and returns it as a string (removing the trailing newline)

(a) raw_input
(b) input
(c) eval
(d) accept

2. Each statement below is either TRUE or FALSE. Identify and mark them accordingly in the answer book.
   2.1 Numpy is a tool for data visualization.
   2.2 The break statement is used for exiting from the loop to the statement following the close of the loop.
   2.3 The scope rule in Python are summarized as ELGB (enclosed, local, global, built-in).
   2.4 Strings in Python are mutable.
   2.5 The symbol used for both input and output is ⟍⟋
   2.6 if list1=[10,20,30], then operation list1*2 returns [20,40,60].
   2.7 The symbol used for conditional statement in a flow chart is ⬭
   2.8 You cannot obtain a value in a dictionary using a key for a single element.
   2.9 It is mandatory to have __main__ function in python.
   2.10 Python allows you to assign a single value to multiple variables simultaneously.

3. Match words and phrases in column X with the nearest in meaning in column Y.

No.	X	Y
3.1	Data structure used in recursion	1. Numpy
3.2	Function takes a list of lines to be written to file	2. Stack
3.3	The function that yields current position in the file	3. tell()
3.4	The operator used for concatenating two strings	4. write()
3.5	Statement used for error checking	5. writelines()
3.6	The function used to find power of a number	6. Tuple
3.7	Array processing package	7. pow()
3.8	Immutable object	8. exp()
3.9	Key value pair	9. +
3.10	The operator used to calculate remainder after division	10. Assert
		11. Queue
		12. Dictionary
		13. //
		14. %

4. Fill in the blanks in 4.1 to 4.10 below, by choosing appropriate words and phrases given in the list below:

A	*	B	Range	C	pass
D	Get	E	Input	F	random
G	@	H	eval	I	list
J	Convert	K	int	L	{ }
M	Continue	N	( )	O	[ ]
P	Module	Q	Dictionary		

4.1	The _____ command is used to take input from the keyboard.
4.2	The _____ function is used to convert a string value to int.
4.3	The function used to evaluate the value of a string is _____
4.4	The _____ function takes the parameter filename and the mode during file processing. .
4.5	List structure in python where elements are stored in _____ parenthesis.
4.6	The _____ statement lets the program go through the piece of code without performing any action.
4.7	_____ operator repeats a list for the given number of items.
4.8	_____ is a set of functions you want to include in your application.
4.9	The structure having keys and values is called _____.
4.10	The _____ function generates a sequence of numbers from 1 to n.

PART TWO
(Answer any FOUR questions)

5.

    a. Make a flow chart to input any number and find its factorial and print.

    b. Explain the role of linker and loader in compilation.

    c. Write a flowchart that finds the sum of series:

       $s=1+x/1!+2x/2!+3x/3!+$ upto n terms

    d. What is a NumPy array. How they are different from lists?

                                                              (5+2+5+3)

6.

    a. Write a recursive function to find the sum of digits of a number.

    b. Write a program that takes a sentence as input from the user and returns the frequency of each letter .Use a variable of dictionary type to maintain the count.

    c. Program to check whether a string is palindrome or not.

                                                               (5+5+5)

7

    a. Take an array of 2 rows and three columns, populate it and find the transpose.

    b. Explain the following with example:

          1. LEGB rule

          2. Seek() function

          3. Tell()

          4. String slicing

          5. List comprehension

                                                               (5+10)

8

    a. Write a function that takes data to be stored in the file f1 as interactive input till user responds with nothing as input. Each character taken as input rom the user must be capitalized and stored in file f1.

    b. Write a function that reads the contents of the file myfile.txt and counts the number of alphabets, lowercase letters, uppercase letters, digits and no of words.

    c. Take two NumPy arrays having two dimensions. Concatenate the arrays on axis 1.

                                                               (6+6+3)

9

    a. Write a recursive function to count the sum of digits of a number

    b. Write a program that takes m as an input parameter and creates a list of m lists such that x^{th} list contains first three multiples of x.

    c. Store the monthly earnings of a year of a store splitting up the earnings by quarter into a list of lists. Retrieve the earnings of every month in a loop and display the quarter with maximum earnings.

                                                               (5+5+5)

23. Sample Question Paper: Internet of Things (IoT) and its Applications (M4-R5)

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1. There are **TWO PARTS** in this Module/Paper. **PART ONE** contains **FOUR** questions and **PART TWO** contains **FIVE** questions.
2. **PART ONE** is to be answered in the **TEAR-OFF ANSWER SHEET** only, attached to the question paper, as per the instructions contained therein. **PART ONE** is **NOT** to be answered in the answer book.
3. Maximum time allotted for **PART ONE** is **ONE HOUR**. Answer book for **PART TWO** will be supplied at the table when the answer sheet for **PART ONE** is returned. However, candidates, who complete **PART ONE** earlier than one hour, can collect the answer book for **PART TWO** immediately after handing over the answer sheet for **PART ONE**.

TOTAL TIME: 3 HOURS   TOTAL MARKS: 100
                                              (PART ONE: 40; PART TWO: 60)
PART ONE
(Answer all the questions; each question carries ONE mark)

1. **Each question below gives a multiple choices of answers. Choose the most appropriate one.**

1.2. Microcontroller used in Arduino UNO prototyping board is
(a) ATmega328m
(b) ATmega328p
(c) ATmega2560
(d) ATmega356p

1.3. Which of the following is not a main element of IoT
(a) People
(b) Process
(c) Security
(d) Things

1.4. To easily interface add-on modules with Arduino we can use
(a) General PCB
(b) Connectivity circuit boards
(c) Arduino shields
(d) Other high-end Arduino boards

1.5. Which symbol is used in Arduino to calculate Modulo
(a) #

(b) $

(c) %

(d) !

1.6. With respect to the body language, the handshake conveys the confidence is

    (a) Firm

    (b) Limp

    (c) Loose

    (d) Incomplete knowledge

1.7. Botnet is often used to launch _____ attack

    (a) DoS

    (b) DDoS

    (c) Brute force

    (d) Passive

1.8. The IIoT stands for

    (a) Indepth Internet of T

    (b) Innovative Internet of Things

    (c) Industrial Internet of Things

    (d) Information Internet of Things

1.9. The default method(s) in Arduino program is/are

    (a) Only loop()

    (b) only setup()

    (c) setup() and loop()

    (d) can be either loop() or setup()

1.10. which of the following communication medium supports highest data rate

    (a) Optical fiber

    (b) Wifi

    (c) Ethernet

    (d) Bluetooth

1.11. Which of the following is not a standard protocol used in IoT domain.

    (a) Wifi

    (b) Z-wave

    (c) Zigbee

    (d) LoMe

2. Each statement below is either TRUE or FALSE. Identify and mark them accordingly in the answer book.

    2.11. The total resistance of resistor is low when connected in series.

    2.12. Microprocessor has only processing capability, no serial interface or interrupts are available.

    2.13. Capacitor blocks AC and allows DC to pass through.

2.14.   Ohms law calculates the power consumed by an electrical appliance.
2.15.   IIoT targets applications related to health and fitness.
2.16.   Time management is primarily creating an environment conducive to effectiveness.
2.17.   Arduino program statement for generating one second delay is - *delay(100);*
2.18.   Stress is an emotional reaction to physical and psychological demands.
2.19.   In ATmega328p, p stands for pico power.
2.20.   Mirai botnet attack was originated from IoT cameras.

3.   Match words and phrases in column X with the nearest in meaning in column Y.

Column A	Column B
3.11. Default bootloader for Arduino	1) sketch
3.12. PWM pins in Arduino UNO	2) 0-255
3.13. Informal Communication	3) Optiboot
3.14. Analog Read method in Arduino UNO returns value range	4) 1999
3.15. Open source Operating System	5) 6
3.16. Program written in Arduino IDE	6) Setup()
3.17. The term 'IoT' was coined in	7) Grapevine
3.18. Single line comment	8) 0-1023
3.19. Analog Write method in Arduino UNO accepts value range	9) //
3.20. Function called once in Arduino program	10) Windows
	11) Linux

4.   Fill in the blanks in 4.1 to 4.10 below, by choosing appropriate words and phrases given in the list below:

(a) microcontroller	(b)Massimo Banzi	(c)Fog Computing	(d) Lilypad
(e) Kevin Ashton	(f) microprocessor	(g) mask	(h) Analog
(i) Report	(j) PWM	(k) mirai	(l) Nano

4.1	_____ IC contains memory, input-output peripherals along with processing capability.
4.2	Analog Write method is used for _____ pins in Arduino.

4.3	The term Internet of Things was first coined by _____
4.4	Modern PC has _____ as main component in CPU.
4.5	_____ is medium weighted extension of cloud computing in IoT domain.
4.6	_____ is designed to launch botnet attacks from IoT .
4.7	The founder of Arduino project is _____
4.8	Personality is derived from Latin word – persona meaning _____
4.9	The statement describing what has happened is called _____
4.10	_____ board of Arduino family can be used to sewn into clothing

PART TWO
(Answer any FOUR questions)

5.
    (a) What is a sensor? Explain its working with example.
    (b) What are the different communication modes available to connect things in an IoT domain?
    (c) What is the role of setup method in an Arduino program?

                    (4+8+3)

6.
    (a) What are Things in IoT domain? what is meant by connected things.
    (b) Write a C program to depict an IoT uses where LED is switched ON once the button is pressed and released and next time button is pressed and released, the LED is switched OFF

                    (7+8)

7.
    (a) Explain the different functional blocks in a IoT ecosystem?
    (b) Discuss the role of digital, analog and PWM pin in Arduino UNO?

                    (7+8)

8
    (a) What are the determinants of personality? Explain motivation and self-esteem in detail.
    (b) Write a C program to interface DHT sensor and LED. The program will switch ON LED once the temperature rises above 25 degrees?

                    (7+8)

9. Briefly explain the following (Any three):
    (a) Microcontroller

(b) OSI Model
(c) Stress management
(d) Etiquettes & manners
(e) Botnet

(5*3=15)