Information Booklet cum Syllabus

Of

'O' Level (IT) Course

Under DOEACC Scheme

Revision-5.1

July 2023

National Institute of Electronics and Information Technology

An Autonomous Scientific Society under
Ministry of Electronics and Information Technology, Government of India
NIELIT Bhawan,
Plot No. 3, PSP Pocket, Sector-8,
Dwarka, New Delhi-110077,
Helpline No. (Toll Free) - 1800116511

Introduction to NIELIT Kolkata

NIELIT Kolkata (formerly DOEACC Society Kolkata Centre since 14.12.2002 and prior to that Regional Computer Centre (RCC), Calcutta) is one of the oldest IT houses in eastern region imparting IT Education and Training for more than 40 years. The Centre was established in 1976 as a Registered Scientific Society (Autonomous Body) by the Central and West Bengal Governments.

In December 2002, RCC, Calcutta, was merged with DOEACC Society — An Autonomous Scientific Society of Department of Electronics &Information Technology under Ministry of Communications& Information Technology, Govt. of India. The Society has its Headquarters at CGO Complex, New Delhi and pan India presence of forty(40) offices .It is also well networked throughout India with the presence of about 700 + institutes.

NIELIT is making efforts to bridge the 'digital divide' through skill development leading to the employability of youth. We also provide betterment schemes for the marginalized sections of the society. Accreditation and Registration processes have been simplified by self-certification of documents, which has considerably reduced the processing time.

Model Career Centre (MCC) has been set up at NIELIT Kolkata under the National Career Service Scheme of the Directorate General of Employment. It is a historic step which would facilitate the youth from all sections of the society to take advantage of career guidance, counseling services and also conducting several job fairs.

The basic objective of NIELIT Kolkata is described below:
  i. To carry out human resource development related activities in the area of Information Electronics and Communication Technology (IECT) which would enable employment generation and IT-Led economic growth.
  ii. Capacity building in recent trends –such as Blockchain, Bigdata, Machine Learning, Data Analytics, AR-VR, Cyber Security, Solar Technology, Multimedia etc.
  iii. Capacity building through e-governance to enable Citizen Centric Services, empowering through Digital Education by using the services of the Centre, accredited Institutes and CSC's.
  iv. Development of several software for National level projects-Agricultural Census, NPR, Livestock etc.
  v. Assist the aspiring youth for their career either by assisting job plan or grooming to be future entrepreneur

Location

NIELIT Kolkata has at present two operational units.
Unit 1: Jadavpur University Campus, Kolkata – 700032.
        +91-33-2414-6081/6054/6682, Fax: +91-33-2414-6549

Unit 1 of NIELIT Kolkata Centre is located in a lush green environment inside Jadavpur University Campus being connected with bus and train services from different corners of the city.

Unit 2: Salt Lake Campus, Block - BF 267, Sector-I, Salt Lake, Kolkata – 700064
+91-33-4602-2246/0938

Unit 2 is a new building of NIELIT Kolkata at Sector-I, Salt Lake which has also started its operation. The Building has 20000 sq.ft. in the area (B+G+3) storied and is well equipped with modern technological facilities needed for training in selected domains.

Centre's Thrust Areas

- NIELIT IT('O', 'A' & 'B' Level) ,CHM ('O' Level) Hardware & Networking Courses and Multimedia and Animation Technology courses
- Emerging Technologies like Blockchain, Bigdata, Machine Learning, Data Analytics, AR-VR, Cyber Security, Solar Technology, Multimedia
- AICTE approved summer training Programmes.
- 'CCC' & 'BCC' Online examination
- Corporate Courses as per requirement
- Several Short Term Courses as per Market demand
- Directorate General of Employment (DGE) Training
- Directorate General of Defence (DGR) Training
- Execution of National Level Software Development Projects- Agricultural Census, NPR, Livestock, DoE etc.
- Model Career Centre (MCC) under National Career Service
- Implementing agency for the Govt. of India sponsored Training program in the area of Electronic System Design and Manufacturing (ESDM) in the state of West Bengal with the help of its Accredited Training Partners.
- Future Skills PRIME capacity building projects (Blockchain, Data Analytics, AR/VR, Robotic Process Automation, Cyber Securities, IoT, etc.) of Ministry of Electronics and Information Technology (MeitY), Government of India

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1.   About The Revised Syllabus

The fourth revised version of DOEACC 'O' Level (IT) syllabus came into effect in January 2010 examinations. Since then, much advancement has been observed in the area of Information Technology. The need of industry has also changed with the availability of new and advanced technologies and tools. With the advancement in technologies, the software development practices have also changed. This also has led to change in job profile. Different job roles require different skills. Moreover, the digital initiatives taken by Government have also changed the way the business is taking place these days. These factors have led to bringing the revision in syllabus of DOEACC 'O' Level (IT) course.

This document presents the fifth revised version of 'O' Level syllabus under DOEACC Scheme which becomes effective for teaching with immediate effect. The syllabus of 'O' Level course is designed to enhance the skills of students so as to enable them to solve problems using Information Technology (IT) tools. The self-learning approach is built into the syllabus enabling the learners to update themselves on the changing technologies in their area of work. The syllabus has been designed to meet the skills required for various IT job roles.

2.   NIELIT

National Institute of Electronics and Information Technology, NIELIT, (Erstwhile DOEACC Society) is an autonomous scientific society of the Ministry of Electronics & Information Technology, Government of India. The Society is registered under the Societies Registration Act, 1860. NIELIT was set up to carry out Human Resource Development and related activities in the area of Information, Electronics & Communications Technology (IECT). NIELIT is engaged both in Formal & Non-Formal Education in the areas of IECT besides development of industry oriented quality education and training programmes in the state-of-the-art areas. NIELIT has endeavored to establish standards to be the country's premier institution for Examination and Certification in the field of IECT. It is also one of the National Examination Body, which accredits institutes/organizations for conducting courses in IT and Electronics in the non-formal sector.

Over the last three decades, NIELIT has acquired very good expertise in IT training through its wide repertoire of courses. These courses are as under.
- ➢ 'O' Level –NSQF aligned course at Level 4
- ➢ 'A' Level -NSQF aligned course at Level 5
- ➢ 'B' Level - NSQF aligned course at Level 7
- ➢ 'C' Level - NSQF aligned course at Level 8
- ➢ Digital Literacy Courses
  - o ACC (Awareness in Computer Concepts)
  - o BCC (Basic Computer Course)
  - o CCC (Course on Computer Concept) –NSQF aligned at Level 3
  - o CCC+ (Course on Computer Concept Plus)
  - o ECC (Expert Computer Course)

At present, NIELIT has forty-seven (47) centers located at Agartala, Aizawl, Ajmer, Alawalpur (Saksharta Kendra), Aurangabad, Bhubaneswar, Calicut, Chandigarh, Chennai, Chuchuyimlang, Churachandpur, Daman, Delhi, Dibrugarh, Dimapur, Gangtok, Gorakhpur, Guwahati, Haridwar, Imphal, Itanagar, Jammu, Jorhat, Kargil, Kohima, Kolkata, Kokrajhar, Kurukshetra, Lakhanpur (Saksharta Kendra), Leh, Lucknow, Lunglei, Majuli, Mandi, Pasighat, Patna, Pali, Ranchi, Ropar, Senapati, Shillong, Shimla, Silchar, Srinagar, Tezpur, Tura and Tezu with its Headquarters at New Delhi. It is also well networked throughout India with the presence of about 700+ institutes. The Headquarters is situated at NIELIT Bhawan, Plot No. 3, PSP Pocket, Sector 8, Dwarka, New Delhi – 110 077.

3. DOEACC SCHEME

DOEACC Scheme is a joint scheme of the Ministry of Electronics& Information Technology, and All India Council for Technical Education (AICTE), Govt. of India.

4. Objective of Scheme

The objective of the Scheme is to generate skilled manpower in the area of Information Technology (IT) and Electronics at the national level by utilizing the facilities and infrastructure available with the institutions/organizations in the non-formal sector. NIELIT is managed and administered by a Governing Council which consists of eminent academicians and professionals from IT and Electronics industries. Minister for Electronics& Information Technology, Government of India, is the Chairman of the Governing Council. The Director General is the Chief Executive Officer of the Society and manages day to day affairs of the Society. Manifold functions of the DOEACC Scheme are:

   i.   Accreditation
   ii. Registration
   iii. Examination
   iv. Certification

5. 'O' Level (IT) Course under DOEACC Scheme

5.1. Objective of the 'O' Level Course

The objective of the course is to equip a student with necessary skills as per following job role.

   i.   User Interface (UI) Designer
   ii. Web Designer
   iii. Web Publication Assistant
   iv. Office Automation Assistant
   v.   IoT Application Integrator

5.2. Structure of NIELIT 'O' Level Course

The revised syllabus (Revision 5.1) of 'O' Level (IT) course consists of four compulsory theory modules, four practical and one project. The structure of the 'O' Level (IT) syllabus is indicated below: -

Module Code	Module	Learning Hours (Theory)	Learning Hours (Practical/ Tutorials/ Project)	Total Learning Hours
M1-R5.1	Information Technology Tools and Network Basics	48	72	120
M2-R5.1	Web Designing & Publishing	48	72	120
M3-R5.1	Programming and Problem Solving through Python	48	72	120
M4-R5.1	Internet of Things and its Applications	48	72	120
MPR-1 to MPR-4	Practical based on M1-R5.1, M2-R5.1 ,M3-R5.1 and M4-R5.1			
PJ1-R5.1	Project		60	60
	Total	192	328	540

5.3. Duration of the Course

The duration of 'O' level (IT) course is 540 learning hours and the minimum period to cover contents is one year for candidates undergoing 'O' Level after 10+2 and six months for candidates undergoing 'O' Level after Graduation.

6. Practical

The students have to devote 60% of the total time allotted to each module of the course for the practical sessions. Practical assignments have been worked out for each theory module. The Practical examinations will be based on the syllabi M1-R5.1, M2-R5.1, M3-R5.1 and M4-R5.1 module of 'O' Level course.

7. Improvement

The candidates are allowed to improve his/her grade in one subject immediately after clearing all the theory papers (immediate to last examination where the candidate has cleared his/her last paper.

8. Project

'O' Level (IT) courses has a project as an important component. The project is carried out by the student under guidance and support of faculty and management of Institute / Organization where the student is undergoing training. It is felt that such a project provides an opportunity to the student to apply his / her knowledge and skills to real life problems (including oral and written communication skills). The project should be given utmost importance and priority both by the students as well as institution faculty / management in respect of its identification, planning and implementation.

8.1. Objective of the Project

The objective of the project is to give the students additional hands-on experience in solving a real life problem by applying knowledge and skills gained on completion of theory papers in a course at a given Level. It provides an opportunity to students to develop written and communication skills. Project also helps the students to realize the importance of resource and time management, ownership of task towards deliverables, innovation and efficiency in task management apart from presentation skills. It also provides a good opportunity for students to build, enhance and sustain high levels of professional conduct and performance and evolves a problem solver frame of mind in the students. It is also felt that taking up the project by a student prepares him/her for a job in industry and elsewhere.

8.2. Project Submission

The student undergoing course 'O' level (IT) course has to submit project in order to be 'O' Level certified. The project should be original and of real life value. The project should not be copy of existing material from any other source.

The Learners (Students) are expected to carry out a project successfully and submit the project certificate in the prescribed format from the head of the institute running the accredited course or the organization of which the learner is an employee. Proforma of the Project Completion Certificate is given on next page.

Performa of the Project Completion Certificate

This is to certify that the Project work done by Mr./Ms._____(NIELIT Registration No._____) in partial fulfillment of DOEACC 'O' Level (IT) Examination at_____has been found satisfactory.

This report has not been submitted for any other examination and does not form part of any other course undergone by the candidate.

Signature
Name:
(By Head of the Institution) with PROV
No. /FULL No.)
Or
Signature
(Name of Head of the Organization / Division)
Division:
Organization Name:
Address:

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

9.1. Calculation of Credits

Credit calculation based on NCVET guidelines i.e. 1 credit of 30hrs (both theory & practical's) is as under -

Sr. No.	Module Code	Module Name	No. of Lecture Theory Hours	No. of Tutorial/ Practical /Project Hours	Total Credits
			(A)	(B)	(C= (A) + (B)/30)
1.	M1-R5.1	Information Technology Tools and Network Basics	48	72	4
2.	M2-R5.1	Web Designing & Publishing	48	72	4
3.	M3-R5.1	Programming and Problem Solving through Python	48	72	4
4.	M4-R5.1	Internet of Things and its Application	48	72	4
5.	PJ1-R5.1	Project		60	2
Total Credits					**18**

10. Examination Pattern

10.1. The examination pattern of each module/paper is tabulated below:

Examination	Duration	Mode of Examination	No. of Questions	Pattern of Question	Max. Marks	Min. Pass Marks	Weightage in Final Total per paper/Module
Theory	2 Hours	Online / OMR	100	MCQ	100	33%	60%
Practical & Viva	3 Hours	Lab Session / Online	3/4	Demonstration	80	33%	40%
				Viva	20		
Minimum Pass Percentage is 50% of total weightage (Theory + Practical) in each module							

10.2. Minimum and Maximum Marks Matrix is as under:

	Title of Component and Identification	Theory Marks		Practical Marks		Module Marks (60% of Theory Marks+ 40% of Practical Marks)	
		Min	Max	Min	Max	Min	Max
1	**M1-R5.1**: Information Technology Tools and Network Basics	33	100	33	100	50	100
2	**M2-R5.1**: Web Designing & Publishing	33	100	33	100	50	100
3	**M3-R5.1**: Programming and Problem Solving through Python	33	100	33	100	50	100
4	**M4-R5.1**: Internet of Things and its Applications	33	100	33	100	50	100
6	**PJ1-R5.1**: Project	Project completion certificate is required to qualify 'O' Level-IT					
	Maximum Marks in the level					400	

10.3. The qualification matrix for each module/paper is:

Theory	Practical	Result	Re-appear
Pass (Qualifying 33% criteria)	Pass (Qualifying 33% criteria)	Pass (Qualifying 50% criteria)	NA
Pass (Qualifying 33% criteria)	Pass (Qualifying 33% criteria)	Fail (Not qualifying 50% criteria)	Need to re-appear in both theory and practical.
Pass (Qualifying 33% criteria)	Fail (Not qualifying 33% criteria)	Qualifying 50% criteria, but Fail	-do-
Fail (Not qualifying 33% criteria)	Pass (Qualifying 33% criteria)	Qualifying 50% criteria, but Fail	-do-
Fail (Not qualifying 33% criteria)	Fail (Not qualifying 33% criteria)	Fail	-do-

Absent (Zero marks would be awarded)	Pass / Fail (as per 33% qualifying criteria)	Fail	-do-
Pass/Fail (as per 33% qualifying criteria)	Absent (Zero marks would be awarded)	Fail	-do

10.4. There would be no negative marking in theory examination.

10.5. The marks will be translated into grades, while communicating results to the candidates. No rounding takes place in the calculation of grades. The gradation structure is as given-

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

10.6. The candidates who have passed practical examination in the previous pattern of examination whereas yet to pass all the required theory modules/papers, would require to take the examination of remaining modules/papers in the new pattern. The final grade of the candidates would be calculated sans practical marks, and certificate would also be issued sans independent practical examination grades, so as to maintain the uniform certificate issuance.

10.7. The candidates who have already passed in the previous pattern of examination all the four theory modules/ papers, but yet to pass the practical examination would be given two chances to pass the practical examination (July 2022 and January 2023 Examination Cycles).

10.8. The candidates would be required to apply for the examinations at the online portal as per the existing procedure.

10.9. The candidates would be issued separate Admit Cards for appearing in Theory and Practical Examinations.

10.10. The candidates would be issued other examination related instructions/guidelines along with the Admit Card.

10.11. 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 Examinations 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 4.

10.12. 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.

10.13. Eligibility Criteria

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

10.13.1 Students registered through O-Level Accredited Institutes:

12th
Or

ITI Certificate (Two Years) after class 10
Or

ITI Certificate (One Years) after class 10 with one year of experience post qualification.
Or

Successful completion of the second year of a Government recognized polytechnic engineering diploma course after class 10, Training of 'O' Level course concurrently during the third year of the said 3 years Polytechnic engineering diploma course.

The certificate of 'O' level will be awarded only after successful completion of the polytechnic engineering diploma.
Or

10th pass and certification in the immediate previous NSQF Level Qualification in relevant field.
Or

Relevant Qualification of immediate previous NSQF Level with 2 Years of experience.

10.13.2 Direct Applicants

As mentioned at Point 10.13.1 above with an additional of two-years of relevant experience.

Relevant experience connotes job experience in IT, including teaching in a recognized institution as a faculty member, excludes coaching.

10.13.2 Students from Central/State Education Boards/University/ Recognized Schools authorized for conducting "O" Level Course:

Students continuing regular schooling from class 9th and onward. Such students have to concurrently undergo training of "O" Level course in their school itself (or at any Accredited NIELIT Institute if the facility is not available at School) with regular classes till class 12th or other qualifications after Class 10th as detailed in point 10.13.1 above. The certificate of 'O' level will be awarded only after successful completion of qualifications as detailed in point 10.13.1 above i.e. the minimum qualification for attaining "O" Level qualification as an institute candidate and completing all requirements of "O" Level qualification.

If candidate's dropout from regular classes, then the candidates has to reregister fulfilling criteria as per Point 10.13.1 or Point 10.13.2 above. Exemption in the modules passed will be given as applicable, to the eligible candidate as per the exemption policy of NIELIT.

Age: No Bar

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 below for submitting Registration Application for each Examinations Cycle for the convenience of processing and allotting Registration Numbers.

For January Exam Cycle				
Sr. N.	Level	Cut-off date for Direct candidates	Cut-off date for Institute candidates	Institute Cut-off date for online payment
1	O	30th Sept.	30th Sept.	7th Oct.

For July Exam Cycle				
Sr. N.	Level	Cut-off date for Direct candidates	Cut-off date for Institute candidates	Institute Cut-off date for online payment
1	O	31st March	31st March	7th April

10.14. 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 can apply as per cut-off dates. Such candidates can fill up examinations Form and Registration Forms for higher Levels subject to following conditions: -

a) Registration fee and Examination fee is paid online.

b) This facility would 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.

10.15. 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 Re-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	Four
Duration of Practical Examination	Three hour duration including viva-voce
Max. Marks	100 = 80(Practical) + 20(Viva Voce)
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 5.1 of 'O' Level (IT) Syllabus

Previous Syllabus		Revised Syllabus	
Module Code (Revision IV)	Revision IV (Module)	Module Code (Revision 5.1)	Revision 5.1 (Module)
M1-R4	IT Tools and Business System	M1-R5.1	Information Technology Tools and Network Basics
M2-R4	Internet Technology and Web Design	M2-R5.1	Web Designing & Publishing
M3-R4	Programming and Problem Solving Through 'C' Language	M3-R5.1	Programming and Problem Solving through Python
M4.1-R4	Application of .NET Technology	M4-R5.1	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 5.1 (new syllabus), if they have already passed the relevant papers in earlier revision.
3. Candidates would have to pass a total of 4 papers (theory + practical's), successfully completed project in order to qualify 'O' Level in Revision 5.1 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 5.1 is done.
5. Candidates would be allowed exemption in equal number of papers which they have passed in earlier syllabi prior to Revision 5.1.

15   Syllabus of Information Technology Tools and Network Basics (M1-R5.1)

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. LibreOffce, Getting Started Guide by LibreOffice Documentation Team
2. Computer Networking by EdTittel,McGRaw Hills Companies
3. OpenOffice.org for DUMMIES by GurdyLeete, Ellen Finkelstein and Mary Leete

16 Syllabus of Web Designing and Publishing (M2-R5.1)

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

Module Unit				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. CSS Borders, W3.CSS Fonts, W3.CSS Text, W3.CSS Tables, W3.CSS List, W3.CSS Images, 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-R5.1)

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	10	15	After completion of this unit of module, Learner will be able to

Python Statements			• 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, Doc Strings, 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-R5.1)

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/ Devices, Protocols andCommunication Model	4	6	After completion of this unit of module, Learner will be able to • 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
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-R5.1)

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-R5.1)

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-R5.1)

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. $370 = 3^3 + 7^3 + 0^3$

ii. Write a function to obtain sum n terms of the following series for any positive integer value of X
$X + X^3/3! + X^5/5!! + X^7/7! + \ldots$

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

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 up to 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-R5.1)

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)

TOTAL TIME: 2 HOURS   **TOTAL MARKS: 100**

(Answer all the questions; each question carries ONE mark)
Answer the following multiple choice questions (1 to 100) 1x100=100

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

1. In Which Generation Time sharing, Real time Network and Distributed Operating Systems were used?
(A) 1st
(B) 4th
(C) 2nd
(D) 5th

2. The Arithmetic and Logic Unit of computer respond to command coming from_
(A) Primary memory
(B) Control unit
(C) Cache memory
(D) External memory

3. Which of the following storage devices can store maximum amount of data?
(A) Floppy Disk
(B) Compact Disk
(C) Hard Disk
(D) Magneto Optic Disk

4. The saving of data and instruction to make them available for later use is a job of:
(A) Cache unit
(B) Input unit
(C) Output unit
(D) Storage unit

5. What is another name for application software?
(A) End-user software
(B) Utility software
(C) Specific software
(D) All of these

6. Operating System of a computer serves as a software interface between the user and_
(A) Memory
(B) Hardware
(C) Peripheral
(D) Screen

7. What is the shortcut key to snap app to right?
(A) Window icon + right arrow

(B) Window icon + up arrow
(C) Window icon + left arrow
(D) Window icon + down arrow

8. Which component gives you access to all of your computer setting and enable you to install and remove program?
(A) Start menu
(B) File explorer
(C) Control panel
(D) Default programs

9. A new printer can be added by the printer and scanner option in_
(A) control panel
(B) Dynamic data exchange
(C) File manager
(D) None of the above

10. What is the shortcut key for taking screenshot of entire display and save?
(A) Window key + PrtScr
(B) Window key + L
(C) Window key + D
(D) Window key + M

11. Which option help us to send same letter to different persons
(A) Mail Merge
(B) Macros
(C) Multiple Letter
(D) Template

12. What is the Short cut key for Superscript?
(A) Ctrl+Shift+P
(B) Ctrl+Shift+D
(C) Ctrl+P
(D) Shift+P

13. Which option is selected for case sensitive matching?
(A) Match only
(B) Case match
(C) Match case
(D) Case only

14. What is the maximum zoom in of libre Writer?
(A) 500
(B) 600
(C) 550
(D) 700

15. What is the shortcut key of Ruler in libre writer?
(A) Ctrl+Shift+R

(B) CTRL+S
(C) CTRL+SHIFT+N
(D) Alt+R

16. Default text in LibreOffice Writer is
(A) Amiri
(B) Linex biolinum G
(C) Calibri
(D) Liberation Serif

17. Which of the following option is not a part of comment pop up
(A) Reply comment
(B) Delete Comment
(C) Delete All Comments
(D) Reply and delete comment

18. In Libre, writer by default Highlighter color
(A) Red
(B) Green
(C) Blue
(D) Yellow

19. Which bar is located just below the title bar
(A) Status bar
(B) Menu bar
(C) Tool bar
(D) Formatting bar

20. What is the shortcut key of LibreOffice_Help
(A) F11
(B) F12
(C) F1
(D) F7

21. What is the shortcut key of Save As option in Libre Office?
(A) CTRL+SHIFT+S
(B) CTRL+S
(C) CTRL+SHIFT+N
(D) SHIFT+S

22. Template option is available under which menu
(A) Edit
(B) Insert
(C) File
(D) View

23. Which of the following feature is not available in Export As option
(A) Export As PDF

(B) Export As EPUB
(C) Export As Image
(D) Export Directly As PDF

24. What is the File Extension for Libre office Writer?
(A) .oft
(B) .odt
(C) .oot
(D) .obd

25. What is the Default view in LibreOffice writer?
(A) Normal view
(B) Web view
(C) Slide view
(D) Print Layout view

26. Rulers option is available in which menu
(A) File
(B) Insert
(C) Table
(D) View

27. In hyperlink dialog box which option is not available
(A) Internet
(B) Mail
(C) Document
(D) File Attachment

28. By default, the page size of Libre office writer is _____
(A) A4
(B) A5
(C) Legal
(D) Letter

29. What is the default alignment in libre writer?
(A) Right
(B) Left
(C) Center
(D) Justify

30. Watermark option is available in which menu?
(A) File
(B) Tools
(C) Insert
(D) Format

31. What is the shortcut to paste special in calc?
(A) Ctrl+Shift+V

(B) Ctrl+V
(C) Ctrl+C
(D) Strl+Shift+S

32. What is the use of filter in Calc?
(A) See Only Specific Data
(B) Arrange data
(C) Copy Data
(D) Making Chart

33. Which of these is a correct formula?
(A) =SUM(J14:J16)
(B) =SUM(J14?J16)
(C) SUM(J14:J16)
(D) J14+J15+J16
34. What is the default alignment of Numeric Cell data?
(A) Left
(B) Right
(C) Center
(D) Justified

35. What is the shortcut key to open format cell option dialogue box?
(A) Ctrl+f
(B) Ctrl+D
(C) Ctrl+L
(D) Ctrl+1

36. In Libre Spreadsheet, Rows are labelled as_____?
(A) A,B,C,….
(B) 1,2,3….
(C) A1, B1, C1…
(D) 1A, 1B, 1C…

37. What is shortcut key to enter current date in a cell in Libre Spreadsheet?
(A) Ctrl +]
(B) Alt +D
(C) Ctrl + ;
(D) Shift + K
38. How do you change column width to fit the contents?
(A) Single-click the boundary to the left to the column heading
(B) Double click the boundary to the right of the column heading
(C) Press Alt and single click anywhere in the column
(D) Press CTRL and double click anywhere in the column

39. Maximum number of rows in a Libre Spreadsheet is_?
(A) 1048576
(B) 16348
(C) 1084576

(D) 1024598

40. The CALC_____function counts matching records in a database using criteria and an optional field
(A) DCOUNT
(B) DCOUNTA
(C) DSUM
(D) SUM

41. Which option is used to restrict scrolling of row and column?
(A) Pause
(B) Stop
(C) Freeze
(D) Scroll Off

42. _____uses filter criteria from specified cells?
(A) AutoFilter
(B) Advanced
(C) Standard
(D) Sorting

43. The DSUM function is a built-in function in Calc that is categorized as a_____Function?
(A) Logical
(B) Database
(C) Statistical
(D) Financial

44. Which shortcut is used for printing the sheet?
(A) CTRL+P
(B) CTRL+Shift+P
(C) Alt+P
(D) CTRL+Alt+P

45. What is the file extension of Libre Spreadsheet document?
(A) .ODF
(B) .ODT
(C) .ODS
(D) .OBT

46. What is the intersection of a column and a row on a worksheet called?
(A) Column
(B) Value
(C) Address
(D) Cell

47. If we want to arrange data in ascending or descending order which option should be chosen?
(A) Filter
(B) Sort

(C) List
(D) Arrange

48. One cell format can be copied to another cell by using?
(A) Format Setting
(B) Format Checking
(C) Clone Formatting
(D) Cloning

49. The short cut key Ctrl + H is used to_____?
(A) Open Find dialog box
(B) Open Find & Replace dialog box
(C) Font dialog box
(D) Format dialog box

50. The cell reference for a range of cells that starts in cell C1 and goes over to column H and down to row 10 is?
(A) C1:10H
(B) C1:H10
(C) C1:H-10
(D) C1:H:10

51. Which type of program is Libreoffice impress?
(A) Presentation
(B) Word Processing
(C) Spreadsheet
(D) Draw

52. In LibreOffice impress, by default the presentation is saved as
(A) Show1
(B) Presentation1
(C) Untitled1
(D) Slide1

53. In LibreOffice impress which view contains only Text?
(A) Normal view
(B) Outline view
(C) Notes view
(D) Slide shorter view

54. In Libre Office Impress the shortcut key to insert a text box is
(A) F5
(B) F8
(C) F3
(D) F2

55. Which of the following shortcut key can be used to close the libre office window-
(A) Ctrl+N
(B) Ctrl+M

(C) Ctrl+W
(D) Ctrl+P

56. Which of the following menu is used to change the layout of a slide?
(A) Format
(B) Slide Show
(C) Slide
(D) Tools

57. What is the shortcut key to insert a hyperlink in the slide?
(A) Ctrl + H
(B) Ctrl + K
(C) Ctrl + A
(D) Ctrl + M

58. In Libre Office Impress slide sorter is found in which menu?
(A) Insert
(B) Format
(C) Slide show
(D) View

59. What is the minimum Zoom size in Libre Office impress?
(A) 5%
(B) 10%
(C) 20%
(D) 15%

60. What is default orientation of slide in Libre Office Impress?
(A) Landscape
(B) Portrait
(C) Horizontal
(D) Vertical

61. Which Objects can be added into the presentation?
(A) Picture, Not Movie
(B) Both Movie and Picture
(C) Movie but not Picture
(D) Only JPG images

62. Which of the following is the shortcut key for checking the spelling in PowerPoint?
(A) F5
(B) F7
(C) F6
(D) F3

63. Which shortcut key is used to add a new slide in Libre office Impress?
(A) Ctrl+N
(B) Ctrl+M

(C) Ctrl + S
(D) Ctrl + T

64. Which shortcut key is used to jump at the first slide?
(A) Home
(B) Pageup
(C) Page down
(D) End

65. What is the slide transition in LibreOffice Impress?
(A) Letter
(B) A special effect used to show a slideshow
(C) Overhead
(D) A type of slide

66. Which Shortcut key is used to start Slide Show from first slide?
(A) F3
(B) F4
(C) F5
(D) F7

67. LibreOffice Impress file is saved in which of the following extension.
(A) .ods
(B) .odp
(C) .ppt
(D) .odt

68. Which of the following is a slide that is used as a starting point for other slides?
(A) First Slide
(B) Master Slide
(C) Minor Slide
(D) Last Slide

69. Which of the following shortcut key is used to stop the slide show?
(A) Esc key
(B) Ctrl + O
(C) Ctrl + N
(D) Ctrl + K

70. Which of the following shortcut is used to print impress presentation?
(A) Ctrl+T
(B) Ctrl+E
(C) Ctrl+S
(D)Ctrl+P

71. ARPANET Stands for
(A) Advanced Research Project Agency Network
(B) Advanced Research Programmed Auto Network

(C) Advanced Research Project Automatic Network
(D) Advanced Research Project Authorized Network

72. Which of the following icon is used to add an attachment to an email?
(A) Stationary Icon
(B) Paper Clip icon
(C) GIF Icon
(D) Emoji Icon

73. _____ option helps you to save an unfinished email without sending it.
(A) Trash
(B) Inbox
(C) Sent Items
(D) Save as Draft

74. Which network topology requires a central controller or hub?
(A) Star
(B) Mesh
(C) Ring
(D) Bus

75. The dedicated connection that establishes a permanent switched circuit that is always ready to carry network traffic is
(A) Wireless Local Loop
(B) TDM
(C) Leased Line
(D) Digital Subscriber Line

76. How many bits are in Version 6 of IP address?
(A) 64 Bits
(B) 32 Bits
(C) 128 Bits
(D) 256 Bits

77. Which is the transmission media that can carry huge data to large distances with less delay or latency?
(A) Wireless or RF or Microwave Frequency
(B) Coaxial Cables
(C) Optical Fiber Cables
(D) Twisted Pair Cables

78. How many bit is the first octet of the 'Class C' IP address?
(A) 4 Bits
(B) 8 Bits
(C) 32 Bits
(D) 128 Bits

79. MAC Address is of how many bits?

(A) 48 Bits
(B) 32 Bits
(C) 64 Bits
(D) 8 Bits

80. An internet service that allows the user to move a file.
(A) SMTP
(B) DHCP
(C) FTP
(D) IP Address

81. Which social network is considered the most popular for business to business marketing?
(A) Facebook
(B) Orkut
(C) Instagram
(D) LinkedIn

82. Which term is mostly used by Twitter users.
(A) Posts
(B) Tweets
(C) Twinks
(D) Tweats

83. Web Pages are uniquely identified by using
(A) IP Address
(B) Domain
(C) URL
(D) File Name

84. An Email Message that has failed to reach its destination is called
(A) Junk Email
(B) Trash
(C) Spam
(D) Bounced Mail

85. E-commerce involves buying and selling of:
(A) International Goods
(B) Electronic Goods
(C) Computer Products
(D) Product and Services over internet

86. Which description is appropriate among the following for 'E-Governance'?
(A) To engage enable and empower citizens
(B) To Provide fair and unbiased to citizens
(C) To provide technology driven governance
(D) to ensure people's faith in E-Commerce

87. What services are available on the UMANG?

(A) EPFO/Pension/CBSE
(B) Ticket Booking
(C) PNR Status
(D) Maps

88. Mail Access starts with the client when user needs to download Email from the
(A) Mail Host
(B) Mail Server
(C) Content Mixing System
(D) Email Server

89. To join the internet, the computer has to be connected to a_____.
(A) Internet architecture board
(B) Internet society
(C) Internet service provider
(D) Different computer

90. An endpoint of an inter-process communication flow across a computer network is
(A) Socket
(B) Pipe
(C) Port
(D) Machine

91. What does BHIM stand for?
(A) Bharat Interface for Money
(B) Bharat Interface to Money
(C) Bharat Internet for Money
(D) Bharat Interaction for Money

92. Startup is started for whom?
(A) Doctors
(B) Entrepreneurs
(C) Students
(D) Youngsters

93. Who was the first to use the term Big Data?
(A) Steve Jobs
(B) Bill Gates
(C) John Mashey 1990
(D) John Bredi

94. Who invented the term Internet of Things?
(A) Bill Gates
(B) Kevin Ashton
(C) Steve Jobs
(D) McDonald

95. What is the meaning of UPI?

(A) Unified Payment Interface
(B) Unfind Pay Interface
(C) Immediate Payment Interface
(D) None of these

96. What is the name of the first recognized IoT device?
(A) Smart Watch
(B) ATM
(C) Radio
(D) Video Game

97. Artificial Intelligence is about_____.
(A) Playing a game on Computer.
(B) Making a machine Intelligent.
(C) Programming on Machine with your Own Intelligence.
(D) Putting your intelligence in Machine.

98. Who is known as the -Father of AI"?
(A) Fisher Ada
(B) Alan Turing
(C) John McCarthy
(D) Allen Newell

99. Which of the following is defined as an attempt to steal, spy, damage or destroy computer systems, networks, or their associated information?
(A) Cyber attack
(B) Computer security
(C) Cryptography
(D) Digital hacking

100. Which of the following is not an objective of network security?
(A) Confidentiality
(B) Integrity
(C) Availability
(D) Hacking

21. Sample Question Paper: Web Designing and Publishing (M2-R5.1)

TOTAL TIME: 2 HOURS   **TOTAL MARKS: 100**

(Answer all the questions; each question carries ONE mark)
Answer the following multiple choice questions (1 to 100) 1x100=100

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

1) HTML stands for _____
   a) Hyper Text Markup Language
   b) Hyper Text Machine Language
   c) Hyper Text Marking Language
   d) High Text Marking Language

2) Which of the following is used to read an HTML page and render it?
   a) Web server
   b) Web network
   c) Web browser
   d) Web matrix

3) What is the correct syntax of doctype in HTML5?
   a) </doctype html>
   b) <doctype html>
   c) <doctype html!>
   d) <!doctype html>

4) Which of the following tag is used for inserting the largest heading in HTML?
   a) head
   b) <h1>
   c) <h6>
   d) heading

5) In which part of the HTML metadata is contained?
   a) head tag
   b) title tag
   c) html tag
   d) body tag

6) Which of the following is not a HTML5 tag?
   a) <track>
   b) <video>
   c) <slider>

d) <source>

7) How do we write comments in HTML?
   a) </…….>
   b) <!……>
   c) </……/>
   d) <…….!>

8) Which of the following elements in HTML5 defines video or movie content?
   a) <video>
   b) <movie>
   c) <audio>
   d) <media>

9) Which of the following is not the element associated with the HTML table layout?
   a) alignment
   b) color
   c) size
   d) spanning

10) Which element is used for or styling HTML5 layout?
    a) CSS
    b) jQuery
    c) JavaScript
    d) PHP

11) Which HTML tag is used for making character appearance bold?
    a) <u>content</u>
    b) content
    c)
content</br>
    d) <i>content</i>

12) Which HTML tag is used to insert an image?
    a)
    b)
    c)
    d)

13) HTML is a subset of _____
    a) SGMT
    b) SGML
    c) SGME
    d) XHTML

14) Which character is used to represent when a tag is closed in HTML?
   a) #
   b) !
   c) /
   d) \

15) Among the following, which is the HTML paragraph tag?
   a) <p>
   b) <pre>
   c) <hr>
   d) <a>

16) In HTML, which attribute is used to create a link that opens in a new window tab?
   a) src="_blank"
   b) alt="_blank"
   c) target="_self"
   d) target="_blank"

17) Which of the following HTML tag is used to create an unordered list?
   a)
   b)
   c)
   d) <ll>

18) Which HTML element is used for abbreviation or acronym?
   a) <abbr>
   b) <blockquote>
   c) <q>
   d) <em>

19) Which of the following HTML tag is used to add a row in a table?
   a) <th>
   b) <td>
   c) <tr>
   d) <tt>

20) Which of the following tag is used to create a text area in HTML Form?
   a) <textarea></textarea>
   b) <text></text>
   c) <input type="text" />
   d) <input type="textarea" />

21) To show deleted text, which HTML element is used?
   a) <del>
   b) <em>
   c) <strong>

d) <ins>

22) Which tag is used to create a dropdown in HTML Form?
    a) <input>
    b) <select>
    c) <text>
    d) <textarea>

23) Which tag is used to create a numbered list in HTML?
    a)
    b)
    c)
    d) <ll>

24) How to create a checkbox in HTML Form?
    a) <input type="text">
    b) <input type="textarea">
    c) <input type="checkbox">
    d) <input type="button">

25) Which of the following extension is used to save an HTML file?
    a) .hl
    b) .h
    c) .htl
    d) .html

26) Which tag is used to create a blank line in HTML?
    a) <b>
    b)
    c) <em>
    d) <a>

27) Which HTML tag is used to convert the plain text into italic format?
    a) <b>
    b) <p>
    c) <i>
    d) <a>

28) What is the use of <hr/> tag in HTML?
    a) For making content appearance italics
    b) To create vertical rule between sections
    c) To create a line break
    d) To create horizontal rule between sections

29) Which attribute is not essential under <iframe>?

a) frame border
b) width
c) height
d) src

30) Which tag is used to underline the text in HTML?
a) <p>
b) <u>
c) <i>
d)

31) Which attribute specifies a unique alphanumeric identifier to be associated with an element?
a) type
b) article
c) id
d) class

32) Which HTML element is used for YouTube videos?
a) <samp>
b) <small>
c) <frame>
d) <iframe>

33) For displaying data in JavaScript, we can't use _____
a) document. write()
b) console.log()
c) innerHTML
d) document.getElementById()

34) For testing we should use _____
a) document. write()
b) console.log()
c) window. alert()
d) innerHTML

35) Which of the following keyword stops the execution of JavaScript?
a) break
b) return
c) debugger
d) try….catch

36) JavaScript numbers are stored as_____
a) integers
b) double precision floating point

c) double
d) floating point

37) Which method is not used for converting variables to number?
    a) parseInt ()
    b) Number()
    c) parseFloat()
    d) valueOf()

38) In HTML, the tags are_____.

    a) in upper case
    b) case-sensitive
    c) in lowercase
    d) not case sensitive

39) Which tag is used in HTML5 for the initialization of the document type?

    a) <Doctype HTML>
    b) <! DOCTYPE html>
    c) <Doctype>
    d) <\Doctype html>

40) What is the correct way in which we can start an ordered list that has the numeric value count of 5?

    a) <ol type = "1" start = "5">
    b) <ol type = "1" num = "5">
    c) <ol type = "1" begin = "5">
    d) <ol type = "1" initial = "5">

41)   Which HTML tag do we use for displaying the power in the expression, $(x^2 - y^2)$?

    a) <p>
    b) <sub>
    c) <sup>
    d) None of the above

42) In HTML, the correct way of commenting out something would be using:

    a) ## and #
    b) <!– and –>
    c) </– and -/->
    d) <!– and -!>

43) Text within STRONG tag is displayed as _____

a) Indented
b) Italic
c) list
d) Bold

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

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

46) "Yahoo", "Infoseek" and "Lycos" are_____?
   a) Search Engines
   b) News groups
   c) Browsers
   d) None of the above

47) 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

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

49)
 Tag is used for
   a) Line Break
   b) Horizontal row
   c) Heading
   d) Underline

50) In HTML the character H stands for ?
   a) Hyphenation
   b) Hyper text

c) Hypertext marking

d) Hyphenation test

51) What does the CSS stands for?

a) Creating Style Sheets

b) Cascading Style Sheets

c) Computer Style Sheets

d) Colorful Style Sheets

52) 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

53) Expand WAN

a) World area network

b) Wide area network

c) Web area network

d) None of the above

54) Who is making the Web standards?

a) Mozilla

b) Microsoft

c) The World Wide Web Consortium

d) NVDIA

55) Which of the following protocol is used by electronic mail?

a) telnet

b) ftp

c) smtp

d) rdp

56) Which of the following is suitable for networking in a building?

a) WAN

b) LAN

c) MAN

d) BAN

57) Which of the following is not a search engine?

a) Google

b) Yahoo

c) Twitter

d) AltaVista

58) While working on a JavaScript project, in your JavaScript application, which function would you use to send messages to users requesting for text input?
a.) Display()
b.) Prompt()
c.) Alert()
d.) Confirm()

59) The rules with regards to conduct for Internet users is known as
a) Mosaic
b) Netiquette
c) Protocol
d) Internet Protocol

60) A Spider is
a) A Computer virus
b) A Browser
c) A program that catalogs websites
d) A hacker community

61) FTP does not use
a)   Two transfer mode
b)   Control connection to remote computer before file can be transferred
c)   User Datagram Protocol
d)   Authorization of a user through login and password verification

62) The HTML tags that create a table header are
a)   <head></head>
b)
c)   <th></th>
d)   <td></td>

63) Which of the following is the correct HTML for inserting background image?
a)   <back ground img="background.gif">
b)
c)   <a href="background.gif">
d)   <body background="background.gif">

64) The main function of a browser is to
a) Compile HTML
b) Interpret HTML
c) de-compile HTML
d) interpret CGI programs

65) In<IMGSRC="C:PICTURE/BB1.gif"ALIGN=middle>ALIGN is

a) A tag

b) The head
c) The body
d) An attribute

66) Web pages are uniquely defined using

a) IP addresses
b) URL
c) Domain
d) Filename

67) Which of the following services are available on the World Wide Web?
   a) Encryption
   b) HTTP
   c) HTML
   d) Firewalls

68) iframe in HTML is used to display a web page within a web page.
   a.) TRUE
   b.) FALSE

69) A Web site's home page is normally named home.htm or home.html
   a.) TRUE
   b.) FALSE

70) Domain names are converted to
   a)   a binary string
   b)   alphanumeric string
   c)   IP addresses
   d)   A hexadecimal string

71) It is possible to display pictures in HTML specification by using the tag.
   a) <GR src=Picturefile>
   b) <PIC src=Picturefile>
   c) <IMG src=Picturefile>
   d) <GIF src=Picturefile >

72) A search engine is a program to search
   a) For information
   b) webpages
   c) webpages for specified index terms
   d) webpages for information using specified search terms

73) XML is
   a) superset of HTML
   b) Extensible Markup Language
   c) Part of DHTML
   d) Presentation language

74) A world wide web contains webpages
   a) residing in many computers
   b) created using HTML
   c) with links to other webpages
   d) residing in many computers linked together using HTML

75 What is cell padding?
   a.) Used to separate cell walls from their contents
   b.) Used to set space between cells
   c.) Both a and b above
   d.) Used to provide width to a cell

76) Plug-in is a
   a) Software
   b) Hardware
   c) Software and hardware both used for specific purpose
   d) Flash player

77) E-mail message can be protected by
   a) Encryption
   b) Caching
   c) Mirroring
   d) Shadowing

78) IP address of a packet is normally analyzed by
   a) CPU
   b) Router
   c) Modem
   d) Hub

79) What are meta tags used for?
   a.) To store information usually relevant to browsers and search engines
   b.) To only store information usually relevant to browsers
   c.) To only store information about search engines
   d.) To store information about external links

80) WebCrawler has a web robot called
   a) Crawler Robot
   b) Crawl bot
   c) Web bot
   d) Web robot

81) Which file controls how your frames will appear?
   a.) Frameset
   b.) Master Document
   c.) Template
   d.) Timeline

82) Which tag is a container?

   a) <body>
   b)
   c) <hr>
   d) <td>

83) Which of the following CSS selectors are used to specify a group of elements?
   a) tag
   b) id
   c) class
   d) both class and tag

84) Which of the following has introduced text, list, box, margin, border, color, and background properties?
   a) HTML
   b) PHP
   c) CSS
   d) Ajax

85) Which of the following CSS framework is used to create a responsive design?
   a) django
   b) rails
   c) larawell
   d) W3CSS

86) Which of the following CSS selector is used to specify a rule to bind a particular unique element?
   a) tag
   b) id
   c) class
   d) both class and tag

87) Which of the following CSS property is used to make the text bold?
  a) text-decoration: bold
  b) font-weight: bold
  c) font-style: bold
  d) text-align: bold

88) Which of the following is the correct way to apply CSS Styles?
    a) in an external CSS file
    b) inside an HTML element
    c) inside the <head> section of an HTML page
    d) all of the mentioned

89) Which of the following CSS property sets the font size of text?
    a) font-size
    b) text-size
    c) text
    d) size

90) Which of the following is not the property of the CSS box model?
    a) margin
    b) color
    c) width
    d) height

91) Which of the following CSS property is used to set the color of the text?
    a) text-decoration
    b) pallet
    c) colour
    d) color

92) Which of the following CSS Property controls how an element is positioned?
    a) static
    b) position
    c) fix
    d) set

93) Which of the following property is used to align the text in a table?
    a) text-align
    b) align
    c) text
    d) none of the mentioned

94) What is the preferred way for adding a background color in HTML?
    a.) <body background="yellow">
    b.) <background>yellow</background>

c.) < body style="background-color:yellow">

d.) <background color="yellow">text<background>

95) What is the correct HTML for creating a hyperlink?

 a.) A

 b.) <a>B

 c.) example

 d.) example

96) Which of these tags are all <table> tags?

 a.) <table><head><tfoot>

 b.) <table><tr><td>

 c.) <table><tr><tt>

 d.) <thead><body><tr>

97) Which of the following JavaScript cannot do?

 a.) JavaScript can react to events

 b.) JavaScript can manipulate HTML elements

 c.) JavaScript can be used to validate data

 d.) All of the Above

98) _____keyword is used to declare variables in javascript.

 a.) Var

 b.) Dim

 c.) String

 d.) None of the above

99) Can a data cell contain images?

 a.) yes

 b.) no

100) Using_____statement is how you test for a specific condition.

 a.) Select

 b.) If

 c.) Switch

 d.) For

22. Sample Question Paper: Programming and Problem Solving Through Python (M3-5.1)

TOTAL TIME: 2 HOURS   **TOTAL MARKS: 100**

(Answer all the questions; each question carries ONE mark)
Answer the following multiple choice questions (1 to 100) 1x100=100

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

1. Which character is used in Python to make a single line comment?
   A. /
   B. //
   C. #
   D. !

2. What keyword is used in Python to raise exceptions?
   A. Raise
   B. goto
   C. try
   D. except

3. Which one of the following is the correct extension of the Python file?
   A. .python
   B. .py
   C. .p
   D. None of the above

4. Which of the following is not a valid set operation in python?
   A. Union
   B. Intersection
   C. Difference
   D. None of the above

5. What is the maximum possible length of an identifier?
   A. 16
   B. 8
   C. 32
   D. None of the above

6. Which of the following are valid string manipulation functions in Python?
   A. count()
   B. upper()
   C. strip()
   D. None of the above

7. How many keywords present in the python programming language?

A. 32
B. 64
C. 33
D. 29

8. In which language is Python written?
   A. C++
   B. C
   C. Java
   D. None of the above

9. How many control statements python supports?
   A. 3
   B. 4
   C. 5
   D. 6

10. Is Python case sensitive when dealing with identifiers?
   A. Yes
   B. No
   C. Machine dependent
   D. None of the above

11. Which of the following concepts is not a part of Python?
   A. Pointers
   B. Loops
   C. Dynamic typing
   D. All of the Above

12. Which keyword is used for function in Python language?
   A. Function
   B. Def
   C. Fun
   D. Define

13. Which of the following statements are used in Exception Handling in Python?
   A. try
   B. except
   C. finally
   D. All of the above

14. What does pip stand for python?
   A. unlimited length
   B. all private members must have leading and trailing underscores
   C. Preferred Installer Program
   D. None of the above

15. Which of the following types of loops are not supported in Python?
  A. For
  B. While
  C. Do-while
  D. None of the above

16. Which of the following functions is a built-in function in python?
  A. factorial()
  B. print()
  C. seed()
  D. sqrt()

17. What is the output of the following program:
print "Hello World"[::-1]
  A. dlroW olleH
  B. Hello Worl
  C. D
  D. error

18. Which of the following functions converts date to corresponding time in Python?
  A. strptime()
  B. strftime()
  C. Both A and B
  D. None of the above

19. To start Python from the command prompt, use the command _____
  A. execute python
  B. go python
  C. python
  D. run python

20. Which of the following modules need to be imported to handle date time computations in Python?
  A. datetime
  B. date
  C. time
  D. timedate

21. What does ~~~~~~5 evaluate to?
  A. +5
  B. -11
  C. +11
  D. -5

15. What will be the result of the following expression in Python "2 ** 3 + 5 ** 2"?
  A. 65536

B. 33
C. 169
D. None of the above

22. What will be the datatype of the var in the below code snippet?
var = 10
print(type(var))
var = "Hello"
print(type(var))
A. Str and int
B. int and int
C. str and str
D. int and str

23. How can assertions be disabled in Python?
A. Passing –O when running python
B. Assertions are disabled by default
C. Both A and B are wrong
D. Assertions cannot be disabled in python

24. How is a code block indicated in Python?
A. Brackets
B. Indentation
C. Key
D. None of the above

25. What will be the output of the following code snippet?
a=[1,2,3,4,5,6,7,8,9]
a[::2]=10,20,30,40,50,60
print(a)
A. ValueError: attempt to assign sequence of size 6 to extended slice of size 5
B. [10, 2, 20, 4, 30, 6, 40, 8, 50, 60]
C. [1, 2, 10, 20, 30, 40, 50, 60]
D. [1, 10, 3, 20, 5, 30, 7, 40, 9, 50, 60]

26. What is the correct command to shuffle the following list?
fruit=['apple', 'banana', 'papaya', 'cherry']
A. fruit.shuffle()
B. shuffle(fruit)
C. random.shuffle(fruit)
D. random.shuffleList(fruit)

27. Which of the following statements given below is/are true?
A. Tuples have structure; lists have an order.
B. Tuples are homogeneous, lists are heterogeneous.
C. Tuples are immutable, lists are mutable.

D. All of them.

28. 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']

29. What is the output of the code print (9//2)
A. 4.5
B. 4.0
C. 4
D. Error

30. What is the output of the following program:
i = 0
while i < 3:
      print (i)
      i=i+1
      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

31. To flatten a given 2-D list and include only those strings whose lengths are less than six:
planets = [['Mercury', 'Venus', 'Earth'], ['Mars', 'Jupiter', 'Saturn'], ['Uranus', 'Neptune', 'Pluto']]

A. flatten_planets = [sublist for sublist in planets for planet in sublist if len(sublist) < 6]
B. flatten_planets = [planet for sublist in planets for planet in sublist if len(planet) < 6]
C. flatten_planets = [planet for sublist in planets for planet in sublist if len(sublist) < 6]
D. None of the above

32. What will be the output of the following Python code?
str1="helloworld" str1[::-1]
A. dlrowolleh
B. Hello
C. World
D. Helloworld

33. Which of the following is not a data type in python?
A. String

B. numbers
C. Slice
D. List

34. PVM is often called_____.
   A. Python Interpreter.
   B. Python compiler
   C. Python Volatile machine
   D. Portable virtual machine

35. Which statement is correct??
   A. List is mutable & Tuple is immutable
   B. List is immutable & Tuple is mutable
   C. Both are mutable
   D. Both are immutable

36. Dictionary has:
   A. Sequence value pair
   B. Key value pair
   C. Tuple value pair
   D. Record value pair

37. The following command is substitution when multiple ifs are used
   A. else if
   B. eliff
   C. elif
   D. otherwise

38. for i in range (-5,0,1) will run
   A. 4 times
   B. 5 times
   C. 6 times
   D. 3 time

39. Which is not true:
   A. a,b,c=5,4,3
   B. x=[10,5,4,6]
   C. d={}
   D. 5=a

40. Which of the following function is used to find the total number of elements in a numpy array
   A. type
   B. ndims
   C. size
   D. shape

41. Which options are correct to create an empty set in Python?
  A. {}
  B. []
  C. ()
  D. Set ()

42. csv stands for
  A. comma string values
  B. comma sequence values
  C. comma separated values
  D. comma segregated values

43. Which of the following keywords is not reversed keyword in python?
  A. None
  B. Class
  C. Goto
  D. None

44. Which is the special symbol used in python to add comments?
  A. $
  B. //
  C. /*… ....*/
  D .#

44. On executing the following commands, Broadcasting in numpy will produce
  a = np.array((0,10,20,30))
  b = np.array((0,1,2))
  y = a[:, None] + b
  A. Error, operands could not be broadcast together with these shapes
  B. [[0 10 20, 30] [10 21, 32] [20 31 22] [30 31 32]]
  C. [[0 0 0] [0 0 0] [0 0 0] [0 0 0]]
  D. [[0 1 2] [10 11 12] [20 21 22] [30 31 32]]

45. Following is a Machine learning concept
  A. Generating prime nos
  B. Drawing image
  C. Predicting image
  D. Drawing Graphs

46. What is the result of round (0.5) – round(-0.5)?
  A. 1.0
  B. 2.0
  C. 0
  D. 0.0

47. The_____function modifies the original array and_____function creates a new instance of the array.
   A. reshape,resize
   B. resize,reshape
   C. ndims,resize
   D. reshape, ndims

48. To create sequences of numbers, NumPy provides a function_____analogous to range that returns arrays instead of lists
   A. arange
   B. aspace
   C. aline
   D. None of the above

49. Which of the following keywords is used for function declaration in Python language?
   A. def
   B. function_name
   C. define
   D. None of these

50. Why does the name of local variables start with an underscore discouraged?
   A. To identify the variable
   B. It confuses the interpreter.
   C. It indicates a private variable of a class
   D. D. None of these

51. Which one of the following has the highest precedence in the expression?
   A. Division
   B. Subtraction
   C. Power
   D. Parentheses

52. The function used to convert to datetime is :
   A. Convert_todatetime()
   B. To_datetime()
   C. Datetime_to()
   D. Todate()

53. colors = ["red", "green", "burnt sienna", "blue"]
   Which list index would select the value 'red' from the above list
   A. "red"
   B. 0
   C. 1
   D. -4

54. What will be the output of squares = {x: x*x for x in range(6)}
A. [0, 1, 4, 9, 16, 25]
B.   [0: 0, 1: 1, 2: 4, 3: 9, 4: 16, 5: 25]
C.   {0: 0, 1: 1, 2: 4, 3: 9, 4: 16, 5: 25}
D.   Error   59. x = [10, [3.141, 20, [30, 'baz', 2.718]], 'foo']

55.What is the expression that returns the 'z' in 'baz'?
  A. x[1][0][1][2]
  B. x[1][0][1][2]
  C. x[1][2][0][2]
  D. x[1][2][1][2]

56. What's the main difference between Python lists and tuples?
  A. Lists can hold any data type and tuples can only contain int and str objects.
  B. Lists are immutable and tuples are mutable.
  C. Lists are faster and tuples are slower.
  D. Lists are mutable and tuples are immutable.

57. How do you assign a tuple of length 1 to the variable a? (Check all that are correct.)
  A. a = (1,)
  B. a=1,
  C. a=[1]
  D. a=1
  E. a=tuple(1)

58. What is printed when the following code is run?
  tup = ('30', '3', '2', '8')
  print(sorted(tup), reverse = True)
  A. ['2', '3', '30', '8']
  B. ['2', '3', '8', '30']
  C. ['30', '8', '3', '2']
  D. ['8', '30', '3', '2']

59.Which of the following file formats are allowed to store data through python programming ?
  A. Video files
  B. Audio files
  C. Text Files
  D. d) Binary Files

60. To open a file in python language.................. function is used .
  A. Begin()
  B. Create()
  C. Open()
  D. File()

61. If we do not specify file mode while opening a file, the file will open in..............mode

A. read
B. write
C. append
D. will give an error

62. To open a file Myfile.txt ,which is stored at d:\Myfolder, for WRITING , we can use
   A. F=open("d:\Myfolder\Myfile.txt","w")
   B. F=open(file="d:\Myfolder\Myfile.txt","w")
   C. F=open("d:\\Myfolder\Myfile.txt","w")
   D. F=open("d:\\Myfolder\\Myfile.txt","w")
   D. F=open(r"d:\Myfolder\Myfile.txt","w")

63. In which format Binary file contains information

   A. Zebra way
   B. Quick response code
   C. same format in which the data is held in memory.
   D. ASCII Format

64. To read all contents from file object FILE at once we may use
   A. FILE.read(*)
   B. FILE.readlines()
   C. FILE.read()
   D. D. FILE.readline()

65. What is easier for a program to read and write.

   A. Binary file
   B. Text file
   C. Doc file
   D. Excel file

66. readlines () will return
   A. list of characters
   B. list of strings
   C. list of lines
   D. list of tuples

67. Which of the following file-modes does retains file data and append new data.
   A. 'a+'
   B. 'a'
   C. 'w+'
   D. 'r+'

68. Which of the following function is used to write LIST OF STRINGS in a file?

A. write()
B. writeline()
C. writelines()
D. write(all)

69. Commnd to write a list in a file.

A. write()
B. writeline()
C. writelines()
D. writepara()

70. Writes a list in a file.

A. write()
B. writeline()
C. writelines()
D. writepara()

71. Which of the following would NOT work as a variable name?
A. a
B. len
C. length
D. x

72. Which of the following method creates a new array object that looks at the same data?

A. View
B. Copy
C. Paste
D. all of the mentioned

73. Which keyword is used for function?

A. Def
B. Def
C. Define
D. Fund

74. NumPy arrays can be____.
A. Indexed
B. Sliced
C. Iterated
D. All of the mentioned above

75. What of the following is the use of function in python?

   A. They are reusable
   B. They don't provide molularity
   C. You cant create your own functions
   D. All of the mentioned

76. What is the purpose of NumPy in Python?
   A. To do numerical calculations
   B. To do scientific computing
   C. Both A and B
   D. None of the mentioned above

77. What will be the output?
   Def f(x,y,z): return x+ y+ z
   f(2,30,400)

   A. 432
   B. 24000
   C. 430
   D. No output

78. What will be the output of the following Python code?
   from numpy import random
   x = random.randint(100)
   print(x)
   A. 56
   B. 26
   C. 40
   D. All of the mentioned above

79. What will be the output of the following python code?

   min=(lambda x,y: x if x<y else y)
   min(101*99, 102*98)

   A. 9997
   B. 9999
   C. 9996
   D. None of the mentioned

80. Which of following is not a decision-making statement:
   A. if-elif statement
   B. for statement
   C. if -else statement
   D. if statement

81.   NumPy stands for?
   A. Number in Python
   B. Numerical Python
   C. Numbering Python
   D. None of the above

82. What keyword would you use to add an alternative condition to an if statement?

   A. else if
   B. elseif
   C. elif
   D.None of the above

83. What error will occur when you execute the following code?   MANGO = APPLE
   A. Name error
   B. Syntax error
   C. Type error
   D. Value error

84. Execution of statements in_____construct depend on a condition test.
   A. Selection
   B. Sequence
   C. Iteration
   D. Repetition

85. The most important object defined in NumPy is an N-dimensional array type called?
   A. narray
   B. ndarray
   C. nd_array
   D. darray

86. Which one of the following is the right way to call a function?
   A. call function_name()
   B. function function_name()
   C. function_name()
   D. None of these

87. Which among the following statement is false?
   A. ndarray is also known as the axis array.
   B. In NumPy, dimensions are called axes.
   C. NumPy main objective is the homogeneous multidimensional array.
   D. ndaaray. dataitemSize is the buffer containing the actual elements of the array.

88. Study the following function:
import math , abs(math.sqrt(36))

A. What will be the output of this code?
B. A. error
C. B. -6
D. C. 6
E. D. 6.0

89. Which of the following sets the size of the buffer used in ufuncs?
A. bufsize(size)
B. setsize(size)
C. setbufsize(size)
D. size(size)

90. What is fortran order in NumPy?
A. Reshaping regarding row major order
B. Reshaping regarding column major order
C. Converting to 1D array
D. All of the above

91. What are the attributes of NumPy array?
A. Shape, dtype, ndim
B. Objects, type, list
C. Objects, non-vectorization
D. Unicode and shape

92. NumPy developed by?
A. Guido Van Rosum
B. Travis Oliphant
C. Wes McKinney
D. Jim Hugunin

93. How we can change the shape of the NumPy array in python?
A. By shape()
B. By reshape()
C. By ord()
D. By change()

94. What is the range of uint32 data type?
A. (-2147483648 to 2147483647)
B. (-32768 to 32767)
C. (0 to 65535)
D. D. (0 to 4294967295)

95. How we install numPy in system?
A. install numpy
B. pip install python numpy
C. pip install numpy

D. pip install numpy python

96. How to import NumPy module?
   A. Import numpy
   B. Import numpy as my_numpy
   C. Import numpy as np
   D. All of the above

97. Python uses:
   A. compiler
   B. assembler
   C. interpreter
   D. Linker only

98. How to import NumPy module?
A. Import numpy
B. Import numpy as my_numpy
C. Import numpy as np
D. All of the above

99. Python uses:
A. compiler
B. assembler
C. interpreter
D. Linker only

100.csv stands for
A. comma string values
B. comma sequence values
C. comma separated values
D. comma segregated values

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23. Sample Question Paper: Internet of Things and its Application (M4-R5.1)

TOTAL TIME: 2 HOURS   **TOTAL MARKS: 100**

(Answer all the questions; each question carries ONE mark)
Answer the following multiple choice questions (1 to 100) 1x100=100

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

1. The term IoT was coined in year
   (a) 1998
   (b) 1999
   (c) 2010
   (d) 2005

2. The size of MAC address is_____bits
   (a) 16
   (b) 32
   (c) 48
   (d) 56

3. In context to advantages of IoT, which of the following is incorrect
   (a) Reduce waste
   (b) security
   (c) enhanced data collection
   (d) improve customer satisfaction

4. The total resistance of three resistors connected in parallel will be_____as compared to the individual value of resistor
   (a) less
   (b) high
   (c) same
   (d) Depends on the temperature

5. Capacitor block AC and allows DC to pass through.
   (a) true
   (b) false
   (c) not ascertain
   (d) it purely depends on the value of capacitor

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

7. The size of bits in IPv4 addressing is
    - (a) 16
    - (b) 32
    - (c) 48
    - (d) 56

8. The pre-built circuit boards that fits on the top of Arduino or any other development board are known as
    - (a) Vero board
    - (b) FRC connectors
    - (c) shields
    - (d) breadboard

9. Which layer in the TCP/IP stack is equivalent to the Transport layer of the OSI model
    - (a) application
    - (b) transport
    - (c) Internet
    - (d) Network Access

10. Each IP packet contains
    - (a) Source and destination IP address
    - (b) Source IP address only
    - (c) destination IP address only
    - (d) either of Source or destination IP address

11. Which language is best suited for IoT analytics
    - (a) PHP
    - (b) Java
    - (c) Python
    - (d) Scala

12. At which layer of OSI model, router works
    - (a) Transport layer
    - (b) Session layer
    - (c) Datalink layer
    - (d) Network layer

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

14. 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

15. Which symbol is used in Arduino to calculate Modulo
     (a)   #
     (b) $
     (c)   %
     (d) !

16. With respect to the body language, the handshake conveys the confidence is
     (a) Firm
     (b) Limp
     (c) Loose
     (d) Incomplete knowledge

17. Botnet is often used to launch_____attack
     (a) DoS
     (b) DDoS
     (c) Brute force
     (d) Passive

18. The IIoT stands for
     (a) Indepth Internet of T
     (b) Innovative Internet of Things
     (c) Industrial Internet of Things
     (d) Information Internet of Things

19. The default method(s) in Arduino program is/are
     (a) onlyloop()
     (b) only setup()
     (c) setup() and loop()
     (d) can be either loop() or setup()

20. Which of the following communication medium supports highest data rate?
     (a) Optical fiber
     (b) Wifi
     (c) Ethernet
     (d) Bluetooth

21. Which layer in the TCP/IP stack is equivalent to the Datalink layer of the OSI model
     (a) Application
     (b) host-to-host
     (c) Internet
     (d) Network Access

22. Which of the following is not a standard protocol used in IoT domain?
    (a) Wifi
    (b) Z-wave
    (c) Zigbee
    (d) LoMe

23. Which of the following is known as lightweight protocol?
    (a) MQTT
    (b) TCP
    (c) IP
    (d) HTTP

24. MQTT protocol is based upon
    (a) Client server architecture
    (b) Publish subscribe architecture
    (c) Both of these
    (d) None of these

25. The size IPv6 addressing is
    (a) 48 bits
    (b) 96 bits
    (c) 128 bits
    (d) 256 bits

26. Statement required in Arduino program to generate one second delay is
    (a) delay(100);
    (b) delay(1000);
    (c) delay(10000);
    (d) delay(1);

27. The size IPv6 addressing is
    (a) 48 bits
    (b) 96 bits
    (c) 128 bits
    (d) 256 bits

28. IIoT targets applications related to
    (a) Health and fitness.
    (b) Entertainment
    (c) Both of these
    (d) None of these

29. The count of PWM pins in Arduino UNO is
    (a) 2
    (b) 3
    (c) 5

(d) 6

30. The analogRead method in Arduino UNO returns value range
    (a) 0-255
    (b) 0-511
    (c) 0-1023
    (d) 0-4095

31. Open source operating system is
    (a) Arduino
    (b) Windows
    (c) Linux
    (d) Mac

32. Single line comment in C Language starts with
    (a) #
    (b) //
    (c) !—
    (d) /*

33. Which of the following Function is called only once in Arduino program?
    (a) loop()
    (b) setup()
    (c) selay()
    (d) digitalWrite()

34. In business communication, grapevine is an example of
    (a) Formal communication
    (b) Informal communication
    (c) Group task
    (d) Business talk

35. The founder of Arduino project is _____
    (a) Kevin asthon
    (b) Massimo Banzi
    (c) Jim hungton
    (d) Massimo berry

36. _____ board of Arduino family can be used to sewn into clothing
    (a) Arduino nano
    (b) Lilypad
    (c) Arduino uno
    (d) Arduino mega

37. Which of the following option is not available in Arduino IDE software?
    (a) Compile

(b) Verify

(c) Terminate

(d) Serial monitor

38. Time management is primarily creating an environment
    (a) Appropriate for communication
    (b) conducive to effectiveness.
    (c) Best for business talk
    (d) None of these

39. Program written in Arduino IDE is known as
    (a) Code
    (b) Source code
    (c) Sketch
    (d) Paint

40. The basic program in Arduino IDE contains
    (a) setup () and loop () function
    (b) only setup () function
    (c) only loop () function
    (d) none of these

41. Which of the transmission media contains central conductor and shield?
    (a) coaxial cable
    (b) twisted pair cable
    (c) fiber-optic cable
    (d) none of these

42. Radio waves are
    (a) Omnidirectional
    (b) Unidirectional
    (c) Bidirectional
    (d) None of these

43. Which of the transmission media uses light as medium of data transfer
    (a) coaxial cable
    (b) twisted pair cable
    (c) fiber-optic cable
    (d) none of these

44. Which type of the signal is used for satellite or wireless LAN communication
    (a) Radio wave
    (b) Microwave
    (c) Infrared
    (d) None of these

45. Which of the transmission media highest data transmission rate?
    (a) coaxial cable
    (b) twisted pair cable
    (c) fiber-optic cable
    (d) none of these

46. The basic categorization of transmission media is
    (a) Guided and unguided
    (b) Determinate and indeterminate
    (c) Fixed and unfixed
    (d) None of these

47. Which of the following is/are correct in context to twisted pair cable?
    (a) More the twist better is the data carrying capability
    (b) Less twist more data rate
    (c) Data-rate does not depend on twist in the cable
    (d) None of these

48. The method of communication in which data transmission takes place in either directions, but one at a time
    (a) Full duplex
    (b) Half duplex
    (c) Simplex
    (d) None of these

49. In communication satellite multiple repeaters are generally known as
    (a) Modulators
    (b) Earth Stations
    (c) Transponders
    (d) None of these

50. Which of the following device perform modulation and demodulation?
    (a) Switch
    (b) modulator
    (c) Modem
    (d) None of these

51. In an IoT ecosystem, devices with unique identities having monitoring, and remote sensing capabilities are known as
    (a) Things
    (b) Motes
    (c) Monitoring devices
    (d) Edge monitors

52. A typical IoT system design which refers to the individual node devices and their protocols that are utilized to create a functional IoT ecosystem, is termed as

(a) Logical design
(b) physical design
(c) both of these
(d) none of these

53. The different type of communication models available in an IoT ecosystem typically fall in following category/categories
   (a) Request-response model
   (b) Push-pull model
   (c) Publish-subscribe model
   (d) All of these

54. _____is a IoT system design which depicts how actually the components should be arranged to complete a particular function
   (a) Logical design
   (b) physical design
   (c) both of these
   (d) none of these

55. IEEE 802.16 protocol stack is commonly referred as
   (a) LoRa
   (b) Bluetooth
   (c) WiMax
   (d) none of these

56. IoT application layer protocol include
   (a) MQTT
   (b) HTTP
   (c) Only MQTT
   (d) Both MQTT and HTTP

57. Bits at physical layer are converted to frames at_____layer of OSI model
   (a) Application layer
   (b) Network layer
   (c) Data link layer
   (d) Transport layer

58. _____type of fiber cable suffers from high signal dispersion.
   (a) Single mode
   (b) Multimode
   (c) None of these
   (d) Both of these

59. The main function of transport layer in ISO-OSI model is
   (a) Node to node delivery
   (b) Process-to-process delivery

(c) Synchronization
(d) None of these

60. A typical microcontroller contains
    (a) Timers
    (b) Memory
    (c) I/O ports
    (d) All of these

61. The advantages of microcontroller in an electronic device include
    (a) Saving cost
    (b) Making circuit compact
    (c) Save power consumption
    (d) All of these

62. Sensors which produce continuous signals that are proportional to the sensed parameter are
    (a) Analog sensor
    (b) Digital sensor
    (c) Light sensor
    (d) Dust sensor

63. Device used to convert light energy into electrical energy is
    (a) Turbine
    (b) Windmill
    (c) Solar cell
    (d) None of these

64. Protocols used for I/O (input/output) sensor interfacing is/are
    (a) SPI
    (b) I2C
    (c) UART
    (d) All of these

65. IEEE protocol commonly referred as WiFi is
    (a) 802.15
    (b) 802.3
    (c) 802.11
    (d) 802.16

66. Collection of standards for Low-rate wireless personal area network i.e. **-LR-WPAN**
    (a) 802.15
    (b) 802.3
    (c) 802.11
    (d) 802.16

67. Latest version of the Internet Protocol (IPv6) and Low-power Wireless Personal Area Networks is acronym as
    (a) 6LoWPAN
    (b) LoRa
    (c) LoRaWAN
    (d) None of these

68. The process flow of four stage IoT solution Architecture includes
    (a) Sensor/actuators, data acquisition, edge IT, data center/cloud
    (b) data acquisition, Sensor/actuators, edge IT, data center/cloud
    (c) Sensor/actuators, data acquisition, data center/cloud, edge IT
    (d) Sensor/actuators, edge IT, data acquisition, data center/cloud

69. HC-05 bluetooth module can be used in programming to work as
    (a) Slave only
    (b) Master only
    (c) Master and slave
    (d) None of these

70. _____is the rate at which the number of signal elements or changes to the signal occurs per second when it passes through communication channel
    (a) Data rate
    (b) Bits rate
    (c) Baud rate
    (d) None of these

71. The total Bits transmitted in one-unit time is referred as
    (a) Data rate
    (b) Bits rate
    (c) Baud rate
    (d) None of these

72. _____pins in Arduino reads data from analog sensor and convert value into digital value
    (a) Analog
    (b) Digital
    (c) Power
    (d) None of these

73. AnalogWrite method can be used for
    (a) PWM pins
    (b) Hybrid pins
    (c) Digital pins
    (d) None of these

74. In ATmega328p, the letter p stands for
    (a) Picopower

(b) Preprocessing
(c) Precise
(d) Popular

75. Inductance is measured in
    (a) Ohm
    (b) Farad
    (c) Henry
    (d) Coulomb

76. In Arduino programming,_____function is used to configure the pins as input or output
    (a) pinMode()
    (b) digitalWrite()
    (c) analogWrite()
    (d) setPin()

77. SI unit of Resistance is
    (a) Ohm
    (b) Farad
    (c) Henry
    (d) Coulomb

78. In Arduino programming,_____function is used to make digital pin HIGH
    (a) pinMode()
    (b) digitalWrite()
    (c) analogWrite()
    (d) setPin()

79. In Arduino programming, digital pins have_____possible values
    (a) Only one
    (b) Two
    (c) Three
    (d) Any number of values

80. Capacitance is measured in
    (a) Ohm
    (b) Farad
    (c) Henry
    (d) Coulomb

81. The property of any conductor that opposes the flow of electric current through it is known as
    (a) Capacitance
    (b) Resistance
    (c) Inductance

(d) None of these

82. _____is the assurance that the information is trustworthy and accurate
    (a) Confidentiality
    (b) Integrity
    (c) Availability
    (d) None of these

83. _____is an indispensable tool for testing, diagnosing, and troubleshooting electrical circuits, components, and devices.
    (a) Soldering iron
    (b) digital multimeter
    (c) voltmeter
    (d) ammeter

84. A set of rules that limits access to information is known as
    (a) Confidentiality
    (b) Integrity
    (c) None of these
    (d) Both of these

85. _____is the guarantee of reliable and constant access to your sensitive data by authorized data
    (a) Confidentiality
    (b) Integrity
    (c) Availability
    (d) None of these

86. _____is flooding the Internet with many copies of same message (typically email)
    (a) Spam
    (b) Injection
    (c) Spoofing
    (d) DoS attack

87. _____is a type of social engineering where an attacker sends a fraudulent message designed to trick a person into revealing sensitive information
    (a) Phishing
    (b) Surfing
    (c) DDoS
    (d) Revealing

88. In C programming language, preprocessors are specified with_____symbol
    (a) #
    (b) $
    (c) ^

(d) &

89. In C programming language, the output of following statement is

$$1 < 2 \; ? \; return \; 1: \; return \; 2;$$

(a) 1
(b) 2
(c) Depends on compiler
(d) Compile time error

90. Which of the following is not logical operator in C language?
(a) &&
(b) ||
(c) !
(d) |

91. In C language, the bitwise complement operator is
(a) !
(b) |
(c) ~
(d) &

92. _____is a program which enters computer system by secretly attaching itself with valid computer program and later steals information.
(a) Phishing
(b) Surfing
(c) Trojan horse
(d) Wamp

93. _____is used for serial communication with devices connected with Arduino
(a) I2C
(b) SPI
(c) UART
(d) None of these

94. _____is the act of secretly listening to the private conversation or communications of others without their consent in order to gather information.
(a) Phishing
(b) Surfing
(c) Trojan horse
(d) Eavesdropping

95. _____malware is designed to launch botnet attack, primarily targeting online consumer devices such as IP cameras and home routers
(a) Darkmotel
(b) Mirai

(c) Petye
(d) whitehorse

96. The process of reading is commonly known as
    (a) Encoding
    (b) Decoding
    (c) Codification
    (d) None of these

97. _____is the document used to communicate within the organization
    (a) Letter
    (b) Email
    (c) Memo
    (d) Fax

98. The document used as evidence in legal cases is
    (a) Letter
    (b) Memo
    (c) Notice
    (d) Minutes of meeting

99. While conversation, the most helpful feature for listeners to understand meaning is/are
    (a) Tone
    (b) Pitch
    (c) Both of these
    (d) None of these

100. Which of the following is not a valid resume format?
    (a) Portfolio
    (b) Chronological
    (c) Functional
    (d) combination