# Theory Paper

| Part A Introduction | | | |
|---|---|---|---|
| **Program: Degree** | | **Class :UG** | **Year: III** Session: |
| **Subject: BCA** | | | |
| **1** | **Course Code** | **UPYTHCA501** | |
| **2** | **Course Title** | **Python Programming (Theory) (Group A - Paper-II)** | |
| **3** | **Course Type (Core Course/ Discipline Specific Elective/ Elective/ Generic Elective /Vocational/..... )** | **Discipline Specific Elective (DSE)** | |
| **4** | **Pre-requisite (if any)** | | |
| **5** | **Course Learning outcomes (CLO)** | **On successful completion of this course, the students will be able to:**<br>1. Develop and execute simple Python programs.<br>2. Structure a Python program into functions.<br>3. Using Python lists, tuples to represent compound data<br>4. Develop Python Programs for file processing | |
| **6** | **Credit Value** | **4** | |
| **7** | **Total Marks** | Max. Marks: 40 + 60 Min. Passing Marks: 16+24 | |

## Part B Content of the Course

No. of Lectures (in hours per week): 3 **Hrs. per week**
Total No. of Lectures: **60 Hrs.**

| Module | Topics | No. of Lectures (1 Hour Each) |
|---|---|---|
| **Unit - I** | What is Python? WHY PYTHON? History, Features - Dynamic, Interpreted, Object oriented, Embeddable, Extensible, Large standard libraries, Free and Open source. Download &Python Installation Process in Windows, Unix, Linux and Mac, Online Python IDLE, Python Realtime IDEs like Spyder, Jupyter Note Book, PyCharm. Rodeo, Visual Studio Code, ATOM, PyDevetc, Data Types and Variables, Numbers, Operators Comments in Python. Input output operation in python. | **No. of Lectures 14** |
| **Unit - II** | Control Statements: Conditional control statements - if, If-else, lf-elif-else, Loop control statements- for, while, Data Structure & Collection:-String, List, Tuple, Set, Dictionary, Comparison of List, Tuple and Set, Function in python, types of function in python, map, reduce, filter function. Lamda Function | **10** |

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|---|---|---|
| Unit - **III** | Importance of modular programming. What is module? Types of Modules - Pre defined, User defined. User defines module creation, OS, Date-time, math modules, organizing python project into packages, Types of packages - pre defined, user defined. Package v/s Folder, File and Directory handling in Python. | |
| Unit - **IV** | Procedural v/s Object oriented programming, Principles of OOP - Encapsulation, Abstraction (Data Hiding), Polymorphism, Inheritance. Inner Classes. Exception handling and types of errors, try, except, finally, raise, and Need to Custom exceptions, Case studies, regular expression. | |
| Unit - V | Multithreading and multiprocessing in python, Threading module, Creating thread - inheriting Thread class , Using callable object, Life cycle of thread. Single threaded application, Multithreaded application, Can we call run() directly? Need to start() method , Sleep() & Join(), Synchronization - Lock class - acquire(), release() functions. Garbage collection. Python Data Base Communications (PDBC), Introduction of Numpy, Pandas & MatPlotLib, Drawing plots. | |
| | | |

## Part C Suggested Study Material

**Suggested Readings:**

1. Mark Lutz, Learning Python
2. Tony Gaddis, Starting Out With Python
3. Kenneth A. Lambert, Fundamentals of Python

JamesPayne,BeginningPythonusingPython2.6andPython32.

**Reference Books:**

1. Python Crash Course: A Hands-On, Project-Based Introduction to Programming Edition) Author: Eric Matthes.
2. The Python Language Reference Manual (version 3.2), Guido van Rossum, Drake, Jr. (Editor),ISBN: 1906966141,Network Theory Ltd, 120 pages (Revised

**Suggestive digital platforms/ web links:**

1. www.w3school.com
2. www.pvthon.org
3. https://www.tutorialspoint.com/Python/index.htm

| S.No. | Online Course | Duration | Plateform |
|---|---|---|---|
| 01 | Joy of Computing using Python https://nptel.ac.in/courses/106106182 | 12 Weeks | NPTEL |
| 02 | Complete Python course https://www.udemy.com/topic/python/ | 12 Weeks | Udemy |

| PART D: Assessment and Evaluation | | | |
|---|---|---|---|
| Internal Assessment : Continuous Comprehensive Evaluation (CCE) : 40 Marks Shall be based on allotted assignments and Class Tests. The marks shall be as follows: | | External Assessment: University Exam (UE) : 60 Marks<br>Time : 03.00 Hours | |
| Assessment and presentation of assignment | 10 Marks | Section (A) : Five Very Short Questions (50 Words Each )<br>OR<br>MCQ Questions | 05 x 02 = 10 Marks<br>OR<br>10 x 01 = 10 Marks |
| Class Test I ( Objective Questions) | 10 Marks | | |
| Class Test II (Descriptive Questions) | 10 Marks | Section (B) : Five Short Questions (200 Words Each) | 05 x 06 = 30 Marks |
| Class Test III | 10 Marks | Section (C): Two Long Questions (500 Words Each) | 02 x 10 = 20 Marks |
| Total | 40 Marks | Total | 60 Marks |
| Any remarks/suggestions: | | | |

| Part A Introduction | | |
|---|---|---|
| **Program: Degree** | **Class : UG** | **Year: III** **Session:** |
| **Subject: BCA** | | |
| **1** | **Course Code** | **UCOMPCA502** |
| **2** | **Course Title** | **Computer Graphics (Theory)**<br>**(Group A - Paper-I)** |
| **3** | **Course Type (Core Course/ Discipline Specific Elective/ Elective/ Generic Elective /Vocational/ )** | **Discipline Specific Elective (DSE)** |
| **4** | **Pre-requisite (if any)** | None |
| **5** | **Course Learning outcomes (CLO)** | **On successful completion of this course, the students will be able to:**<br>1. Understand the basics of computer graphics, different graphics systems and applications of computer graphics.<br>2. Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.<br>3. Use of geometric transformations on graphics objects and their application in composite form.<br>4. Extract scene with different clipping methods and its transformation to graphics display device.<br>5. Explore projections and visible surface detection techniques for display of 3D scene on 2D screen.<br>6. Render projected objects to naturalize the scene in 2D view and use of illumination models for this. |
| **6** | **Credit Value** | **4** |
| **7** | **Total Marks** | Max. Marks: 40 + 60 Min. Passing Marks: 16+24 |

## Part B Content of the Course

No. of Lectures (in hours per week): 3 **Hrs. per week**
Total No. of Lectures: **60 Hrs.**

| Module | Topics | No. of Lectures (1 Hour Each) |
|---|---|---|
| Unit 1 | **Introduction to Computer Graphics:** Application of Computer Graphics. Interactive and Passive Graphics.<br>**Graphic Systems:** Display Processor, Cathode Ray Tube (CRT), Random Scan vs Raster Scan, Color CRT Monitors, Direct View Storage Tubes, Flat Panel Display.<br>**Input Output Devices:** Input Devices, Trackball, Light Pen, Image Scanner, Output Devices, Plotters. | 12 |

| | | |
|---|---|---|
| Unit -II | **Scan Conversion a line: Scan Conversion Definition, Scan Converting a** Point. Scan Converting **a Straight Line. DDA Algorithm.** **Scan Conversion Circle: Defining a Circle, Defining a Circle using** Polynomial Method, Defining **a Circle using Polar Coordinates Method,** Bresenham's Circle Algorithm, **Midpoint Circle Algorithm.** **Scan Converting Ellipse: Scan converting a Ellipse,** **Polynomial** Method, Trignometric Method, Midpoint **Ellipse Algorithm** | **12** |
| **Unit - III** | **Filled Area Primitives: Boundary Fill Algorithm, Flood Fill Algorithm,** Scan Line Polygon **Fill Algorithm.** **2D Transformations: Introduction of** Transformation, **Translation,** Scal Mg. Rotation, Reflection, Shearing, Matrix Representation, Homogeneous Coordinates, Composite Transformation, **Pivot** Point **Rotation.** **2D-Viewing: Window, Window to Viewport** Co-ordinate Transformation, Zooming, Panning. | **12** |
| Unit -IV | **Clipping Techniques: Clipping, Point Clipping, Line Clipping,** Midpoint Subdivision Algorithm, Text Clipping, **Polygon, Sutherland-**Hodgeman Polygon Clipping, Weiler-Atherton **Polygon Clipping.** **Pointing & Positioning:** Pointing & Positioning Techniques, Elastic or Rubber Band Techniques, Dragging. **Shading:** Introduction of Shading, Constant Intensity Shading, Gouraud shading, Phong Shading. | **12** |
| Unit V: | **Animation:** Animation, Application Areas of Animation, Animation Functions. **3D Computer Graphics:** Three Dimensional Graphics, Three Dimensional Transformations, Scaling, Rotation, Rotation about Arbitrary Axis, Inverse Transformations, Reflection, Shearing **Hidden Surfaces:** Hidden Surface Removal, Back Face Removal Algorithm, Z-Buffer Algorithm, Painter's Algorithm, Scan Line Algorithm, Subdivision Algorithm. | 12 |

**Keywords/Tags:** Graphic Systems, Input-Output Devices, Scan Conversion, 2D Transformations, 2D-Viewing, Clipping Techniques, **Shading,** Animation, 3D Computer Graphics, **Hidden** Surfaces.

## Part C-Learning Resources

**Text Books, Reference Books, Other resources**

**Suggested Readings:**

Textbooks:


1. Hearn: Computer Graphics C Version, Pearson Education India; 2nd edition, 2002.
2. John Hughes, Andries van Darn, Morgan McGuire, David Sklar, James Foley: Computer Graphics: Principles and Practice, Addison-Wesley Professional, 3rd edition, 2013.
3. Zhigang Xiang, Roy Plastock: Computer Graphics, McGraw **Hill Education, 2nd** edition,

## Reference Book:


1. James D. Foley, Andries van Darn, Steven K. Feiner, John F. Hughes: Introduction to Computer Graphics, Addison Wesley, 1993.
2. Chopra Dr. Rajiv: Computer Graphics, S Chand & Co Ltd.
3. Desai: Computer Graphics, **PHI,** 2008.
4. Asthana, R.G.S.: Computer Graphics for Scientists and Engineers, New Age International Pvt Ltd.


**Suggested Digital Platforms Web links:**

https://www.eshiksha.mp.gov.in/mpdhe https://epgp. i nfl ibnet.ac. in

**Suggested equivalent online courses:**

https://nptel.ac.in/courses/106103224

https://nptel.ac.in/courses/106106090

| PART D: Assessment and Evaluation | | | |
|---|---|---|---|
| Internal Assessment : Continuous Comprehensive Evaluation (CCE) : 40 Marks Shall be based on allotted assignments and Class Tests. The marks shall be as follows: | | External Assessment: University Exam (UE) : 60 Marks<br>Time : 03.00 Hours | |
| Assessment and presentation of assignment | 10 Marks | Section (A) : Five Very Short Questions (50 Words Each )<br>OR<br>MCQ Questions | 05 x 02 = 10 Marks<br>OR<br>10 x 01 = 10 Marks |
| Class Test I ( Objective Questions) | 10 Marks | | |
| Class Test II (Descriptive Questions) | 10 Marks | Section (B) : Five Short Questions (200 Words Each) | 05 x 06 = 30 Marks |
| Class Test III | 10 Marks | Section (C): Two Long Questions (500 Words Each) | 02 x 10 = 20 Marks |
| Total | 40 Marks | Total | 60 Marks |
| Any remarks/suggestions: | | | |

# Part A- Introduction

| Program: Degree | Class: B.C.A. | Year - III | Session: |
|---|---|---|---|

## Subject- Foundation Course

| | | |
|---|---|---|
| 1 | **Course Code** | **UPERSAR503** |
| 2 | **Course Title** | **Personality Development and Character Building** |
| 3 | **Course Type** | **SEC/ Ability Enhancement Compulsory Course** |
| 4 | **Pre-requisite (if any)** | **Compulsory for all Students** |
| 5 | **Course Learning outcomes (CLO)** | 1. Students will acquire the conceptual knowledge of Personality Development.<br>2. Students will develop insight into character building.<br>3. Students will be able to become global visionary citizens.<br>4. Students will be able to understand Indian knowledge tradition.<br>5. Students will be able to understand the difference between nature, culture and distortion.<br>6. This course will help in character building and overall development of personality of the students. |
| 6 | **Credit Value** | 4 |

# Part B- Content of the Course

Total No. of Lectures + Practical (in hours per week): **L-1 Hr / P-1 Lab Hr (=2 Hrs)**

Total No. of Lectures/ Practical: **L-30 /P-0 (30 Hrs)**

| Unit | Topics | No. of lectures (Total 30) |
|---|---|---|
| 1 | • Personality development (Physical, mental, intellectual and spiritual development) meaning, concept, factors of personality development.<br>• Character building (personal and national character): Meaning, concept, factors of character and means of character building.<br>• Panchkosha, Annamaya Kosha, Pranamaya Kosha, Manomaya Kosha, Vigyanmaya Kosha and Anandamaya Kosha general introduction meaning purpose and importance. | 06 Theoretical<br>04 Experiential |
| 2 | • Physical and mental development<br>• Meaning, concept of physical and mental development<br>• Ideal daily routine, balanced diet, routine, subtle exercise<br>• Ashtanga Yoga-Yama Niyam, Ishwar Pranidhan, self-study, contentment, patience, virtue, practice of discipline.<br>• Past glory, social and citizenship awareness, equal respect to all sects and scientific outlook<br>• Nation, Nationality, Democracy, Independence, Suraj, Vasudhaiva Kutumbakam, Coexistence. | 06 Theoretical<br>04 Experiential |

| | | |
|---|---|---|
| 3 | • Moral and mental development<br>• Difference among happiness, joy and pleasure.<br>• Ashtanga Yoga, Pranayama, Pratyahara, Dharana, Dhyana, Samadhi.<br>• Continuity of Karmayoga, Bhaktiyoga, Jnanayoga in life according to one's own will<br>• Indian time calculation.<br>• Self-respect and contemplation of mother tongue and Indian knowledge tradition.<br>• Biographies of Legends.<br>• Practice of service, tolerance, charity, dedication and self-examination. Self reliance | 06<br>Theoretical<br>04<br>Experimental |
| | **PART C** | |
| | Suggested Readings:-<br>1- उच्च शिक्षा भारतीय दृष्टि -श्री अतुल कोठारी<br>2- अदम्य साहस - डॉ० ए.पी.जे. अब्दुल कलम<br>3- व्यष्ततत्व ववकास - स्वामी ववववेकानंद रामक्रटण<br>4- आत्मतत्व का ववस्तार-श्रुतम प्रकाि न जोधपुर<br>5-भारतीय मनोववज्ञान श्री लज्जा राम तौमर<br>6- उपननषद वविषांक - गीता प्रेस गोरखपुर<br>7- भारतीय ज्ञान परम्परा वोध हहंदी ग्रन्थ अकादमी म०प्र० | |

| PART D: Assessment and Evaluation | | | |
|---|---|---|---|
| Internal Assessment : Continuous Comprehensive Evaluation (CCE) : 40 Marks<br>Shall be based on allotted assignments and Class Tests. The marks shall be as follows: | | External Assessment: University Exam (UE) : 60 Marks<br>Time : 03.00 Hours | |
| Assessment and presentation of assignment | 10 Marks | Section (A) : Five Very Short Questions (50 Words Each )<br>OR<br>MCQ Questions | 05 x 02 = 10 Marks<br>OR<br>10 x 01 = 10 Marks |
| Class Test I ( Objective Questions) | 10 Marks | | |
| Class Test II (Descriptive Questions) | 10 Marks | Section (B) : Five Short Questions (200 Words Each) | 05 x 06 = 30 Marks |
| Class Test III | 10 Marks | Section (C): Two Long Questions (500 Words Each) | 02 x 10 = 20 Marks |
| Total | 40 Marks | Total | 60 Marks |
| Any remarks/suggestions: | | | |

| Part A Introduction | | |
|---|---|---|
| | **Program: Degree** | **Class :UG** **Year: III** **Session:** |
| | **Subject: BCA** | |
| **1** | **Course Code** | **UPROJCA504** |
| **2** | **Course Title** | **Project (Minor) /Internship** |
| **3** | **Course Type (Core Course/ Discipline Specific Elective/ Elective/ Generic Elective /Vocational/ )** | Project |
| **4** | **Pre-requisite (if any)** | |
| **5** | **Course Learning outcomes (CLO)** | |
| **6** | **Credit Value** | **6** |
| **7** | **Total** | **Max Marks 100** **Min Marks 40** |

# Practical Paper

| Part A Introduction | | | |
|---|---|---|---|
| **Program: Degree** | **Class : UG** | **Year: III** | **Session:** |
| **Subject: Computer Application** | | | |
| **1** | **Course Code** | **UPYTHCA505** | |
| **2** | **Course Title** | **Python Programming (Practical) (Group A - Paper-II)** | |
| **3** | **Course Type (Core Course/ Discipline Specific Elective/ Elective/ Generic Elective /Vocational/ )** | **Discipline Specific Elective (DSE)** | |
| **4** | **Prerequisite (if any)** | **To** study this course, a student must have basic Logical, and analytical skills. | |
| **5** | **Course Learning outcomes (CLO)** | **On successful completion of this course, the students will be able to:**<br>1. Develop Simple programs in Python<br>2. Knowledge of conditional and loop statements.<br>3. Learning of Tuple, List, Directory in Python<br>4. Knowledge of Files and Ooops Concepts in Pyhton.<br>5. Introductory Knowledge of Pandas, PDBC and **Numpy.** | |
| 6 | **Credit Value** | **2** | |
| **7** | **Total Marks** | Max. Marks: 40+60 | Min. Passing Marks:16+24 |
| **Part B- Content of the Course** | | | |
| **Number of Lab Practical's (in hours per week): 2 Hours Per Week** | | | |

| | | |
|---|---|---|
| **Total No. of Lab : 30 (Each Lab of 2 Hours)** | | |
| | **Suggestive List of Practical**<br>**Students are required to write program(Code) in Python, execute and test it** | **No. of Labs: 30 (** Hours **Each)** |
| | **1. Write** a program to demonstrate different number data types in Python.<br>**2.** Write a program to perform different Arithmetic Operations on numbers in Python.<br>**3.** Write a program to create, concatenate and print a string and accessing sub-string from a given string.<br>**4.** Write a python script to print the current date in the following format a."Fri Oct 11 02:26:23 15T2019"<br>**5.** Write a program to create, append, and remove lists in python.<br>**6.** Write a program to demonstrate working with tuples in python.<br>**7.** Write a program to demonstrate working with dictionaries in python.<br>**8.** Write a python program to find largest of three numbers.<br>**9.** Write a Python program to construct the following pattern, using a nested for loop<br>*<br>* *<br>* * *<br>* * * *<br>****<br>*<br>*<br>**10.** Write a Python script that prints prime numbers less than20.<br>**11.** Write a python program to define a module to find Fibonacci Numbers and import the module to another program.<br>**12.** Write a python program to define a module and import a specific function in that module to another program.<br>**13.** Write a program that inputs a text file. The program should print all of the unique words in the file in alphabetical order.<br>**14.** Write a Python class to convert an integer to a roman numeral.<br>**15.** Write a Python class to reverse a string word by word. | |
| | **Keywords/Tags: Open Source, Data Type, Module, List, Tuples, Directory, Loops, Array** | |

## Part C-Learning Resources

**Text Books, Reference Books, Other resources**

**Suggested Readings:**

1. Mark Lutz, Learning Python
2. Tony Gaddis, Starting Out With Python
3. Kenneth A. Lambert, Fundamentals of Python
4. JamesPayne.BeginningPythonusingPython2.6andPython32.

Suggestive digital platforms/ web links:

**www.lavatpoint.com**

**www.w3school.com**

**www.pvthon.org**

**https://www.tutorialspoint.com/python/index.htm**

**Suggested equivalent online courses:**

| S.No. | Online Course | Duration | Plate-form |
|---|---|---|---|
| **01** | Joy of Computing using Python https://nptel.ac. in/courses/106106182 | **12** Weeks | NPTEL |
| 02 | Complete Python course https://www.udemy.com/topic/pytlion/ | 12 Weeks | Udemy |

**Any remarks/ suggestions:**

| PART D: Assessment and Evaluation | | | |
|---|---|---|---|
| Internal Assessment : Continuous Comprehensive Evaluation (CCE) : 40 Marks | | External Assessment: University Exam (UE) : 60 Marks<br>Time **03.00 Hours** | |
| **Internal Assessment** | **Marks** | **External Assessment** | **Marks** |
| Hands-on Lab Practice | 10 Marks | Practical record file | 10 Marks |
| Viva | 10 Marks | Viva voce practical | 10 Marks |
| Lab Test from practical list | 10 Marks | Table works/ Exercise Assigned (02) in practical exam | 30 Marks |
| Assignments (Charts/ Model)/ Technology Dissemination/ Excursion/ Lab visit/ Industrial Training | 10 Marks | Reports of excursion/ Lab visits/ Industrial training/ Survey/ Collection/ Models | 10 Marks |
| Total<br>*Excursion/ Lab visits/ Industrial*<br>*Training is compulsory* | 40 Marks | Total | 60 Marks |

| Part A Introduction | | |
|---|---|---|
| **Program: Degree** | **Class :UG** | **Year: III Year** **Session:** |
| **Subject: BCA** | | |
| | **Course Code** | **UCOMPCA506** |
| 2 | **Course Title** | **Computer Graphics (Practical) (Group A Paper-I)** |
| 3 | **Course Type (Core Course/ Discipline Specific Elective/ Elective/ Generic Elective /Vocational/..... )** | **Discipline Specific Elective (DSE)** |
| 4 | **Pre-requisite (if any)** | **None** |
| 5 | **Course Learning outcomes (CLO)** | **On successful completion of this course, the students will be able to:**<br>1. Understand the basics of computer graphics, different graphics systems and applications of computer graphics.<br>2. Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.<br>3. Use of geometric transformations on graphics objects and their application in composite form.<br>4. Extract scene with different clipping methods and its transformation to graphics display device.<br>5. Explore projections and visible surface detection techniques for display of 3D scene on 2D screen.<br>6. Render projected objects to naturalize the scene in 2D view and use of illumination models for this. |
| 6 | **Credit Value** | **2** |
| 7 | **Total Marks** | Max. Marks: 40+60 Min. Passing Marks:16+24 |
| **Part B- Content of the Course** | | |
| | | |

| **Total No. of** Lectures-Tutorials-Practical (in hours per week): **L-T-P: 0-0-1** | | |
|---|---|---|
| **Unit** | **Topics** | **No. of Lectures (2 Hours Each)** |
| | 1. Write a Program to draw basic graphics construction like line, circle, arc, ellipse and rectangle.<br>2. Write a program of Translation, Rotation, and Scaling using Composite Transformation.<br>3. Write a program to draw a Circle using midpoint implementation Method.<br>4. Write a program to draw Bezier curve.<br>5. Program to rotate a rectangle about its midpoint.<br>6. Program to clip a line using Liang Barsky Method.<br>7. Program to implement Standard Perspective Projection in 3-Dimensions.<br>8. Program to implement Parallel Projection in 3-Dimensions.<br>9. Write a Program to implement Digital Clock.<br>10. Write a Program to draw animation using increasing circles filled with different colors and patterns.<br>11. Write a Program control a ball using arrow keys.<br>12. Write a Program to implement Bouncing Ball in vertical direction. | |
| **Part C-Learning Resources**<br>**Text Books, Reference Books, Other resources Suggested Readings: Textbooks:** | | |
| | • Learn: Computer Graphics C Version, Pearson Education India; 2nd edition, 2002.<br>• John Hughes, Andries van Dam, Morgan McGuire, David Sklar, James Foley: Computer Graphics: Principles and Practice, Addison-Wesley Professional, 3rd edition. 2013.<br>• Zhigang Xiang, Roy Plastock: Computer Graphics, McGraw Hill Education, 2nd edition, 2006. 4. Reference Book: | |

| PART D: Assessment and Evaluation | | | |
|---|---|---|---|
| Internal Assessment : Continuous Comprehensive Evaluation (CCE) : 40 Marks | | External Assessment: University Exam (UE) : 60 Marks<br>Time **03.00 Hours** | |
| **Internal Assessment** | **Marks** | **External Assessment** | **Marks** |
| Hands-on Lab Practice | 10 Marks | Practical record file | 10 Marks |
| Viva | 10 Marks | Viva voce practical | 10 Marks |
| Lab Test from practical list | 10 Marks | Table works/ Exercise Assigned (02) in practical exam | 30 Marks |
| Assignments (Charts/ Model)/ Technology Dissemination/ Excursion/ Lab visit/ Industrial Training | 10 Marks | Reports of excursion/ Lab visits/ Industrial training/ Survey/ Collection/ Models | 10 Marks |
| Total<br>*Excursion/ Lab visits/ Industrial*<br>*Training is compulsory* | 40 Marks | Total | 60 Marks |