PANJAB UNIVERSITY, CHANDIGARH-160014 (INDIA)
(Estd. under the Panjab University Act VII of 1947 — enacted by the Govt. of India)

FACULTY OF SCIENCE

SYLLABI

FOR

Bachelor of Computer Applications
Second & Third Year
Examinations, 2015

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GUIDELINES REGARDING CONTINUOUS ASSESSMENT FOR REGULAR STUDENTS OF B.A./B.SC./B.COM./B.C.A. COURSES

IMPORTANT NOTE

(i) In order to incorporate an element of continuous assessment of students, the Colleges will conduct two mandatory House Tests in theory papers – one in the month of September/October and the other in December/January every year.

(ii) (a) For September Test, there will be only one paper of one hour’s duration in each subject, and for December Test, there will be paper/s on the pattern of annual examination conducted by the University.

There will be a Special Test for those students who could not fulfil the conditions of eligibility. It will not be held to provide an opportunity to all students to improve their earlier score. Those students who are exempted by the Principal of the College from appearing in the House Test/s in September and/or December/January will also be allowed to appear in the Special Test; this Test will determine their eligibility for admission to the examination as well as their score for Internal Assessment.

(b) With a view to meet the grievance of students, if any, on account of scores obtained by them, the answer-books will be shown to them. Difference of opinion on the issue, if any, will be sorted out with the help of respective Heads of departments as well as the Principal of the College.

(iii) Whereas the September House Test will carry weightage of 40 per cent, the December House Test will have weightage of 60 per cent in each subject/paper. The total weightage for both the Tests taken together shall be 10 per cent of the total marks in each theory subject/paper. The weightage of 10 per cent marks shall be added to each paper of B.A./B.Sc./B.Com./B.C.A. II and III Year which will, henceforth, carry weightage of only 90% marks as against 100% marks at present. A candidate will have to pass in theory and practical/s separately. For private candidates and students of the University School of Open Learning, the question paper shall, as usual, have weightage of 100% marks each.

(iv) The record of marks secured by the students in the two House Tests will be sent by the respective Colleges so as to reach the office of Controller of Examinations latest by 15th March, failing which the result of the students shall be shown as ‘RLA’ and the entire responsibility for this would lie with the Principal/s of the College/s.

(v) The Colleges will continue to forward the internal assessment of the students for Practicals. Projects and similar other activities, wherever applicable, to the Controller of Examinations, as usual, so as to reach this office latest by 15th March.

(i)
SPECIAL NOTE:

(i) Each theory question paper will be set out of the marks allotted to each theory paper and 10% marks of the maximum marks of each paper will be internal assessment.

(ii) For private candidates, who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will proportionately be increased to maximum marks of the paper in lieu of internal assessment.

(iii) It will not be mandatory for the students to separately pass in the internal assessment.
## OUTLINES OF TESTS, SYLLABI AND COURSES OF READING FOR BACHELOR OF COMPUTER APPLICATIONS FOR THE EXAMINATIONS OF 2015

### Scheme of Examination, 2014

<table>
<thead>
<tr>
<th>SECOND YEAR</th>
<th>LT/Week</th>
<th>Theory Marks</th>
<th>Internal Assessment</th>
<th>Exam. Hours</th>
<th>Paper Code</th>
</tr>
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<tbody>
<tr>
<td>1. Project Management &amp; System Development</td>
<td>4</td>
<td>90</td>
<td>10</td>
<td>3</td>
<td>BCA-09</td>
</tr>
<tr>
<td>2. Computer Based Numerical &amp; Statistical Methods (Using C)</td>
<td>4</td>
<td>90</td>
<td>10</td>
<td>3</td>
<td>BCA-10</td>
</tr>
<tr>
<td>3. Data Structure Using C</td>
<td>5</td>
<td>90</td>
<td>10</td>
<td>3</td>
<td>BCA-25</td>
</tr>
<tr>
<td>4. Client Server Computing using ORACLE</td>
<td>5</td>
<td>90</td>
<td>10</td>
<td>3</td>
<td>BCA-12</td>
</tr>
<tr>
<td>5. Object Oriented Programming (Using C++)</td>
<td>5</td>
<td>90</td>
<td>10</td>
<td>3</td>
<td>BCA-13</td>
</tr>
<tr>
<td>6. Unix Operating System</td>
<td>5</td>
<td>90</td>
<td>10</td>
<td>3</td>
<td>BCA-14</td>
</tr>
<tr>
<td>7. Computer Lab.1: Based on BCA-12 and BCA-14</td>
<td>6</td>
<td>90</td>
<td>10</td>
<td>4</td>
<td>BCA-15</td>
</tr>
<tr>
<td>8. Computer Lab.2: Based on BCA-13 and BCA-25</td>
<td>6</td>
<td>90</td>
<td>10</td>
<td>4</td>
<td>BCA-16</td>
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<table>
<thead>
<tr>
<th>THIRD YEAR</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Enterpreneurship Development Programme</td>
<td>4</td>
<td>90</td>
<td>10</td>
<td>3</td>
<td>BCA-17</td>
</tr>
<tr>
<td>2. Data Communication &amp; Networks</td>
<td>5</td>
<td>90</td>
<td>10</td>
<td>3</td>
<td>BCA-18</td>
</tr>
<tr>
<td>4. Internet Programming</td>
<td>5</td>
<td>90</td>
<td>10</td>
<td>3</td>
<td>BCA-20</td>
</tr>
<tr>
<td>5. Discrete Mathematics</td>
<td>5</td>
<td>90</td>
<td>10</td>
<td>3</td>
<td>BCA-27</td>
</tr>
<tr>
<td>6. Project and Seminar</td>
<td>6</td>
<td>85</td>
<td>15</td>
<td></td>
<td>BCA-21</td>
</tr>
<tr>
<td>7. Computer Lab.1: Based on BCA-19</td>
<td>5</td>
<td>90</td>
<td>10</td>
<td>4</td>
<td>BCA-23</td>
</tr>
<tr>
<td>8. Computer Lab.2: Based on BCA-20</td>
<td>5</td>
<td>90</td>
<td>10</td>
<td>4</td>
<td>BCA-24</td>
</tr>
</tbody>
</table>
SYLLABUS OF BACHELOR OF COMPUTER APPLICATIONS

SYLLABI AND COURSES OF READING FOR BACHELOR OF COMPUTER APPLICATIONS
FOR THE EXAMINATION OF 2015

SECOND YEAR

Paper Code : BCA-09
Paper Title : Project Management and System Development
Theory Marks : 90
Number of Lectures : 100
(45 minutes duration)

Objectives :

• Define the characteristics of a project.
• Explain the need for project management.
• Compare and contrast the roles of project managers in organizational environments.
• Describe the systems development cycle.
• Explain the roles of systems analysis and systems management in the life cycle of a project.

Note :
(i) The syllabus of this paper has been divided into four sections.
(ii) Examiner will set total nine questions comprising two questions from each Section and one compulsory question of short answer type covering whole syllabi.
(iii) The students are required to attempt one question from each Section and the entire Compulsory question.
(iv) All questions carry equal marks, unless specified.

SECTION-A

(Total No. of Periods – 25)

SECTION-B

(Total No. of Periods – 25)

SECTION-C


(Total No. of Periods – 25)
SYLLABUS OF BACHELOR OF COMPUTER APPLICATIONS

SECTION-D


(Total No. of Periods – 25)

References:

Objectives: To Teach implementation numerical and statistical methods.

Note: (i) The syllabus of this paper has been divided into four sections.
(ii) Examiner will set total *nine* questions comprising *two* questions from each Section and *one* compulsory question of short answer type covering whole syllabi.
(iii) The students are required to attempt *one* question from each Section and the entire Compulsory question.
(iv) All questions carry equal marks, unless specified.
(v) The students can use only Non-programmable & Non-storage type Calculator.

### SECTION-A

**Numerical Methods:**

- **Computer Arithmetic:** Floating Point Numbers, operations, normalizations and their consequences, Errors and its types.
- **Iterative Methods:** Bisection, False-Position, Newton - Raphson Methods, Zeros of a polynomial using Birge – Vieta Method.  
  
  (No. of Periods : 25)

### SECTION-B

**Simultaneous Linear Equations:** Solution of Simultaneous Linear Equations Using Gauss - Elimination, Gauss-Jordan and Gauss-Seidal Methods, Concept of Pivoting.

  
  (No. of Periods : 25)

**Note:** Log tables may be provided.
SYLLABUS OF BACHELOR OF COMPUTER APPLICATIONS

SECTION-C

Statistical Methods :

Measures of Central Tendency :
Preparing Frequency distribution table, Arithmetic mean, Geometric mean, Harmonic mean, Median and Mode.

Measures of Dispersion, Skewness and Kurtosis, Range :
Mean deviation, Standard deviation, Coefficient of variation, Moments, Skewness and Kurtosis.

(No. of Periods : 25)

SECTION-D

Correlation : Least square fit, Polynomial and curve fittings. Regression Analysis : Linear regression and non linear regression algorithms.

Development of Programs for Statistical Methods using C.

(No. of Periods : 25)

References :


SYLLABUS OF BACHELOR OF COMPUTER APPLICATIONS

Paper Code : BCA-25
Paper Title : Data Structure Using C
Theory Marks : 90 Number of Lectures : 100 (45 minutes duration)

Objectives : The basic algorithms related to handling data like stack, lists, queue, trees and graphs are introduced in this subject. The implementation of these algorithms will be taught using previously learned C programming language.

Note : (i) The syllabus of this paper has been divided into four sections.

(ii) Examiner will set total nine questions comprising two questions from each Section and one compulsory question of short answer type covering whole syllabi.

(iii) The students are required to attempt one question from each Section and the entire Compulsory question.

(iv) All questions carry equal marks, unless specified.

SECTION-A


(No. of Periods : 25)

SECTION-B

2. Trees – Definition and Basic concepts, Representation in Contiguous Storage, Binary Tree, Binary Tree Traversal, Searching, Insertion and deletion in Binary trees, Binary Search tree, AVL trees.

(No. of Periods : 25)

SECTION-C

3. Graphs and their application, Sequential and Linked representation of Graph-adjacency, Matrix, Operations on Graph, Traversing a graph.

(No. of Periods : 25)

SECTION-D


(No. of Periods : 25)

References :

SYLLABUS OF BACHELOR OF COMPUTER APPLICATIONS

Paper Code : BCA-12
Paper Title : Client Server Computing Using ORACLE
Theory Marks : 90
Number of Lectures : 100
(45 minutes duration)

Objectives : This course aims at giving the students the insight of Client Server Computing and Creating Applications using the Oracle Web Server.

Note :
(i) The syllabus of this paper has been divided into four sections.
(ii) Examiner will set total nine questions comprising two questions from each Section and one compulsory question of short answer type covering whole syllabi.
(iii) The students are required to attempt one question from each Section and the entire Compulsory question.
(iv) All questions carry equal marks, unless specified.

SECTION-A
1. Introduction to DBMS, Advantages and disadvantages of DBMS, introduction to RDBMS, The 12 Rules (Codd's Rule) for RDBMS, Difference b/w DBMS and RDBMS. Data Models and their types (Hierarchical, Networking, Relational).


Introduction to SQL *Plus : Introduction to SQL, Oracle Data types, Starting SQL *Plus, Data Manipulation and Control-I : Data Definition Language (DDL), Creating Tables, Creating a Table with data from another table, Inserting Values into a Table, Updating Column(s) of a Table, Deleting Row(s) from a Table, Dropping a Column, Querying database tables, Conditional retrieval of rows, Working with Null Values, Matching a pattern from a table, Ordering the Result of a Query, Aggregate Functions, Grouping the Result of a Query, ROLLUP Operation: Getting Sub Totals, CUBE Operation : Getting Cross Tabs, Command Summary of SQL *Plus Editor.

(No. of Periods : 25)

SECTION-B

(No. of Periods : 25)

SECTION-C

(No. of Periods : 25)

SECTION-D
4. PL/SQL-II: Cursor Management in PL/SQL, Cursor Manipulation, Implicit Cursor Attributes, Exception Handling in PL/SQL; Predefined Exceptions, User Defined Exceptions.


(No. of Periods : 25)

References :
Object Oriented Programming (Using C++)

Paper Code: BCA-13  
Paper Title: Object Oriented Programming (Using C++)
Theory Marks: 90  
Number of Lectures: 100  
(45 minutes duration)

Objectives: By the end of the course, students will be able to write C++ programs using the more esoteric language features, utilize OO techniques to design C++ programs, use the standard C++ library, exploit advanced C++ techniques.

Note:
(i) The syllabus of this paper has been divided into four sections.
(ii) Examiner will set total nine questions comprising two questions from each Section and one compulsory question of short answer type covering whole syllabi.
(iii) The students are required to attempt one question from each Section and the entire Compulsory question.
(iv) All questions carry equal marks, unless specified.

SECTION-A
   Structure of a C++ Program and I/O streams. Classes and Objects Class Declaration: Data Members, Member Functions, Private and Public members, Creating Objects, Accessing class data members, Accessing member functions Class Function Definition: Member Function definition inside the class declaration and outside the class declaration, friend function, inline function, static function.
   (No. of Periods: 25)

SECTION-B
   (No. of Periods: 25)

SECTION-C
3. Function Overloading & Operator Overloading.
   Inheritance - Extending Classes Concept of inheritance, Base class, Defining derived classes, Visibility modes: Public, Private, Protected; Single inheritance: Privately derived, Publicly derived; Making a protected member inheritable, Access Control to private and protected members by member functions of a derived class, Multilevel inheritance, Nesting of classes.
   (No. of Periods: 25)

SECTION-D
   (No. of Periods: 25)

References:
3. E. Balaguruswamy, 2008: Object Oriented Programming with C++, TMH.
Paper Code : BCA-14
Paper Title : Unix Operating System
Theory Marks : 90
Number of Lectures : 100
(45 minutes duration)

Objectives : - Work comfortably in the UNIX environment, Edit and manage files and user-level security for UNIX development, - Use standard UNIX development tools for C or C++.

Note : (i) The syllabus of this paper has been divided into four sections.

(ii) Examiner will set total nine questions comprising two questions from each Section and one compulsory question of short answer type covering whole syllabi.

(iii) The students are required to attempt one question from each Section and the entire Compulsory question.

(iv) All questions carry equal marks, unless specified.

SECTION-A
1. Introduction to Operating Systems, its needs and services, Simple batch Systems, Multi-programmed batched systems, Time sharing systems, Parallel systems, Distributed systems and Real-time systems. (No. of Periods : 15)
2. Overview of UNIX : History, Features of UNIX, Comparison between UNIX and Windows. (No. of Periods : 05)
3. Structure of UNIX Kernel, Shell, Command execution. (No. of Periods : 05)

SECTION-B
4. UNIX directory system.

SECTION-C
5. Administering UNIX Systems : Introduction to System Administration, Functional activities of System Administration - Starting up the system, Maintaining the Super User Login, Shutting down the system, recovering from system crash, Taking backups, Managing disk space, Mounting and Un-mounting file system, Adding and removing users, Changing groups and password, Maintaining security, Monitoring system activity, Accounting of system usage and billing, Setting up remote communication, Installing printers and peripheral devices. (No. of Periods : 25)

SECTION-D
6. Shell Programming : Executing a shell program, Study of shell programming as a Language; Wild card characters, Type of statements and Reserved Words, Special Shell parameters. (No. of Periods : 10)
7. The AWK pattern scanning and processing language. (No. of Periods : 05)
8. UNIX and Networking : Setting up of DNS, Mail, WWW servers under UNIX. (No. of Periods : 10)

References :
1. Srirengan, K., 1999. Understanding UNIX, Prentice-Hall of India,
<table>
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<tr>
<th>Paper Code</th>
<th>BCA-15</th>
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<tbody>
<tr>
<td>Paper Title</td>
<td>Computer Lab.-1: Based on BCA-12 and BCA-14</td>
</tr>
<tr>
<td>Theory Marks</td>
<td>90</td>
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</tbody>
</table>

<table>
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<tr>
<th>Paper Code</th>
<th>BCA-16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper Title</td>
<td>Computer Lab.-2: Based on BCA-13 and BCA-25</td>
</tr>
<tr>
<td>Theory Marks</td>
<td>90</td>
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</tbody>
</table>
SYLLABUS AND COURSES OF READING FOR BACHELOR OF COMPUTER APPLICATIONS FOR THE EXAMINATION OF 2015

THIRD YEAR

Paper Code : BCA-17
Paper Title : Enterpreneurship Development Programme
Theory Marks : 90

Number of Lectures : 100
(45 minutes duration)

Objectives : EDPs aim at training various target groups in entrepreneurial traits so that they obtain adequate information, motivation and guidance in setting up their own enterprises. In order to maintain a homogeneous nature of participating groups, EDPs focus on rural entrepreneurs, women, SC/ST, minority communities etc.

Note :
(i) The syllabus of this paper has been divided into four sections.
(ii) Examiner will set total nine questions comprising two questions from each Section and one compulsory question of short answer type covering whole syllabi.
(iii) The students are required to attempt one question from each Section and the entire Compulsory question.
(iv) All questions carry equal marks, unless specified.

SECTION-A

1. Project Formulation : Need, Scope and approaches for project formulation; structure of project report; study and analysis of sample project report; preparation of a project report; Techno-economic feasibility of the project.

(No. of Periods : 25)

SECTION-B

2. Finance & Accounting : Working capital assessment, its management & exercise thereon; Assessment of fixed capital and exercise thereon; Capital budgeting; Product costing and cost consciousness. Financial ratios and their significance; Break-even analysis; Credit institutions and financing procedures; Books of accounts, financial statements & fund flow analysis.

(No. of Periods : 25)

SECTION-C

3. Managing the Enterprise : Resource management – men, material, money and machines; Personnel management, Office management.


(No. of Periods : 25)

SECTION-D


(No. of Periods : 25)
## References:


SYLLABUS OF BACHELOR OF COMPUTER APPLICATIONS

Paper Code : BCA-18
Paper Title : Data Communication & Networks
Theory Marks : 90
Number of Lectures : 100
(45 minutes duration)

Objectives : As part of this course, students will be introduced to computer networks and data communication paradigms, about network models and standards, network protocols and their use, wireless technologies.

Note :  
(i) The syllabus of this paper has been divided into four sections.
(ii) Examiner will set total nine questions comprising two questions from each Section and one compulsory question of short answer type covering whole syllabi.
(iii) The students are required to attempt one question from each Section and the entire Compulsory question.
(iv) All questions carry equal marks, unless specified.

SECTION-A


(No. of Periods : 25)

SECTION-B


(No. of Periods : 25)

SECTION-C


(No. of Periods : 25)

SECTION-D


(No. of Periods : 25)

References : 

SYLLABUS OF BACHELOR OF COMPUTER APPLICATIONS

Paper Code : BCA-19
Paper Title : Computer Graphics and Multimedia Applications
Theory Marks : 90

Number of Lectures : 100
(45 minutes duration)

Objectives :

- To study the graphics techniques and algorithms.
- To study the multimedia concepts and various I/O technologies.
- To enable the students to develop their creativity.

Note : (i) The syllabus of this paper has been divided into four sections.
   (ii) Examiner will set total nine questions comprising two questions from each Section and one compulsory question of short answer type covering whole syllabi.
   (iii) The students are required to attempt one question from each Section and the entire Compulsory question.
   (iv) All questions carry equal marks, unless specified.

SECTION-A

Computer Graphics :
1. A Survey of Computer Graphics :
   (No. of Periods : 15)
2. Overview of Graphics Systems :
   (No. of Periods : 10)

SECTION-B

   (No. of Periods : 10)
   Use the above primitives to develop programs like drawing concentric circles, Ellipses, Sine surves, Histograms, Pie charts and human face.  
   (No. of Periods : 15)

SECTION-C

Multimedia Applications :
   (No. of Periods : 25)

SECTION-D

7. Applications :
8. Studying features and use of Multimedia Image Processing authoring tools like photo shop, Macromedia Director.  
   (No. of Periods : 25)
References:

Paper Code : BCA-20
Paper Title : Internet Programming
Theory Marks : 90

Objectives :

- To describe basic Internet Protocols.
- Explain JAVA and HTML tools for Internet programming.
- Describe scripting languages – Java Script.
- Explain dynamic HTML programming.
- Explain Server Side Programming tools.

Note : (i) The syllabus of this paper has been divided into four sections.
(ii) Examiner will set total nine questions comprising two questions from each Section and one compulsory question of short answer type covering whole syllabi.
(iii) The students are required to attempt one question from each Section and the entire Compulsory question.
(iv) All questions carry equal marks, unless specified.

SECTION-A

1. Review of forms in HTML, Java Script: Features, tokens, data types, variables, operations, control structures strings arrays, functions, core language, objects, client side objects, event handling. Applications related to client side form validation.

   (No. of Periods : 25)

SECTION-B

2. Fundamentals of Java: Java Vs. C++, Byte lode, Java virtual machine, constants, variables, data types, operators, expressions, control structures, defining class, creating objects, accessing class members, constructions, method overloading.

   (No. of Periods : 25)

SECTION-C

3. Inheritance : Basics, member access, using super to call super class constructors, creating a multi level hierarchy, method overriding, dynamic method dispatch, using abstract classes, using Final.

Packages and Interfaces: Defining a package, understanding CLASSPATH, Access protection : Importing packages, Interfaces, Defining an Interface, Implementing Interfaces, Applying Interfaces, Variables in Interfaces.

Exception Handling: Fundamentals, Exception types, Using Try and Catch, Multiple Try and Catch clauses, Nested Try statements, Built-in exceptions.

(No. of Periods : 25)
SECTION-D


I/O Applets : I/O Basics : Streams, The predefined streams; Reading console I/P, Writing console O/P. The print writer class; Reading and Writing files, Applet fundamentals, Using AWT controls, Layout Managers and Menus, String handling and event handling.

(No. of Periods : 25)

References :

Objectives: This is first mathematics subject. Student will learn and revise his knowledge acquired previously. Logic, Relations and Functions, Algebraic Functions and Graph Theory will be introduced in this course.

Note: (i) The syllabus of this paper has been divided into four sections.
       (ii) Examiner will set total nine questions comprising two questions from each Section and one compulsory question of short answer type covering whole syllabi.
       (iii) The students are required to attempt one question from each Section and the entire Compulsory question.
       (iv) All questions carry equal marks, unless specified.

SECTION-A

1. Set Theory: Relations and Functions: Set Notation and Description, subset, basic set operations, Venn Diagrams, laws of set theory, partitions of sets, min sets, duality principle, basic definitions of relations and functions, graphics of relations, properties of relations: injective, surjective and bijective functions, compositions.

2. Recurrence: Recurrence Relations and Recursive Algorithms – Linear-Recurrence Relations with Constant Coefficients; Homogeneous Solutions: Particular Solution, Total Solution, Solution by the Method of Generating functions.

   (No. of Periods: 25)

SECTION-B

3. Graph Theory: Graph and planar graphs – Basic Terminology, Multi-graphs, Weighted Graphs, Paths and Circuits, Shortest Paths, Eulerian Paths and Circuits. Travelling Salesman Problem, Planar Graphs.

   (No. of Periods: 25)

SECTION-C


   (No. of Periods: 25)

SECTION-D


   (No. of Periods: 10)

7. Algebra of Logic: Proposition of logic operations, truth tables and propositions generated by set, equivalence and implication laws of logic, mathematical system, propositions over a universe, mathematical induction, quantifiers.

   (No. of Periods: 15)
References:


BCA : 21 PROJECT and SEMINAR

Project and Seminar must be taken up from the real life problems. Marks for these are to be given on the basis of Programming Style, User friendly I/O, on-line help and documentation (user Manual). This work will carry 100 marks, (85 Marks for Project and Seminar Viva; and 15 Marks for Internal Assessment).

Paper Code : BCA-23
Paper Title : Computer Lab.-1 : Based on BCA-19
Theory Marks : 90

Paper Code : BCA-24
Paper Title : Computer Lab.-2 : Based on BCA-20
Theory Marks : 90

Published by : Professor A.K. Bhandari, Registrar, Panjab University, Chandigarh.