MANGALORE UNIVERSITY
Bachelor of Computer Applications (BCA) Degree Programme
2019-2020 Onwards
II SEMESTER BCA – BLOWN UP SYLLABUS

Group I Course 1	BCAC 181 BASIC MATHEMATICS	48 hours
Theory/Week 4 Hrs Credit: 2		IA: 20 Exam: 80

Topic	Chapter No	Sections
UNIT-I		
Logarithms Introduction, Laws of Logarithms (Statements only), Illustrations 2,3,4 Examples 2,4,5,7,11(a) and 11(b), 14 (P 195, 197-199, 201,202,204), 19(a) (P 206), Exercise(I) 1, 2(I, III), 3 (I) (II), 11(a), (b), 17(a)	BOOK 1 Chap 7	7.0 7.1
Permutations and Combinations Introduction, Fundamental Rules of Counting (Statement), Example 1, 5 Permutations, Illustrations 1(P 303), Remark 1 (P 304), Example 6, 7 (304, 305), Permutations of things not all different Example 12(a), (b), 13(P 307, 308) Combination Formulae, Statement of Theorem (P 319) Example 31 and 34 (P 319, 320)	BOOK 1 Chap 9	9.0 9.1 9.2 9.6 9.8
Binomial Theorem Statement only (P 334), Example 1, 2(P 336), Exercise 1 (ii) 2 (i) & (ii) (P 338) Positions of Terms Examples 5 (P 337), 7(a) & 7 (b) (P 339)		10.1 10.2
Analytical Geometry Introduction, Directed Line, Quadrants, Example 1 (P 555) , Coordinates of the midpoints, (statement and example) (P 556), Distance between two points (Only formula no proof), Section Formula, External Division, Coordinates of Centroid, Area of a Triangle (Only statements), **Examples** 2(a) & (b) (P 557), 3, 4, 7,11(P 558, 559, 562,565) **Exercise** 1(i ,ii)8, 9(i), 15 (a) and (b), 16(a) and (b) 21(a), 24 (i) & (ii)	BOOK 1 Chap 10 BOOK 1	15.0,15.1,15.2 15.4 to 15.9
Straight Line Different forms of equations of straight line (Statements), General equation of a straight Line (Statement Only), Example 18 (P 579), Example 23(581), Example 29(587) Exercise 2 (a), 3(b) (i), (ii) and (iii) (P 592)	Chap 15 BOOK 1	15.13 15.15(i, v, vi vii ,ix) 15.16
Circle The equation of a Circle (only Formula), Illustration (P 597), General Equation of the Circle(Statement only), Finding centre and radius Example (39) (P 601) Exercise 5(i) (P 612), 6(a) Equation of tangent and normal (Statement only, P 605 and 606) Example 50 **Ellipse** Example 53 (Page 611)	Chap 15 BOOK 1 Chap 15	15.22 15.23 (i) and (vi) 15.24, 15.25 15.26 15.28

UNIT-II		
Trigonometry Quadrants, Measurement of Angles, Circular measure, Example 2, Exercise 3 (a) i and ii, 4 (P 483), Trigonometric functions (definition only) , trigonometric Ratios, relation between trigonometric functions I II & III only formulae (P 487), Signs of Trigonometric functions, T-ratios of standard angles (Only table P 503), Example 25 (P 493), Exercise(II) 12 (a),(b), 13(d, e) (P 499) Exercise(III) 1 (i) (ii), 2 (a) 4(a) (b)	BOOK 1 Chap 14	14.1 I, III 14.2 14.3 14.4 14.5 14.6(Table only)
Calculus Limit of a function definition, Some Important Limits, Example 3, 4 (P 635) Exercise 1(a), (c) (P 645)	BOOK 1 Chap 16	16.5 16.7 I, II III IV
Continuity of a Function Statement only, Example 16(a) (b) (c) (P 641, 642), Exercise 5, 6 (P 645)	BOOK 1 Chap 16	16.8
Differentiation Definition, Derivative of a power function, derivative of a constant with any function, derivative of sum of functions, derivative of product of two function, derivative of the quotient of the two functions (Only statements), Illustration 1 and 3 (P 656, 657)	BOOK 1 Chap 17	17.1 17.3 to 17.7
Integration Definition (P 724), Indefinite Integrals, Rules of Integration, Some Standard Results (Formula Only) (I II & IX) Illustration 1, 2, 3 (P 727), Exercise 1, 2(i) 2(ii) (P 730) Definite Integrals(Definition), Illustration 1, 2,3, 5 (P 758, 759), Exercise(VI) 4(i)	BOOK 1 Chap18	18.1 to 18.3 18.10
UNIT-III		
Set Theory Basic Concepts of Set Theory, Inclusion and Equality of sets, The Power Set, Definitions Exercises2-1.3 1,2 a to g,4 Some Operations on Sets Definitions Example1,3,5,7 (P 113 to 115) Exercise 2-1.4 2, 3 and 7 (P 115 & 116) Venn Diagrams Ordered Pairs and n-Tuples Cartesian Products Definition Examples 1 & 2 (P 124) Exercises (Using Examples Not using Postulates)2-1 1,2,3,4,5,8,9,13(P 126)	BOOK 2 Chap 2	2-1.1, 2-1.2 2-1.1 to 2-1.5, 2-1.6 2-1.3 2-1.4 2-1.8 to 2.1.14 2-1.5 2-1.8 2-1.9
Relations Definitions Example 1 (P 151) , Exercise 2-3.1 1 Properties o Binary Relations in Sets		2-3.1, 2-3.2 2-3.3 to 2-3.7

Definitions Exercise 2-3.2 5 Relation Matrix and Graph of the Relation Example 1, 2 and 3 (P 158-160), Equivalence Relation, Definition Example 1 and 2 (P 165), Compatibility Relations Definition Composition of Binary Relations Definition (2-3.13, 2-3.14), Examples 1, 2, 3 and 4 (P 177-180) Partial ordering Definition(2-3.16) **Functions** Definitions (2-4.1, 2-4.3, 2-4.4, 2-4.5), Example (P 196) Composition of Functions, Definitions(2-4.6), Example 1 and 2 (P 198, 199), Inverse Functions, Example 1,2 (203), Exercise 2-4.3 1, 3, 4 Binary and n-ary operations, Definition(2-4.8) Characteristic Function of a set , Definition(2-4.17)		2-3.3 2-3.5 2-3.6 2-3.7 2-3.8 2.4 2-4.2 2-4.3 2-4.4 2-4.5
UNIT-IV		
Logical statements and Truth tables Introduction, definition, truth tables, negation, Compounding, Negation of compound statements, Tautologies and Fallacies, Prepositions, Conditional statements, Biconditional statements, Arguments, Joint Denial Examples: 1,2,34,5,6,7,8,9,10,11,12,15,16,17 Exercise: 1,2,3,5,6,7 **Matrix Algebra** Introduction, definition, types of matrices, Illustrations scalar multiplication of matrices, Illustrations, equality of matrices, Exercise (I) 1,2,3 matrix operations, Addition and subtraction, Example 1, Multiplication, Example 2,3,4,6,12,13 Exercise : 1(i,ii,iii),2, 13 Transpose of a matrix, Example: 15 Exercise: 1(a),3 Determinants of a square matrix, determinants of order two, Cramer's rule, Example:16,17 Determinant of order three, expansion of the determinants, minors of a matrix, co-factors of a matrix, Example:23, 24,25 exercise: 1,3 Adjoint of a square matrix, inverse of a matrix (using adjoint matrices –cofactor method), Example:27 Exercise: 6 Rank of a matrix. Illustrations:1,2,3 Exercise:4(i, ii)	Book 1 Chap 1 Book 1 Chap 20	1.0-1.7 1.9-1.12 20.1,20.2 20.3 20.4 20.5 20.6 20.8 20.10 20.11 20.12 20.13 20.14 20.18 20.19 20.20 20.22 20.25

Text Books :

1. D.C. Sanchethi & V.K. Kapoor, **Business Mathematics**, 11th edition, Sulthan Chand & sons
2. JP Tremblay, R Manohar, **Discrete Mathematical Structures with Applications to Computer Science**, 3rd edition, Tata McGraw Hill publication

Reference books:

1. Padmalochan Hazarika, **A Textbook of Business Mathematics**, 2nd Edition, S. Chand Publishing, 2010
2. Ross Sharon Cutler, Kolman, Bernard, **Discrete Mathematical Structures**, Phi Learning, 2008

Group I Course 2	BCAC 182 OBJECT ORIENTED PROGRAMMING USING C++	48 hours
Theory/Week 4 Hrs Credit: 2		IA: 20 Exam: 80

Topic	Chapter	P. No.
UNIT I		**12 Hours**
Procedure oriented and Object oriented Programming Paradigm, **Principles of Object Oriented programming:** Basic Concepts, benefits, application. **Beginning with C++:** Program features, comments, cin, cout, return statement, Structure of a C++ program. **Tokens, expressions and control structures:** Tokens, keywords, identifiers, basic and derived data types, symbolic constants, declaration of variables, dynamic initialization of variables, reference variables, the operators::, ::*, .*, delete, endl, new, setw. Typecast operator, expression and implicit conversions, operator precedence, control structures – while, do-while, if, and switch.	Chapter 1 Chapter 2	Sections : 1.3, 1.4, 1.5, 1.6, 1.8 Pages: 16 - 25 Complete
UNIT II		**12 Hours**
Functions in C++: main function, Prototyping, call and return by reference, inline functions, default arguments, const arguments, function overloading, mathematical functions **Classes and objects:** structures, specifying a class, creating objects, accessing class members, defining member functions, making outside functions inline, nesting of member functions, private member functions, arrays within a class, memory allocation for objects, static data members, static member functions, arrays of objects, objects as function arguments, friends functions, returning objects, const member functions, pointers to members	Chapter 4, 6	Complete chapter 6
UNIT III		**12 Hours**
Constructors and destructors: Parameterized constructors, multiple constructors, constructors with default arguments, dynamic initialization of objects, copy constructor, dynamic constructors, constructing two dimensional arrays, const object, destructors, memory allocation to an object using destructor **Operator overloading:** defining, overloading unary and binary operators, overloading binary operators using friend functions, manipulation of strings using operator overloading, rules for overloading operators, type conversions – basic to class, class to basic, one class to another class.	Chapter 6 Chapter 7	Complete Complete
UNIT IV		**12 Hours**
Inheritance: Defining a derived class, single inheritance, protected members, multilevel inheritance, multiple inheritance, hierarchical inheritance, hybrid inheritance, containership, virtual base classes, abstract classes, constructors in derived classes, nesting of classes. **Pointers, virtual functions, polymorphism:** Pointers to objects, this pointer, pointers to derived classes, virtual functions.	Chapter 8 Chapter 9	Complete complete

Text Books:

E. Balagurusamy, **Object Oriented Programming with C++**, 5th Edition, Tata McGraw Hill Publication.

Reference Books:

1. D. Ravichandran, **Programming with C++**, Third Edition, McGraw hill 2011
2. Robert Lafore, **Oriented Programming in C++**, Galgotia Publications Pvt. Ltd, 2006

Group I Course 3 Theory : 4 hrs/week Credits : 2	BCAC183 Database Concepts and Oracle	48 Hours IA : 20 Exam : 80

Topic	Book Number	Chapter Number	Section Numbers
UNIT - I			
Database and Database Users DBMS Definition, Characteristics of the Database Approach, Advantages of Using a DBMS, Database Users, Database Administrators	1	1	1.1, 1.3, 1.4, 1.5, 1.6 [All Sub Sections]
Database System concepts and architecture: Data Models, Schemas, and Instances, Three-schema architecture and Data Independence, Database Languages and Interfaces, The Database System Environment, Classification of Database Management Systems.	1	2	2.1, 2.2, 2.3, 2.4, 2.6 [All Sub Sections]
Data Modeling Using the Entity-Relationship Model: High-Level Conceptual Data Models for Database Design, An example database application, Entity Types, Entity Sets, Attributes and Keys, Relationships, Relationship Types, sets, roles, and Structural Constraints, Weak Entity Types, ER Diagrams Naming Conventions and Design issues.	1	3	3.1, 3.2, 3.3 [3.3.1, 3.3.2], 3.4, 3.5, 3.7
UNIT - II			
Relational Data Model, Relational Constraints Relational Model Concepts, Relational model Constraints and Relational Database Schemas, Update Operations, transactions and Dealing with Constraint Violations.	1	5	5.1, 5.2, 5.3 [All Sub Sections]
Relational Algebra: Unary relational algebra Operations: SELECT and PROJECT, Relational Algebra operations from Set theory, Binary relational operations - JOIN and DIVISION, Additional Relational Operations.	1	8	8.1, 8.2, 8.3 [8.3.1, 8.3.2, 8.3.3, 8.3.4], 8.4
Basics of Functional dependencies and Normalization for Relational databases: Functional dependencies, Normal Forms based on primary keys, General definitions of second and third normal forms, Boyce-Codd Normal form.	1	14	14.2, 14.3, 14.4, 14.5 [All Subsections]
Disk Storage, basic file structures and Hashing: Secondary storage devices, Buffering of Blocks, Placing File Records on Disk, Operations on Files, Files of Unordered Records (Heap Files), Files of Ordered Records (Sorted Files), Hashing Techniques.	1	16	16.1, 16.2, 16.3, 16.4, 16.5, 16.6, 16.7, 16.8 [16.8.1, 16.8.2]
UNIT - III			
SQL - The Relational Database Standard: Data manipulation in DBMS, Data types, SQL commands: Create Table, Inserting data, SELECT, DELETE, UPDATE, ALTER TABLE, DROP TABLE, RENAME, DESCRIBE. (Explain with syntax and examples)	2	7	P.No 114-131
Computations on table data, DUAL, SYSDATE,	2	9	P.No 161-184
UNION,INTERSET MINUS CLAUSE, ORACLE functions, DATA constraints on table, USER_CONSTRAINT TABLE, defining and dropping Integrity constraint in ALTER TABLE, Default value	2	8	[All Subsections]
	2	10	P.No 192-227

concepts, GROUP BY, HAVING, ORDER BY, Sub queries, Joins. SQL transaction commands COMMIT, ROLLBACK and SAVEPOINT.			
UNIT - IV			
Introduction to PL/SQL: PL/SQL structure, CURSORS: Definition, Types of cursors, cursor attributes, Parameterized cursors, Exception Handling: Need for exception handling, named Exception handlers, RAISE_APPLICATION ERROR PROCEDURE, Stored Procedures and functions, Package Database triggers.	2	15 16 17 18	[All Subsections] P.No 352 -367 P.No 393-397 P.No 404-420 , 429-438
Text Books: 1. Ramez Elmasri and Shamkanth B. Navate, **Fundamentals of Database Systems**, 7th Edition, Pearson Education 2. Ivan Bayross, **SQL/PL/SQL- the Programming language of Oracle**, 4th revised Ed, BPB Publications			

Group II Course : 1	Elective -II: Expanded Course BCACE 186 E1: Internet of Things	24 Hours
Theory/Week 2 Hrs Credit: 1		IA :10 Exam :40

UNIT I		12 Hours
Topic	**Chapter**	**Sub Sections**
Internet of Things Overview: IoT Definition , IoT vision ,smart and hyper connected devices, IoT conceptual framework, IoT Architectural view, Technology behind IoT , Components of IoT system, ,Development tools, APIs and Device interfacing components , Platform and integration tools ,Sources of IoT, M2M communication, M2M architecture, Software and Development tools, IoT examples	Chapter 1	1.1 To 1.7 [Includes All Sub sections]
Design Principles for Connected Devices: Introduction, Modified OSI model for IoT / M2M systems, ITU-T reference model, Communication technologies	Chapter 2	2.1 ,2.2,2.2.1,2.2.2 , 2.3,2.3.1,2.3.2
Design Principles for Web : Web Communication protocols for connected devices, Message Communication protocols, Communication Gateway protocols-SOAP, REST, HTTP RESTFUL and WEBSOCKETS	Chapter 3	3.1 To 3.4 [includes All Sub sections]

UNIT II		6 Hours
Internet Connectivity -Introduction, Internet connectivity, Internet based communication, IP addressing in IoT.	Chapter 4	4.1 To 4.4 [includes All Sub sections]
Data Acquiring and storage, Organising the data Transactions on stored data.	Chapter 5	5.1 To 5.4 [includes All Sub sections]
Sensors : Introduction , Sensor Technology, Industrial IoT and Automative IoT, Sensor data Communication protocols, Actuator, RFID technology Wireless sensor network technology.	Chapter 7	7.1 To 7.7 [includes All Sub sections]

TEXT BOOK :

Internet of Things: Architecture and Design Principles by Raj Kamal Mc Graw Hill Education

Reference Books:

1. **IoT Fundamentals** by David Janes , Ganzalo , Patrik , Rob Barton and Jeromey Henry
2. **Internet of Things** by Saurabh Gupta
3. **Internet of Things: A Hands-On Approach** by Arsheep Bahga , Vijay Madisetti

Group II Course : 2	Elective -II: Expanded Course BCACE 187 E2: Big Data Analytics	24 Hours
Theory/Week 2 Hrs Credit :1		IA :10 Exam :40

UNIT I		12 Hours
	Chapter	**Sub Sections /Page.No**
Getting an Overview of Big Data :- What is Big Data. History of Data management – Evolution of Big Data. Structuring of Big Data. Types of data, Structures Data, Unstructured Data, Challenges Associated with unstructured Data ,Semi -Structured Data, Elements of Big Data, Big Data Analytics, Advantages of Big Data Analytics, Careers in Big Data.	Chapter 1	All Sections
Exploring the use of Big Data in Business Context: Use of Big Data in social networking, Use of Big Data in preventing Fradulent activities, Use of Big Data in Detecting Fradulent activities in Insurance Sector, Use of Big Data in Retail Industry.	Chapter 2	All Sections
Introducing Technologies for Handling Big Data: Distributed and Parallel Computing for Big Data, How data models and computing models are different? Introducing Hadoop, Cloud Computing and Big Data, In- Memory Computing Technology for Big Data.	Chapter 3	All Sections
Understanding Hadoop Ecosystem: Hadoop Ecosystem, Hadoop Distributed File System, MapReduce, Hadoop YARN, Introducing Hbase, Combining Hbase and HDFS, Hive, Pig and Pig Latin, Sqoop, ZooKeeper, Flume, Oozie.	Chapter 4	85-92 101-111 114-115

UNIT II		12 Hours
Understanding MapReduce, Fundamentals and Hbase: The MapReduce Framework, Techniques to Optimize MapReduce Jobs, Uses of MapReduce, Role of Hbase in Big Data Processing.	Chapter 5	122 to 135
Understanding Big Data Technology Foundations: Exploring the Big Data Stack, Physical Redundant Networks, Virtualization and Big Data, Virtualization Approaches.	Chapter 6	150-159 162-163 166-167
Storing Data in Databases and Data Warehouses: RDBMS and Big Data, Non–relational Database, Polyglot Persistence, Integrating Big Data with Traditional Data Warehouses, Big Data Analysis and data Warehouse, Changing Deployment Models in Big Data Era	Chapter 7	All Sections

Text Book:
DT Editorial Services, Big Data Black Book Black Book, Dreamtech Press Publications,2016

Reference Books:

1. **Furht, Borko, Villanustre**, Flavio, **Big Data Technologies and Applications**, Springer Publication, 2016
2. Vijayalakshmi Radha and Shankarmani**, Big Data Analytics,** Wiley Publication, 2016

Group II Course : 3	Elective -III: Expanded Course BCACE 188 Artificial Intelligence	24 Hours
Theory/Week 2 Hrs Credit :1		IA :10 Exam :40

UNIT I		12 Hours
	Chapter	**Sub Sections**
Introduction: What is AI? Early work in AI, Importance of AI, AI and its related fields, AI techniques. **Problems, Problem space and search:** Defining the problem as state space search, Control strategies. **Heuristic search Heuristic search techniques:** Generate and test, Hill climbing: Simple hill climbing, steepest-Ascent hill climbing, best- first search, climbing agendas, problem reduction, constraint specification. **Knowledge Concepts:** Introduction, definition and importance of knowledge, some knowledge based systems, Knowledge representation, organization, manipulation, acquisition. **General concepts in Knowledge acquisition:** Introduction learning , types of learning , general learning model , performance measures	Book 2 Book 1 Book 1 Book 1 Book 2 Book2	1.1,1.2,1.4 1.3,1.3.1 2.2,2,2,1 2.2.2 3.1, 3.2, 3. 2.1,3.2.2 2.2,2.3 , 2.4 , 2.5, 2.6, 2.7 16.1, 16.2 ,16.5

UNIT II		12 Hours
Pattern recognition: Introduction, the recognition and classification process, Learning classification, Patterns, Recognizing and understanding speech. **Expert System architecture:** Introduction, characteristics features of expert system, background history, applications, importance of expert system, rule based architectures. **LISP and other AI Programming language** : Introduction to LISP; syntax and numeric functions, Basis List manipulation function, functions, predicates and conditionals, input, output and local variables, iteration and recursion, property lists and array, miscellaneous topic, PROLOG and other AI programming languages .	Book 2 Book 2 Book 2	13.1,13.2 (Only P.No 273), 13.4 15.1 3.1, 3.2, 3.3,3.4 ,3.5, 3.6,3.7, 3.8

Text Book:

1. Elaine Rich and K. Knight , Artificial Intelligence ,TMH 2nd Edition
2. D.W Patterson, Introduction to Ai and Expert systems, PHI Publications

Reference Books:

1. Stuart Russell, Peter Norvig, **Artificial Intelligence: A Modern Approach**, 2nd Edition, Pearson Education
2. Saroj Kaushik, **Artificial Intelligence**, Cengage Learning India, 2011

Practical-III	BCAP 184 C++ LAB	48 Hrs
Practical/Week: 4 Hrs Credits: 2	Exercises on C++ Programming	I.A.: 20 Exam: 80

	PART A
1	Write a program with a class POLYMORPH to calculate the volume of sphere, cylinder and rectangular prism using function overloading concept.
2	Write a program to perform the following operations on two complex numbers: a) Addition using a member function b) Subtraction using a friend function
3	Write a program to compute the total marks and declare the results using an array of objects. Assume that the class contains the data members - roll no, name, marks in 3 subjects. Result is calculated as follows. If student gets <35 in any of the subjects, Fail. Otherwise various results are calculated on the basis of average as a) >=70 Distinction b) >=60 and <70 First Class c) >=50 and <60 Second Class else Pass Class. Use member functions to accept the data, compute, and display the result in tabular form.
4	Write a program to create a class DISTANCE with the data members feet and inches. Use a constructor to read the data and a member function Sum ( ) to add two distances by using objects as function arguments and show the result. (Input and output of inches should be less than 12.)
	PART B
1	Using constructors and proper methods, design a class graphics which stores shapes, area, back colour and fore colours. Use this class in the main program to input any 'N' shapes and perform the following operations and print the list in a neat format. a) Sort according to area b) Search for a specified shape.
2	Create a class 'Bank' which includes data members – Acno, Name, Balance and a parameterized constructor to initialize the data members and other methods like deposit, withdrawal, and display the details of the customer. (Hint: Check for minimum balance of Rs. 500/- while opening the account and during the withdrawal. Also, amount should be positive integer. Otherwise show appropriate message.)
3	Write a program to accept two strings and using operator overloading perform the following. a) Concatenation of two strings. b) Comparison of two strings alphabetically. (Note : For concatenation (+), for comparison (==, > or <)
4	Create a class 'Time' which includes the data members – hours, minutes and seconds. Write a menu driven program with the following methods to a) accept time b) display time c) increment time by one second by overloading unary operator ++ d) decrement time by one second by overloading unary operator - - (Hint: Validate minutes and seconds to be in the range of 0-59 in input and output).

<table>
<tr><th colspan="2">PART C</th></tr>
<tr><td>1</td><td>Using single inheritance, create a class ELECTRICITY that includes Tariff code, Zone, Meter number. Tariff code can be LT1, LT2 or LT3. Zone is either RURAL or URBAN.
Create another class CUSTOMER that inherits ELECTICITY, and includes AccountID, CustName, Address, Previous reading and Present reading. Validate for Present reading >= Previous reading. A fixed amount of Rs. 200/- to be paid by all the customers. Prepare an electricity bill with all the details in a neat format using the following data:
<table>
<tr><th>Tariff code</th><th>UNITS</th><th>RURAL</th><th>URBAN</th></tr>
<tr><td>LT1</td><td>0 to 40</td><td>6.80</td><td>6.80</td></tr>
<tr><td></td><td>Above 40</td><td>7.00</td><td>7.00</td></tr>
<tr><td rowspan="3">LT2</td><td>0 to 30</td><td>3.40</td><td>3.55</td></tr>
<tr><td>31 to 100</td><td>4.65</td><td>4.95</td></tr>
<tr><td>Above 100</td><td>6.20</td><td>6.70</td></tr>
<tr><td rowspan="2">LT3</td><td>0 to 50</td><td>7.25</td><td>7.75</td></tr>
<tr><td>51 & above</td><td>8.55</td><td>8.95</td></tr>
</table></td></tr>
<tr><td>2</td><td>Using hierarchical inheritance, create a base class ‘ITEM’ with data members item number, title and price. Derive the following items for base class ITEM.
a) ‘Book’ with author name, publication and pages as the data members.
b) ‘CD’ with data members - category, time of play and speed.
Issue desired number of items and print the list of books and CD’s separately. Also print the number of books, CDs and total number of items purchased.</td></tr>
<tr><td>3</td><td>Using multiple inheritance, write a program to create a class ‘Personnel Information’ which includes name, address and gender as the data members. Another class for ‘Physical Information’ with data members height, weight, blood group. Derive a class called ‘Salary’ which inherits from the above two classes, with employee number, department and salary. Find increment in salary for an employee as follows.
For Male: In department S or P - 10%
For Female: In department S or P - 11%.
(Hint: S for Sales and P for Purchase; for any other department, no increment.)</td></tr>
<tr><td>4</td><td>Create a class Employee containing name and EmpNo. Create two more classes Manager with data members department name and number of employees under that department, and Scientist with data members year and number of publications. Using the concept of containership, read all the information of a Scientist and Manager and display the information in a neat format.</td></tr>
</table>

Scheme of Examination

<table>
<tr><th>Sl. No.</th><th colspan="3">Details</th><th>Marks</th><th>Total</th></tr>
<tr><td rowspan="3">1</td><td rowspan="3">PART A</td><td>i.</td><td>Problem solving and coding</td><td>8</td><td rowspan="3">18</td></tr>
<tr><td>ii.</td><td>Compiling the code and debugging</td><td>6</td></tr>
<tr><td>iii</td><td>Execution and testing</td><td>4</td></tr>
<tr><td rowspan="3">2</td><td rowspan="3">PART B</td><td>i.</td><td>Problem solving and coding</td><td>10</td><td rowspan="3">22</td></tr>
<tr><td>ii.</td><td>Compiling the code and debugging</td><td>7</td></tr>
<tr><td>iii</td><td>Execution and testing</td><td>5</td></tr>
<tr><td rowspan="3">3</td><td rowspan="3">PART C</td><td>i.</td><td>Problem solving and coding</td><td>11</td><td rowspan="3">25</td></tr>
<tr><td>ii.</td><td>Compiling the code and debugging</td><td>8</td></tr>
<tr><td>iii.</td><td>Execution and testing</td><td>6</td></tr>
<tr><td>4</td><td colspan="4">Class Records</td><td>10</td></tr>
<tr><td>5</td><td colspan="4">Viva – Voce</td><td>5</td></tr>
<tr><td colspan="5">Total Marks</td><td>80</td></tr>
</table>

Practical-IV	**BCAP 185** **DBMS Lab**	**48 Hrs**
Practical/Week: 4 Hrs **Credits: 2**	**Exercises on DBMS Problems**	**I.A.: 20** **Exam: 80**

NOTE:

- Display all the records and describe the structure for every table in each exercise.
- For any query, the result must contain at least one record.

PART A

1 Create a table *EMPLOYEE* using SQL command to store details of employees such as *EMPNO, NAME, DESIGNATION, DEPARTMENT, GENDER* and *SALARY*.
Specify Primary Key and NOT NULL constraints on the table
Allow only '*M*' or '*F*' for the column *GENDER*.
DEPARTMENT can be SALES, ACCOUNTS, IT
Choose DESIGNATION as CLERK, ANALYST, MANAGER, ACCOUNTANT and SUPERVISOR that depends on department.

Write the following SQL queries:

a) Display EMPNO, NAME and DESIGNATION of all employees whose name ends with RAJ.
b) Display the details of all female employees who is earning salary within the range 20000 to 40000 in SALES or IT departments
c) List the different DEPARTMENTs with the DESIGNATIONs in that department
d) Display the department name, total, average, maximum, minimum salary of the DEPARTMENT only if the total salary given in that department is more than 30000.
e) List the departments which have more than two employees.

Marks distribution:
Creating the table with constraints: 4, Inserting records: 2, a)3 b)3 c)2 d)2 e)2

2 Create a table *CLIENT* to store CLIENT_NO, NAME, ADDRESS, STATE, BAL_DUE. Client no must start with 'C'. Apply the suitable structure for the columns. Specify Primary Key and NOT NULL constraints on the table
Insert 10 records.

Write the following SQL queries:

a) From the table CLIENT, create a new table CLIENT1 that contains only CLIENT_NO and NAME, BAL_DUE from specified STATE. Accept the state during run time.
b) Create a new table CLIENT2 that has the same structure as CLIENT but with no records. Display the structure and records.
c) Add a new column by name PENALTY number (10, 2) to table CLIENT.
d) Assign Penalty as 10% of BAL_DUE for the clients C1002, C1005, C1009 and for others 8%. Display records.
e) Change the name of CLIENT1 as NEW_CLIENT.
f) Delete the table CLIENT2.

Marks distribution:
Creating the table with constraints: 4 Inserting records: 2 a)2 b)3 c)2 d)3 e)1 f) 1

3	Create a table BOOK using SQL command to store Accession No, TITLE, AUTHOR, PUBLISHER, YEAR, PRICE. Apply the suitable structure for the columns. Specify Primary Key and NOT NULL constraints on the table. Insert 10 records. **Write the following SQL queries:** a) List the details of publishers having 'a' as the second character in their names. b) Display Accession No., TITLE, PUBLISHER and YEAR of the books published by the specified author before 2010 in the descending order of YEAR. Accept author during run time. c) Modify the size of TITLE to increase the size by 5 characters. d) Display the details of all books other than Microsoft press publishers. e) Remove the records of the books published before 1990. **Marks distribution:** Creating the table with constraints: 4 Inserting records: 3 a)2 b)3 c)2 d)2 e)2
4	Create a table SALES with columns SNO, SNAME, MANAGER_NAME, JOIN_DATE, DATE_BIRTH, SALARY, SALES_AMOUNT and COMMISSION. Minimum Age for joining the company must be 18 Yrs. Default value for Commission should be 0. Apply the suitable structure for the columns. Specify Primary Key and NOT NULL constraints on the table. Insert 10 records with data except commission. Manager of Manager can be Null. **Write the following SQL queries:** a) Display the details of Sales Persons whose salary is more than Average salary in the company. b) Update commission as 20% of Sales Amount. c) Display SNO, SNAME, MANAGER_NAME, SALARY, COMMISSION, MANAGER_SALARY of the sales persons getting sum of salary and commission more than salary of manager .(Self join) d) Display the records of employees who finished the service of 10 years. **Marks distribution:** Creating the table with constraints: 5 Inserting records: 2 a)3 b)2 c)3 d)3
	PART B
1	Create the following tables by identifying primary and foreign keys. Specify the not null property for mandatory keys. *SUPPLIERS (SUPPLIER_NO, SNAME, SADDRESS, SCITY*) *COMPUTER_ITEMS (ITEM_NO, SUPPLIER_NO, ITEM_NAME, IQUANTITY)* *Consider three suppliers. A supplier can supply more than one type of items.* **Write the SQL queries for the following:** a) List *ITEM* and *SUPPLIER* details in alphabetical order of city name and in each city decreasing order of *IQUANTITY.* b) List the name and address, city of the suppliers who are supplying keyboard. c) List the supplier name, items supplied by the suppliers 'Cats' and 'Electrotech'. d) Find the items having quantity less than five and insert the details of supplier and items of these into another table NEWORDER. **Marks distribution:** Creating the tables with constraints: 5 Inserting records: 5 a)3 b)3 c)3 d)3
2	Create the following tables by identifying primary and foreign keys. Specify the not null property for mandatory keys. *EMPLOYEE_MASTER (EMP_ID, EMP_NAME, EMP_ADDRS, PHONE)* A*TTENDANCE (EMP_ID, MONTH, WOM, MHRS, THRS, WHRS, TRHRS, FHRS, SHRS, SUHRS).* (Valid values for WOM<=5, MONTH can be 1-12). Apply appropriate constraints. Consider 3 employees. And attendance records for at least two months.

Write the SQL queries for the following:

a) Display EMP_ID, *EMP_NAME* and *EMAIL_ID* of all employees who are working on every Sunday of 2nd or 4th week in a month.
b) Display total hours worked by each employee in each month with EMP_ID,
c) Display the names of the employees who never attended the duty so far (attendances not given so far).
d) Display the employee name, month, week, total hours worked for employees who have total number of hours more than 20 hours a week.

Marks distribution:

Creating the tables with constraints: 5 Inserting records: 5 a)3 b)3 c)3 d)3

3 Create the following tables by identifying primary and foreign keys, specify the not null property for mandatory keys.

PRODUCT_DETAIL				
P_No	**P_Name**	**QtyAvailable**	**Price**	**Profit (%)**
P0001	Monitor	10	3000	20
P0002	Pen Drives	50	650	5
P0003	CD Drive	100	10	3
P0004	Keyboard	25	600	10

PURCHASED_DETAIL		
CustNo	**P_No**	**QtySold**
C1	P0003	2
C2	P0002	4
C3	P0002	10
C4	P0001	3
C1	P0004	2
C2	P0003	2
C4	P0004	1

Write the SQL queries for the following:

a) Display total amount spent by C2.
b) Display the names of product for which either QtyAvailable is less than 30 or total QtySold is less than 5 (Use UNION).
c) Display the name of products and quantity purchased by C4.
d) How much Profit does the shopkeeper get on C1's purchase?
e) How many 'Pen Drives' have been sold?

Marks distribution:

Creating the tables with constraints: 4 Inserting records: 4 a)3 b)3 c)3 d)3 e) 2

4 Create table STUDENT_PROFILE that includes Rollno, name, class, ECCC (Extra/Co-curricular he belongs to such as SPORTS, NSS, etc.) and another table MARKS_REPORT that includes Rollno, Internal_Test, Marks1, Marks2, Marks3 and ECCC_marks.

Constraints

- Internal_Test can be either 1 or 2.
- Each mark can be 0 – 100. Absence in the test can be entered as -1.
- Consider at least 3 classes.

Apply suitable datatype and constraints to each column.
Insert 5 students marks report in the both the tests.

Write the SQL queries for the following:

a) Find number of students failed class-wise.

b) Display the complete details of the students secured distinction (Percentage>=70) in I BCA
c) Display class and highest total marks in second internals in each class.
d) Display the student name with rollno and class of those who passed in I internals and failed in II internals (use SET operator).

Marks distribution:
Creating the tables with constraints: 5 Inserting records: 5 a)3 b)3 c)3 d)3

PART C

1 Write a PL/SQL program to compute the selling price of books depending on the book code and category. Use Open, Fetch and Close. The Book_detail table contains columns Book Code, Author, Title, Category and Price. Insert 10 records. The selling price = Price – Discount.
The discount is calculated as follows:

Book Code	Category	Discount Percentage
A	Novels	10% of Price
	Technology	12.5% of Price
B	Commerce	18% of Price
	Science	19% of Price
C	Songs	25% of Price
	Sports	24% of Price
D	Others	28% of Price

Print the result in a tabular form with proper alignment.

```
Book_code  Category      Title  Author  Price  Discount %  Disc.Amt  Selling_Price
=========  ==========  =====  ======  =====  ==========  ========  =============
```

Marks distribution:
Creating the tables with constraints and inserting records: 5
PL/SQL code: 10 Compiling and debugging: 5 OUTPUT: 5

2 Write a PL/SQL program to display employee pay bill (using Cursor For loop). Use a **procedure** to receive basic pay and to compute DA, HRA, Tax, PF, Gross Pay and Net pay (Use OUT). Base table contains the columns empnum, empname, basic pay. Insert 3 records.
Allowances are computed as follows:

Basic Pay	DA	HRA
<=20000	35% of Basic	8% of Basic
>20000 and <=30000	38% of Basic	9% of Basic
>30000 and <=40000	40% of Basic	10% of Basic
>40000	45% of Basic	10% of Basic

Gross = Basic + DA + HRA; PF = 12% of Gross or Rs. 2000, whichever is minimum.
PT = Rs. 100 upto Gross is 25,000; else Rs. 200, Net = Gross – (PF +PT)
Print Pay slip as follows:

```
==============PAYSLIP=================
Empno           :10011          Empname : Raj
Basic Pay       :20000             P.F.: 3432
DA              :7000            P.T.: 200
H.R.A.          :1600
Gross           :28600          Net Pay : 24968
**************************************************
==============PAYSLIP=================
Empno           :10012          Empname : Rani
Basic Pay       :30000             P.F.: 5292
DA              :11400             P.T.: 200
H.R.A.          :2700
Gross           :44100          Net Pay : 38608
**************************************************
```

Marks distribution:
Creating the tables with constraints and inserting records: 5
PL/SQL code: 5, Procedure code: 6, Compiling and debugging: 4, OUTPUT: 5

3 Given the following tables: ITEM_MASTER (itemno, name, stock, unit_price) [Apply the Primary key and check constraint for stock and price as >0) [Insert 5 records]
ITEM_TRANS (itemno, quantity and trans_date)
Create a **package** PCK_ITEM includes a function CHK_ITEM and a procedure PROC_ITEM.
Function CHK_ITEM gets one argument itemno and is used to check whether the parameter itemno exists in ITEM_MASTER and should return 1 if exist. Otherwise 0 and display proper message.
Procedure PROC_ITEM gets two arguments itemno and quantity, and is used to perform the following if item exists. If required quantity is not available, give appropriate message. If available, insert a record of this transaction to ITEM_TRANS and modify the stock in ITEM_MASTER.
Write a **PL/SQL** program to accept ITEM_NO and Quantity needed of required item. Use **Package** to do the transaction process (Transaction date can be current date).
OUTPUT to be shown as follows:

```
Enter value for accept_itemno: 1
old   5:            X:=&accept_itemno;
new   5:            X:=1;
Enter value for quantity: 3
old   6:          M:=&quantity;
new   6:          M:=3;
Item :aa   Quantity  :3  Price  :15 Total Amount  :45
```

Marks distribution:
Creating the tables with constraints and inserting records: 5
PL/SQL code: 3, Package specification: 2 Procedure: 4, Function: 3
Compiling and debugging: 3, OUTPUT: 5

4	Consider the following tables: LIBRARY (Accession no, Title, Author, Publication, Status). Status can be A for available and I for Issued. Insert 3 records with status 'A' for all initially. ISSUE (Rollno, Accession no, Borrowdate, returndate). OUTDATED (Accession no, Title, Author, Publication, tdate). Write the following Trigger programs. i. Whenever the book is to be issued, insert a new record to ISSUE without having return date. When the record is **inserted** to ISSUE table, trigger TRIG_ISSUE to be executed to update status in LIBRARY as '*I'*. ii. Whenever book is returned, update return date of that record as todays date in ISSUE table. When the record is **updated** to ISSUE table, trigger TRIG_ISSUE to be executed to update status in LIBRARY as '*A'*. iii. Whenever the book is **deleted** by accepting Accession no. for status 'A' (at SQL >), trigger TRIG_OUTDATE has to be executed to insert a record to OUTDATED. Write a PL/SQL program to accept Rollno, Accession no. and transaction (B for Borrow and R for Return). Check for the existence of a given Accession no. and proceed as follows. • If does not exist , display the message 'Given accession no. is not available' • If exist and transaction is B, check the status as 'A', then insert to ISSUE, and display the message with accno, author, title, publication and roll no to whom it is issued . • If exist and transaction is R, then update return date as current system date in ISSUE by accepting Rollno and Aceession no (for the record having return date empty.) If searched record is not available, raise the predefined exception. **Marks distribution:** Creating the tables with constraints and inserting records: 5 PL/SQL code: 5, Trig_ISSUE: 4, Trig_OUTDATE: 3 Compiling and debugging: 3, OUTPUT: 5

Scheme of Examination

Sl. No.	Details	Marks
1	PART A	18
2	PART B	22
3	PART C	25
4	Class Records	10
5	Viva – Voce	5
Total Marks		**80**