S.Y.B.Sc(IT) Sem-III : Logic Dis. Math

Jan-2017

Con. 106-16. S.Y.B.Sc (I.T.) (Sem-III) **RT-4961**

Jan-2017 (3 Hours) **[Total Marks : 100**

Logic and Dis. Mathematics

N.B. : (1) **All** questions are **compulsory.**

(2) In **each** question from Question No. **2** to **7**, **Sub-question (a)** is **compulsory** and attempt any **one** from **Sub-question (b)** and **(c)**.

(3) **Figures** to the **right** indicate **full** marks.

1. Attempt any **one** of the following :— **10**

(a) State first principle of finite induction and using it show that :

(i) $1^2 + 2^2 + 3^2 + \ldots\ldots + n^2 = \dfrac{n(n+1)(2n+1)}{6}$

(ii) $\dfrac{1}{3.4.5} + \dfrac{2}{4.5.6} + \ldots\ldots + \dfrac{n}{(n+2)(n+3)(n+4)} = \dfrac{n(n+1)}{6(n+3)(n+4)}$

(Note that 3.4 means product of 3 and 4)

(b) Describe the following with one example and one theorem related to **each** :

(i) Bipartite graph (ii) Algebraic structure

2. (a) State and prove De Morgan's laws for any n sets. **8**

(b) What is Tautology ? Compute the truth table of $(P \Rightarrow Q) \Leftrightarrow (\sim Q \Rightarrow \sim P)$. Is it Tautology ? **7**

(c) Out of 240 students in a college, 130 students are in NCC, 110 are in NSS and 80 are in other activities. 40 are in NCC & NSS both, 35 are in NCC & other activity both and 30 are in NSS & other activity both. 20 students take part in all the three. Prepare Venn diagram. Also, find number of students taking part in atleast one of them, using inclusion-exclusion principle. **7**

3. (a) Write a note on Warshall's algorithm. Using the algorithm, find R^∞ when $A = \{1, 2, 3, 4\}$ and $R = \{(1,1), (1,2), (2,3), (3,4)\}$. **8**

(b) Draw Hasse diagram of D_{20}, set of all positive divisors of 20. Is D_{20}, a poset ? Further, check if D_{20} is a lattice. **7**

(c) Show that any two equivalence classes are equal or disjoint. **7**

4. (a) State and prove extended Pigeonhole principle. Give one example. **8**

(b) What is binary operation ? Show that binary operation * is associative and commutative if * is defined as $a*b = ab/9$ for all a and $b \in Q - \{0\}$. Also, find identity and inverse element. **7**

(c) Find fog and gof. Also, check if they are equal when $f, g : IR \to IR$ is defined as $f(x) = x + 1$ and $g(x) = x^2$ for all $x \in IR$. **7**

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5. (a) Write Prim's algorithm to find the minimal spanning tree in a graph. **8**
   (b) Draw K_6, a complete graph on 6 vertices. Show Hamiltonian cycle in K_6. **7**
   (c) Draw Peterson's graph. Further, draw three subgraphs of Peterson's graph. **7**

6. (a) Show that the set $S = \{\pm 1, \pm i, \pm j, \pm k\}$ is an integral domain but not a field. **8**
   (b) Let $e : B^2 \rightarrow B^6$ be an (2.5) encoding function defined as $e(00) = 00000$, $e(01) = 11011$, $e(11) = 11100$ and $e(10) = 00101$. (i) Find minimum distance. (ii) How many errors can e detect ? (iii) How many errors can e correct ? **7**
   (c) Show that $G = \{0, 1, 2, 3, 4,5\}$ forms an abelian group with respect to addition modulo 6. **7**

7. (a) The number of bacteria in a culture is 1000 and this number increases by 250% every two hours. Using recurrence relation, find number of bacteria present after one day. **8**
   (b) Determine the coefficient x^5 of generating function $(1 - 2x)^{-7}$. **7**
   (c) Solve the recurrence relation $a_n - 3a_{n-1} = 5(7^n)$, where $n \geq 1$ and $a_0 = 2$. **7**

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S.Y.B.Sc (IT.) Sem - III = Comp. Graphics.

Jan - 2017

Con. 102-16. Computer Graphics **RT-4195**

(3 Hours) **[Total Marks : 100**

N. B.: (1) **All** questions are **compulsory**.
(2) All question carry equalmarks

1.	**Attempt the following question:**	
a.	Explain the following terms with proper examples object, image, computer graphics.	5M
b.	What are the types of computer graphic? Explain them in brief.	5M
2.	**Attempt *any three* of the following:**	
a.	Write Short note on Bitmap & Vector based images.	5M
b.	Explain the working of CRT with a neat labeled diagram.	5M
c.	Explain in detail about Bresenham's line generating algorithm. Give example.	5M
d.	Describe in detail about the DDA scan conversion algorithm?	5M
3.	**Attempt *any three* of the following:**	
a.	Derive the transformation matrix for rotation about arbitrary point.	5M
b.	Discuss shear 2D transformation in brief.	5M
c.	Write a note on i) 2-D Scaling and b) 2-D Reflection	5M
d.	Write a short note on homogenous co-ordinates.	5M
4.	**Attempt *any three* of the following:**	
a.	Give the matrix representation for the following 3D transformation i) Translation ii) Rotation.	5M
b.	Explain in detail about 3D window to viewport coordinate transformation.	5M
c.	Explain parallel projection in detail.	5M
d.	Write short notes on perspective projections.	5M
5.	**Attempt *any three* of the following:**	
a.	Explain the concept of Windowing and Clipping.	5M
b.	Explain Cohen Sutherland line clipping algorithm with suitable example.	5M
c.	Explain the concept of aliasing and anti-aliasing in detail	5M
d.	Explain the concepts of Half toning, thresholding and dithering	5M
6.	**Attempt *any three* of the following:**	
a.	Write a short note on B-spline Curve	5M
b.	Explain the painter's algorithm for hidden surface removal.	5M
c.	Write a note on Back-face culling	5M
d.	Explain the Z-Buffer algorithm	5M
7.	**Attempt *any three* of the following:**	
a.	Write a short note on morphing and state its advantages.	5M
b.	Write a short note on transparency.	5M
c.	Explain the concept of ray tracing	5M
d.	Explain in detail about CMY color model.	5M

B.Y.B.Sc (IT) Sem-III Advanced-SQL
Jan -2017

Con. 103-16. Advanced SQL **RT-4355**

(3 Hours) **[Total Marks : 100**

Note: All Questions from Q.1 to Q. 7 are compulsory.

Q1.	Attempt the following: a) Explain sequence with syntax and example. b) Explain any five Aggregate functions with example.	5marks 5marks
Q2.	Attempt any three from the following: a) What is constraint? Explain Foreign key constraint with example. b) Define View. Explain how to Create, update and delete the view. c) Explain the subqueries manipulating data with example. d) Consider the following database Book(BID, Book_Name, Date_Issue, Author, Student_ID) Student(Student_ID, Student_name, Course) i) List all the students whose name's second character is 'e'. ii) List all the student who have issued the book in the month of June. iii) List all the Books available in library. iv) List all the Books whose author name's first character is 's' v) List all the students admitted for BMS course.	 5marks 5marks 5marks 5marks
Q3.	Attempt any three from the following: a) What is Group by clause? Explain the syntax with example. b) Explain Date/Time functions with example. c) Explain privilege with the help of Grant and Revoke commands example. d) What is multiple column subquery? Explain with suitable example.	 5marks 5marks 5marks 5marks
Q4	Attempt any three from the following: a) Explain the PL/SQL block. Give the benefits of PL/SQL b) Explain the purpose Bind variables with example. c) What is a scalar data type? Explain. d) Explain the different types of operators used in PL/SQL.	 5marks 5marks 5marks 5marks
Q5	Attempt any three from the following: a) Explain loop statements with example. b) Explain Index By Tables with help of example c) Write a PL/SQL block of code to print average of odd numbers in between 1 to 100. d) Explain exception handling in PL/SQL with an example.	 5marks 5marks 5marks 5marks
Q6.	Attempt any three from the following: a) Define package in PL/SQL. Give the advantages of packages? b) Write a PL/SQL block of code for a procedure to display the employee. c) Explain Stored Procedure with example. d) What is subprogram? Explain its creation and calling example.	 5marks 5marks 5marks 5marks
Q7.	Attempt any three from the following: a) Create a trigger to change the revaluation marks to 50. Every time the mark exceeds 100 then an appropriate message is displayed. b) How to create triggers in the PL/SQL? Explain with example. c) Compare Database trigger with stored procedure. d) Explain Dynamic SQL.	 5marks 5marks 5marks 5marks

S.Y.B.Sc.(I.T.) Sem-III OBJ. ORI. PRO. C++

Con. 105-16. Jan - 2017 **RT-4724**

Object Oriented Programming

(3 Hours) **[Total Marks : 100**

N.B. : 1. All questions are compulsory (Q1-Q7)
2. Attempt any 3 sub questions out of 4 from Q2 to Q7
3. Draw neat and labelled diagram wherever necessary.

Q1 Attempt any two questions of the following

a) What is inheritance? Explain any two types with diagram and example. 5m
b) Explain the following terms i) Object ii) Class 5m
c) State and explain the various applications of Object Oriented programming. 5m
d) Explain the difference in between Class and Structure with example. 5m

Q2 a) State any five features of Object Oriented Programming. 5m
b) Describe the concept of polymorphism with example. 5m
c) Distinguish between procedural and object oriented approach. 5m
d) Write short note on reusability in C++. 5m

Q3 a) Write a C++ program with a class to check a number is even or odd. 5m
b) Explain the concept of static data member of a class with example. 5m
c) Write short note on copy constructor. 5m
d) How to define the member functions in C++? 5m

Q4 a) What is pointer? Explain the use of pointer with the help of suitable example. 5m
b) Explain the Operator overloading concept. 5m
c) Write a short note on overloading the arithmetic assignment operator. 5m
d) Explain the concept of friend function with example. 5m

Q5 a) Explain the virtual function. State the rules used for virtual function. 5m
b) Write a C++ program to store the details of a car object into a file. Read the details from the file (Data Members: Carid, name price). 5m
c) Explain the abstract class with the help of suitable example. 5m
d) Write a C++ program to store the details of employee object into a file. Read the following details from the file (Data Members: Emp_id, name, Salary). 5m

Q6 a) Explain the following terms i) stream ii) input stream iii) output stream 5m
b) Write a C++ program to count the number of 'a' and 'o' in an input stream. 5m
c) Write short note on the following terms i) Constructor ii) Destructor 5m
d) Write a C++ program to check whether the input string is palindrome or not. 5m

Q7 a) Explain the concept of class template with any example. 5m
b) Write short note on function overloading and give example. 5m
c) What is container? Explain its types. 5m
d) Write a short note on iterator classes. 5m

S.Y.B.Sc.(IT.) Sem - III = @ Modern. Ope. Syst.

Jan - 2017

Con. 104-16. Modern Operating Systems **RT-4560**

(3 Hours) **[Total Marks : 100**

Q.1 a) Explain multithreading models. (05)

b) Discuss NFS in detail. (05)

Q.2 Attempt any three question from the following. (15)

a) Explain the single batch and multiple batch processing system.

b) Explain Assemblers and Compilers in detail.

c) Explain real time operating system in detail.

d) Explain distributed system in detail.

Q.3 Attempt any three question from the following (15)

a) Explain system programs and its types.

b) Explain various operating system services.

c) Define and explain virtual machine.

d) Explain different types of system calls.

Q.4 Attempt any three question from the following (15)

a) Discuss different scheduling algorithms.

b) Define and explain process with different process states.

c) Explain critical section problem.

d) Give different benefits of threads.

Q.5 Attempt any three question from the following (15)

a) Discuss in detail page replacement algorithm.

b) What is segmentation? Discuss in detail.

c) Explain paging in detail

d) Explain dynamic partioning.

Q.6 Attempt any three question from the following (15)

a) Explain necessary conditions required for deadlock

b) Explain swap-space management.

c) Explain DISK structure and disk management in brief.

d) Write a note on RAID and its types.

Q.7 Attempt any three question from the following (15)

a) Explain application I/O interface.

b) Write a note on Access matrix.

c) Explain STREAMS.

d) What are different types of security and network threats?

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