S.Y.B.Sc (I.T.) (Sem-III)

July 2018

Con. 312-18. **TE-6923**

Logic, Discrete Mathematics

Duration: 3 Hours Total Marks: 80

General Instructions:

1. There are 8 questions in this paper.
2. All questions are compulsory.
3. Each question carries 10 marks.
4. Internal choices are there in each question.
5. Figures to the right indicates full Marks.

1. Attempt **any 2** from the following. 10

   a) Write the set in listing method

      i) The set of all prime numbers are less than ten.

      ii) $A = \{x/x \notin Z \text{ and } x^2 < 12\}$

   b) Draw the truth table for :$(p \leftrightarrow q) \rightarrow (-p)$

   c) A software company writes a new package which integrates a word processing program with spread sheet program and they wish to run it on a 64k machine. The word processor requires 40k for program and data and the spread sheer requires 32k for the same. If 16k must be reserved for the integrator, what is the minimum amount of overlapping space that will be necessary?

2. Attempt **any 2** from the following. 10

   a) Let A be the set of non-zero integers. R is a relation defined on set A, such that xRy if $x^y - y^x$. Check whether R is an equivalent relation.

   b) Let A {1,2,3,4,5,6}. Define a relation R by xRy if 2x=y. find the relation R and write down the matrix for R and also draw the diagram for R.

   c) Define the following terms:

      a) relation b) identity relation c)universal relation d)void relation e)digraph

3. Attempt **any 2** from the following. 10

   a) If the functions "f" and "g"are given by f = { (1,2), (3,5), (4,1)} and g = {(2,3),(5,1),(1,3)}, find fog and gof.

   b) Find the inverse of the function $f:R \rightarrow R$, where $f(x) = x + 3$

   c) State the pigeon-hole principle. Show that if 27 students are there in class, then there are at least two students who have their first name starting from same alphabet.

4. Attempt **any 2** from the following. 10

   a) By using the principle of mathematical indication show that $9^n - 4^n$ is divisible by 5 $\forall n \in N$

   b) Define the following terms:

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i) Function ii) Inverse function iii) bijective function iv) Boolean function v) Constant function

c) Find the transitive closure for the relation R={ (1,1),(1,2),(1,3),(2,2),(2,3),(3,1),(3,3) } defined on the set A={1,2,3}

5. Attempt **any 2** from the following. 10

a) Define i) Tree ii) 2-tree iii) connected graph iv) complete graph v) regular graph

b) State the kruskal's Algorithm to find the minimal spanning tree.

c) State the Huffman's Algorithm and hence find the minimum weighted path length for the given information, where the data items are to be taken as external nodes.

Data item	A	B	C	D	E	F	G
Weight	5	3	3	7	4	3	5

6. Attempt any 2 from the following. 10

a) Define isomorphism. If G is a group under addition modulo 5, where G={0,1,2,3,4} and G' is a cyclic group of order 5, where G'={e,a,a^2,$a^3$$a^4$}, then show that the mapping f:G→G' where $f(x)=a^x$, $\forall x \in G$ is an isomorphism of G onto G'.

b) Determine whether the set G={(a,b): a,b $\in$ R, a ≠0} under the operation '*' defined as (a,b)*(c,d)=(ac, bc+d) for all (a,b),(c,d) $\in$ G is an abelian group..

c) Consider a (2,3) encoding function e:B^2 →B^3 defined by e(00)=100, e(01)=101, e(10)=110, e(11)=11. Find how many errors can the node detect and correct?

7. Attempt **any 2** from the following. 10

a) State and solve Fibonacci Sequence.

b) Explain the term generating function with examples.

c) Solve the recurrence relation.

$a_r-3a_{r-1}-4a_{r-1}=4r$

8. Attempt **any 2** from the following. 10

a) Determine whether the relation R is a partial order relation on the set of positive integers Z^+, where a Rb if a≥b. Draw the Hasse diagram.

b) Solve the recurrence relation:

$a_r + 6a_{r-1} + 12a_{r-2} + 8a_{r-3} = 0$ with $a_2 = 16$ and $a_3 = 80$

c) In the structure (R,*),'*' is defined as a*b=a. Check whether the operation * is associative and commutative.

Duration: 3 Hours Total Marks: 100

N. B. All Questions are compulsory, unless specified.

1. Attempt **any 2** from the following:- 10

a) Define onto and into functions. Let P be the propositional function defined by

$P(x,y) = (x \vee y) \wedge \sim x$. Evaluate a) P(T,T) b) P(T,F) c) P(F,F)

b) State the Prims Algorithm to find the minimal spanning tree.

c) In the structure (R,*), '* ' is defined as a*b = a+b+ab. Check whether the operation * is associative and commutative.

2. Attempt **any 3** from the following:- 15

a) Define "argument" in logic and explain the concept of valid argument. Check the validity of the following argument:

i) If a man is a bachelor, then he is unhappy.

ii) If a man is unhappy, then he is bachelor.

iii) Therefore bachelor's die young.

b) State and prove De-Morgan's law in logic.

c) In a pollution study of 1500 Indian rivers, the following data were reported: 520 were polluted by sulphur compounds, 335 were polluted by phosphates, 425 were polluted by crude oil, 100 were polluted by sulphur and phosphates, 150 polluted by both phosphates and crude oil and 28 were polluted by sulphur compounds, phosphates and crude oil. How many rivers were not polluted?
Also draw the Venn diagram.

d) By using the principle of mathematical induction show that:
$1+3+5+\ldots\ldots+(2n-1)=n^2$

3. Attempt **any 3** from the following:- 15

a) Determine whether the relation R is a partial order relation on the set of positive integers Z^+, where aRb if $a \geq b$. Draw the Hasse diagram.

b) Find the value of the following expressions:

a) -*2/283 b)+-*235↑238

c) Given A={1,2,3,4} and B={x,y,z}.

Let R be the relation from A to B defined as: R={(1,x),(2,z),(3,x),(3,y),(3,z)}.

Find: a) Matrix of the relation b) Find the inverse of the relation R c) The Digraph for R.

d) State the Huffman's Algorithm

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Suppose the seven data items A,B,C,D,E,F,G are assigned the following weights: (A,13),(B,2),(C,19),(D,23),(E,29),(F,29),(G,9)

Find the minimum weighted path length P using Huffman's Algorithm, where the data items are to be taken as external nodes.

4. Attempt **any 3** from the following:- 15

a) Show that there does not exist 7 lectures each of 30 minutes from 10 am to 1 pm.

b) If f(x) = 2x and g(x) = x/2, find f(g(0.5)), g(g(0.2)) and f(20 mod 3)εε

c) If the functions "f" and "g"given by f = {(1,2), (3,5), (4,1)} and g={(2,3), (5,1), (1,3)}, find fog and gof.

d) Show that in any set of 11 integers there are at least two integers whose difference is divisible by 10.

5. Attempt **any 3** from the following:- 15

a) Find the value of the following post-fix expressions: i) 123+- ii) 723x-↑93/+

b) State the Kruskal's Algorithm to find the minimal spanning tree.

c) State the Huffman's Algorithm and hence find the minimum weighted path length for the given information, where the data items are to be taken as external nodes.

Data item	A	B	C	D	E	F	G
Weight	5	3	3	7	4	3	5

d) Define i) tree ii) 2-tree iii) regular graph iv) connected graph v) complete graph

6. Attempt **any 3** from the following:- 15

a) Prove that the set of integers Z forms an abelian group with respect to operation * defined on it a s: a*b = a + b +1

b) Define isomorphism. Let G be a set of real numbers and 'G' be a set of positive real numbers. Let f:G->G'be a function, defined by f(a) = 5^a, for all a ε G. Show that f is an isomorphism from G onto G'.

c) Show that the set Q+ of positive rational numbers form an abelian group with respect to the operation * defined as a*b = ab/2

d) Define the following terms:
i) Groupoid ii) Ring iii) Integral Domain iv) Group v) Homomorphism

7. Attempt **any 3** from the following:- 15

a) Solve the recurrence relation:

$a_r - 8a_{r-1} + 16a_{r-2} = 0$ with $a_2 = 16$ and $a_3 = 80$

b) Explain the term generating function with examples.

c) Define sequence and series with examples.

d) Solve the recurrence relation:

$a_r - 7a_{r-1} + 10a_{r-2} = 0$, with $a_0 = 1$ and $a_1 = 2$

S.Y.B.Sc (I.T.) (Sem-III)

July 2018

Con. 308–18. Computer Graphics TE–6045

(3 Hours) [Total Marks : 80

N.B. : (1) **All** questions are **compulsory**.
(2) **Figures** to the **right** indicates **full** marks.

1. Answer the following Questions.(Solve Any **Two**)
   (a) What is CRT? Explain it with diagram. 5
   (b) Distinguish between Raster and Random Scan Display system. 5
   (c) Calculate the pixel positions along a straight line between A(10,12) And B (20,20) using DDA algorithm. 5

2. Answer the following Questions.(Solve Any **Two**)
   (a) What is transformation? Explain two dimensional transformations. 5
   (b) Rotate point A(2,4) in 2-Dimensional plane by an angle 90 degree in Anticlockwise direction. 5
   (c) Explain 2D transformation using Homogenous coordinator system. 5

3. Answer the following Questions.(Solve Any **Two**)
   (a) What is 3D transformation? Write about shear transformation. 5
   (b) Explain parallel projection & perspective projection. 5
   (c) Explain world coordinator & viewing coordinator. 5

4. Answer the following Questions.(Solve Any **Two**)
   (a) Write various applications of computer graphics. 5
   (b) What is reflection? Explain its. 5
   (c) Explain 3D rotation. 5

5. Answer the following Questions.(Solve Any **Two**)
   (a) Explain clipping & viewing transformation. 5
   (b) What is polygon clipping? Explain its. 5
   (c) Write seed fill algorithm. 5

6. Answer the following Questions.(Solve Any **Two**)
   (a) Explain Bezier curves & surface. 5
   (b) Write z-buffer algorithm. 5
   (c) What is fractals? Write its various application. 5

7. Answer the following Questions.(Solve Any **Two**)
   (a) What is shading? Explain anyone types of shading. 5
   (b) What is morphing? Explain. 5
   (c) Explain Key frame animation in detail. 5

8. Answer the following Questions.(Solve Any **Two**)
   (a) Explain Inside Outside test. 5
   (b) Explain B-spline curves. 5
   (c) Write short note on object rendering. 5

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(3 Hours) [Total Marks : 100

N.B. : (1) **All** questions are **compulsory**.
(2) **Figures** to the **right** indicate **full** marks.

1. Write various applications of computer graphics ? 10

2. Answer the following questions. (Solve any **three**)
   (a) Write and explain DDA algorithm. 5
   (b) Explain Raster and Random Scan Display system. 5
   (c) Explain Plasma Panel Display with its advantages and disadvantages. 5
   (d) Write Bresenham line drawing algorithm. 5

3. Answer the following questions. (Solve any **three**)
   (a) What is transformation? Explain rotation transformation. 5
   (b) Rotate point A(2,4) in 2- Dimension plane by an angle 90 degree in Anticlockwise direction. 5
   (c) Explain what is Homogenous coordinator system. 5
   (d) Explain shear transformation for 2 dimension. 5

4. Answer the following questions. (Solve any **three**)
   (a) Explain what is text clipping. 5
   (b) Explain 3 Dimension translation system. 5
   (c) What is projection? Explain perspective projection. 5
   (d) Explain viewing coordinator system. 5

5. Answer the following questions. (Solve any **three**)
   (a) What is clipping? Write two dimensional clipping. 5
   (b) Explain text clipping. 5
   (c) What is in-side-outside test ? 5
   (d) What is aliasing & ant aliasing ? 5

6. Answer the following questions. (Solve any **three**)
   (a) What is curve? Explain Curve Continuity & Conic Curves. 5
   (b) Explain sweep surface. 5
   (c) Explain what is visible & hidden surface. 5
   (d) Write z-buffer algorithm. 5

7. Answer the following questions. (Solve any **three**)
   (a) Write short note on object rendering. 5
   (b) What is shading & flat shading ? 5
   (c) What is fractals? Write its various applications. 5
   (d) What is animation? Write the procedural animation. 5

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Con. 309-18.

Advanced SQL

TE-6261

(3 Hours) [Total Marks : 80

General Instruction

1. There are 8 questions in this paper.
2. All Questions are Compulsory.
3. Each question carries 10 marks.
4. Internal choices are there in each question.
5. Figures to the right indicate Full Marks.

Q1. Attempt any two:-

a) Write a short note on DML. 5
b) Explain sequence with syntax and example. 5
c) What is cursor? Explain its types. 5

Q2. Attempt any two:-

a) What are Joins? Explain any one in detail. 5
b) Explain concept of synonyms with example 5
c) With examples explain any four Numeric and any four String functions 5

Q3. Attempt any two:-

a) Explain the purpose of GRANT and REVOKE statement 5
b) Explain cube and rollup with example 5
c) Explain the purpose of CONNECT BY and PRIOR statement 5

Q4. Attempt any two:-

a) Explain multiple column sub queries with example 5
b) Explain concept of Sub queries in From clause with example 5
c) Explain Scalar and correlated sub queries with example 5

Q5. Attempt any two:-

a) Explain the purpose of ROLLBACK and SAVEPOINT statement with example 5
b) State the guidelines for declaring and initializing PL/SQL variables 5
c) Explain Sequences in PL/SQL with example 5

Q6. Attempt any two:-

a) Explain Bind Variables with example 5
b) Explain various data type conversion functions with examples. 5
c) Write a PL/SQL block to accept the marks of 3 subjects and calculate the total and average marks 5

Q7. Attempt any two:-

a) State the use of select statement in PL/SQL? 5
b) Write a PL/SQL block to print the area and perimeter of a circle 5
c) Write a PL/SQL block to demonstrate cube of an input number 5

Q8. Attempt any two:-

a) Explain parts of Triggers with the help of example. 5
b) Explain the use of triggers 5
c) Give the syntax of BEFORE INSERT TRIGGER and explain with the help of example. 5

(3 Hours) [Total Marks : 100

N.B : 1) All Questions are Compulsory
2) Figures to the right indicate Full Marks.

1. Attempt the following:-

a) Explain any 5 aggregate Functions. 5
b) What is View? Explain different types of view with examples. 5

2. Attempt any 3 from the following:

a) What are different types of Joins? Explain any 1 in detail. 5
b) What is constraint? Explain Foreign Key constraint with example. 5
c) What is sequence? Explain syntax for creating a sequence. 5
d) Explain GROUP BY clause along with example. 5

3. Attempt any 3 from the following:

a) Using Date time functions, how do you calculate age from date of birth? 5
b) What is multiple column subqueries? Explain with suitable example. 5
c) Explain privilege with the help of Grant and Revoke commands example. 5
d) State the difference between correlated and non-correlated subquery. 5

4. Attempt any 3 from the following:

a) Write a PL/SQL block to display the addition of two numbers. 5
b) Write a short note on % type attribute. 5
c) What are set operators? List and explain any two set of operators with example. 5
d) What is scalar data type? Explain. 5

5. Attempt any 3 from the following:

a) Explain loop statement with example. 5
b) Explain exception handling in PL/SQL with an example. 5
c) Write a PL/SQL block of code for area of triangle two times with different values. Store the values in table. 5
d) Enlist and explain any 5 methods of Index by table. 5

6. Attempt any 3 from the following:

a) What is package? State and explain the components of package. 5
b) What is a stored procedure? Give syntax and explain its advantages. 5
c) Write a short note on Data Dictionary and PL/SQL Source code. 5
d) What is subprogram? Explain its creation and calling example. 5

7. Attempt any 3 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. 5
b) What are Dynamic queries? How to execute PL/SQL block dynamically. 5
c) Explain any 5 functions/procedures of DBMS_OUTPUT. 5
d) Explain INSTEAD OF trigger? Differentiate triggers and procedures. 5

S.Y.B.Sc (I.T.) (Sem-III)

July 2018

Con. 311-18. Object Oriented Programming with C++ TE-6582

(3 Hours) [Total Marks : 80

N.B. : (1) **All** questions are **compulsory**.
(2) **Figures** to the **right** indicate **full** marks.

1. Answer the following Questions.(Solve Any **Two**)
   (a) What is oop? Explain with its characteristics. 5
   (b) What is object and class? Explain with example. 5
   (c) Define the terms Data hiding and polymorphism. 5

2. Answer the following Questions.(Solve Any **Two**)
   (a) How the member function can define inside class and outside the class. 5
   (b) What are the different types of constructor? Explain any two. 5
   (c) Write a short note on destructor with example. 5

3. Answer the following Questions.(Solve Any **Two**)
   (a) Explain what is friend class & friend function. 5
   (b) What is conversion function? How it is created? 5
   (c) What is operator overloading? Write any 4 rules to overload operator. 5

4. Answer the following Questions.(Solve Any **Two**)
   (a) Differentiate between procedural & object oriented approach. 5
   (b) Explain what is a copy constructor with suitable program. 5
   (c) Write a program to overload the increment and decrement operator. 5

5. Answer the following Questions.(Solve Any **Two**)
   (a) Explain the term Virtual function and write the rules for it. 5
   (b) Explain the different forms of inheritance. 5
   (c) What is an abstract class? Explain. 5

6. Answer the following Questions.(Solve Any **Two**)
   (a) List the Assignment and Append operators of string. 5
   (b) Write a use of put( ) , write( ), getline( ) & read( ) function. 5
   (c) How are exceptions handled in classes? 5

7. Answer the following Questions.(Solve Any **Two**)
   (a) What is Class template? How it is define and call? 5
   (b) Write a difference between Function overloading & Function Template. 5
   (c) Write a short note on iterator classes. 5

8. Answer the following Questions.(Solve Any **Two**)
   (a) Explain the different types of File mode. 5
   (b) Define the terms:- Stream, Input stream & Output stream. 5
   (c) Explain the terms vector and stack. 5

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(3 Hours) [Total Marks : 100

N.B. : (1) Question No. 1 is **compulory**.
(2) Every question has an option.
(3) **All** questions carry **equal** marks.

1. (a) Write a C++ program with a class to check a number is even or odd. 5
(b) Explain Inheritance with example. 5

2. Write any **three** from the following.
(a) What is object and class? Explain with example. 5
(b) Differentiate between procedural & object oriented approach. 5
(c) Define the terms Data abstraction and Data encapsulation. 5
(d) Differentiate between Structure & Class. 5

3. Write any **three** from the following.
(a) Explain static data member and static member function. 5
(b) What is a Destructor? Explain with suitable program. 5
(c) Explain copy constructor with example. 5
(d) How the member function can define inside class and outside the class. 5

4. Write any **three** from the following.
(a) What is operator overloading? Write the rules to overload operator. 5
(b) Explain friend class with suitable example. 5
(c) Explain the concept of friend function with example. 5
(d) Write a C++ program for overloading the unary operator ++ 5

5. Write any **three** from the following.
(a) Explain the different types of File mode. 5
(b) What is virtual function? State the rules used for virtual function. 5
(c) Design a class for single level inheritance using public and private type derivation. 5
(d) What is an abstract class? Explain. 5

6. Write any **three** from the following.
(a) Write a C++ program to concatenate & compare two strings. 5
(b) How are exceptions handled in classes? 5
(c) Define the terms:-Input stream & Output stream. 5
(d) Write the use of following functions: 5
(i) get( ) (ii) put( ) (iii) read( ) (iv) write( )

7. Write any **three** from the following.
(a) Explain Function overloading with one example. 5
(b) Differentiate between Function Templates & Class Template 5
(c) Explain the terms vector and stack. 5
(d) Write a short note on container & its types. 5

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July 2018

Modern Operating system

Con. 310–18. **TE–6417**

(3 Hours) [Total Marks : 80

NOTE:

1. **Draw neat and labelled diagrams where necessary.**
2. **There are 8 compulsory questions in this paper (Q1, Q2, ..., Q8).**
3. **Each question carries 10 maximum marks.**
4. **Questions have internal choices.**
5. **Figures to the right indicates maximum marks.**

Q1. Answer **any 2** of the following **10m**

A. Write a note on Real-Time Systems.
B. How does a multi-processing system work?
C. Explain working of a compiler.

Q2. Answer **any 2** of the following **10m**

A. Write a note on OS Services.
B. What are the functions of an assembler?
C. Write a note on streams.

Q3. Answer **any 2** of the following **10m**

A. Write a note on microkernel approach.
B. State and explain different types of system calls with examples.
C. What are system programs? Explain any 5 of them.

Q4. Answer **any 2** of the following **10m**

A. Explain para-virtualization.
B. What is an intrusion detection system?
C. Explain with the help of a diagram solaris loadable modules.

Q5. Answer **any 2** of the following **10m**

A. How does a JAVA Virtual Machine work?
B. Write a note on Network File System.
C. Explain Optimal Algorithm.

Q6. Answer **any 2** of the following **10m**

A. State and explain different levels of RAID.
B. Write a note on Segmentation.
C. Explain Remote Procedure Call.

Q7. Answer **any 2** of the following **10m**

A. Explain different states of a process with the help of diagram.
B. Write a note on deadlock detection.
C. How does a multilevel queuing schedule work?

Q8. Answer **any 2** of the following **10m**

A. Explain different multi-threading models.
B. Write a note on Peterson's solution.
C. What are Semaphores?

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Con. 310-18. **TE–6417**

(3 Hours) [Total Marks : 100

NOTE:

1. **Draw neat and labelled diagrams where necessary.**
2. **There are 10 compulsory questions in this paper (Q1, Q2, ..., Q10).**
3. Each question carries 10 maximum marks.
4. Questions have internal choices.
5. Figures to the right indicates maximum marks.

Q1. Answer **any 2** of the following **10m**

A. Write a note on Clustered Systems.
B. How does a multi-programmed batch system work? Explain with the help of diagram.
C. Describe Schematic of a Computer.

Q2. Answer **any 2** of the following **10m**

A. Explain working of a compiler.
B. What are the functions of an assembler?
C. Write a note on streams.

Q3. Answer **any 2** of the following **10m**

A. Write a note on OS Services.
B. State and explain different types of system calls with examples.
C. What are system programs? Explain any 5 of them.

Q4. Answer **any 2** of the following **10m**

A. Write a note on layered approach.
B. What is an intrusion detection system?
C. Explain with the help of a diagram solaris loadable modules.

Q5. Answer **any 2** of the following **10m**

A. Explain the levels at which a system must be protected.
B. What is meant by system boot?
C. Discuss information that is needed to configure an OS module.

Q6. Answer **any 2** of the following **10m**

A. Explain para-virtualization.
B. How does a JAVA Virtual Machine work?
C. Explain some of the most common types of violations related to the security problem.

Q7. Answer **any 2** of the following **10m**

A. Explain different states of a process with the help of diagram.
B. Write a note on process termination.
C. How does a multilevel feedback queuing schedule work?

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Q8. Answer **any 2** of the following **10m**

A. Explain different multi-threading models.

B. Write a note on Peterson's solution.

C. What are Semaphores?

Q9. Answer **any 2** of the following **10m**

A. Explain swapping of two processes using a disk and a backing store.

B. Write a note on Segmentation.

C. Explain FIFO Algorithm.

Q10. Answer **any 2** of the following **10m**

A. What are the design issues for paging systems?

B. Explain Linked Allocation of disk space with the help of a diagram.

C. State and explain different levels of RAID.

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