S.Y.B.Sc. (IT) (SEM-III) February, 2019

Computer Graphics

P4–Exam.–2019-1–87

Con. 566–19. 2 **PV–6088**

(3 Hours) **[Total Marks : 80**

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

Q.1 Attempt any **two :** 5
(a) Explain the working method of Cathode Ray Tubes. 5
(b) List the differences between Raster-Scan Display and Random-Scan Display. 5
(c) Write a short note on Image Representation.

Q.2 Attempt any **two :** 5
(a) Explain the Bresenham's Line-Drawing Algorithm 5
(b) Write a short note on Ellipse drawing algorithm 5
(c) Describe the concept of two dimensional Scaling and Reflection

Q.3 Attempt any **two :** 5
(a) Explain the concept of Rotation about an Arbitrary Point. 5
(b) What are the advantages of homogeneous coordinate system? 5
(c) Write a short note on Identity Transformation.

Q.4 Attempt any **two :** 5
(a) Explain the concept of three-Dimensional Shear Transformation. 5
(b) Write a short note on World Coordinates and Viewing Coordinates. 5
(c) Describe the concept of Parallel Projection and Perspective Projection.

Q.5 Attempt any **two :** 5
(a) Write a short note on Line Clipping. 5
(b) Describe the concept of Text Clipping. 5
(c) Write a short note on Inside-Outside Test.

Q.6 Attempt any **two :** 5
(a) Write a short note on Scan-Line Algorithm. 5
(b) What is mean by Thresholding and Dithering? 5
(c) Describe the concept of Curve Continuity.

Q.7 Attempt any **two :** 5
(a) Write a short note on Bezier Curves. 5
(b) What is mean by Surface of Revolution ? 5
(c) Write a short note on Subdivision Surfaces

Q.8 Attempt any **two :** 5
(a) Write a short note on Flat and Polygon Mesh Shading. 5
(b) What is mean by Ray Tracing? 5
(c) List and explain various applications of Animation.

Con. 566–19. PV–6088

(3 Hours) [Total Marks : 100

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

Q.1 (a) List and explain various applications of Computer Graphics. 5
(b) Explain the concept of inside-Outside Test. 5

Q.2 Attempt any **three** :
(a) Write down the Algorithm for Digital Differential Analyzer line drawing algorithm. 5
(b) Explain Midpoint Circle drawing algorithm. 5
(c) Write a short note on Random-Scan Display. 5
(d) Describe the working method of Cathode Ray Tubes. 5

Q.3 Attempt any **three** :
(a) Write a short note on Identity Transformation. 5
(b) Describe the concept of Scaling and Reflection. 5
(c) What is Homogeneous Coordinates? What are the advantages of Homogeneous Coordinates system? 5
(d) Explain the transformation matrix of rotation about an arbitrary point. 5

Q.4 Attempt any **three** :
(a) Describe the concept of World Coordinates and Viewing Coordinates 5
(b) What is mean by Perspective Projection? 5
(c) Write a short note on Three-Dimensional Transformation: Scaling and Translation. 5
(d) Write a short note on Three-Dimensional Rotation. 5

Q.5 Attempt any **three** :
(a) Write a short note on Line Clipping 5
(b) Describe the concept of Text Clipping 5
(c) Explain the concept of Seed Fill Algorithm 5
(d) What is mean by Aliasing and Anti-Aliasing? 5

Q.6 Attempt any **three** :
(a) Write a short note on piecewise curve design. 5
(b) List down the various applications of Fractals. 5
(c) Write a short note on Bezier surfaces. 5
(d) Explain floating horizon algorithm. 5

Q.7 Attempt any **three** :
(a) Write a short note on Illumination model. 5
(b) Explain the concept of flat shading and polygon mesh shading. 5
(c) Write a short note on motion control methods. 5
(d) Explain the concept of Morphing. 5

[TURN OVER

S.Y.B.Sc. (IT) (SEM -III) February, 2019

Advanced SQL

P4--Exam.--2019-1--88

Con. 567–19.

PV–6110

(3 Hours)

[Total Marks : 80

N.B.: (1) There are **eight** questions in this paper.
(2) **All** questions are **compulsory**.
(3) Each question carries 10 marks.
(4) Internal choices are there in each question.
(3) **Figures** to the **right** indicate **full** marks.

Q1. Attempt any **two**:-
(a) What are joins? Explain the different types of joins. 5
(b) Explain sequence with syntax and example. 5
(c) Write in short about ASQL. 5

Q2. Attempt any **two**:-
(a) Explain the following functions- FLOOR,NVL,SUBSTR. 5
(b) Explain concept of synonyms with example. 5
(c) Explain the concept of access control in brief. 5

Q3. Attempt any **two**:-
(a) Explain the advantages of PL/SQL. 5
(b) Explain cube and rollup with example. 5
(c) What is subprogram ? Explain the advantages of subprogram. 5

Q4. Attempt any **two**:-
(a) List and explain the SET operators with example. 5
(b) Explain concept of Sub queries in From clause with example. 5
(c) List and explain The different types of constraints with example. 5

Q5. Attempt any **two**:-
(a) Explain the different explicit cursor attributes. 5
(b) State the guidelines for declaring and initializing PL/SQL variables. 5
(c) Explain the different types of exceptions in PL/SQL. 5

Q6. Attempt any **two**:-
(a) What is package ? what are its components? What are its advantages? 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) What are dynamic queries? How to execute PL/SQL block dynamically? 5
(c) Write a PL/SQL block to demonstrate cube of an input number 5

Q8. Attempt any **two**:-
(a) Write a PL/SQL function that returns the square of a number. 5
(b) Explain the use of triggers. 5
(c) Why are functions called 'Stored Functions' in Oracle? Explain its syntax and give an example. 5

[TURN OVER

(3 Hours) [Total Marks : 100

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

Q1. Attempt the following:-
(a) What are the advantages of PL/SQL. 5
(b) What is View? Explain different types of view with examples. 5

Q2. Attempt any **3** from the following:
(a) Explain indexes in brief. 5
(b) What is constraint? Explain Foreign Key constraint with example. 5
(c) What are scalar functions? Explain various scalar functions in detail. 5
(d) Explain GROUP BY clause along with example. 5

Q3. Attempt any **3** from the following:
(a) Explain the concept of access control in brief. 5
(b) What is multiple column subqueries? Explain with suitable example. 5
(c) Explain the Order By clause and its enhancements. 5
(d) State the difference between correlated and non-correlated subquery. 5

Q4. Attempt any **3** from the following:
(a) Explain identifiers. State and Explain the predefined data types in PL/SQL. 5
(b) Write a short note on% type attribute. 5
(c) Write a PL/SQL function that returns the square of a number 5
(d) What is scalar data type? Explain. 5

Q5. Attempt any **3** from the following:
(a) Write a short note on explicit cursors. 5
(b) How are exceptions handled in PL/SQL? 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

Q6. Attempt any **3** from the following:
(a) What is a package? What are its components? What are its advantages? 5
(b) What is a stored procedure? Give syntax and explain its advantages. 5
(c) Code a function named fn_check_account_id that accepts one parameter that tests the existence of an account number (account_id)in the table tbl_bank_account. This function should return a value of 1 if the account exists or zero if it doesn't. 5
(d) What is subprogram? Explain its creation and calling example. 5

Q7. Attempt any **3** from the following:
(a) What are Dynamic queries? How to execute PL/SQL block dynamically. 5
(b) Explain any 5 functions/procedures of DBMS_OUTPUT. 5
(c) Create a trigger named invoices_before_update_payment for the invoices table that raises an application error whenever payment total plus credit_ total becomes larger than invoice_total in a row. 5
(d) Explain INSTEAD of trigger? Differentiate between triggers & procedures? 5

S.Y.B.Sc.(IT)(SEM-III) February, 2019

Modern operating Systems

Con. 570–19. 2 PV–6106

(3 Hours) [Total Marks : 100

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

Q.1 Answer the following : **10**
(a) Explain tree structured directory.
(b) Write a note on clustered system.

Q.2 Attempt any **three** : **15**
(a) Explain NFS in detail.
(b) Explain real time operating system
(c) Define and explain Linkers and Compilers.
(d) Explain Distributed system in detail.

Q.3 Attempt any **three** : **15**
(a) Explain PCB and its components.
(b) Write a note on streams.
(c) Explain various operating system services.
(d) Write a note on layered structure.

Q.4 Attempt any **three** : **15**
(a) Define and explain process with different process states.
(b) Explain multithreading models.
(c) Explain critical section problem.
(d) Define and explain semaphores.

Q.5 Attempt any **three** : **15**
(a) Explain in detail different scheduling algorithms.
(b) Explain segmentation in detail.
(c) Explain in detail page replacement algorithm.
(d) Write a note on swapping.

Q.6 Attempt any **three** : **15**
(a) How does a multilevel queuing schedule work?
(b) Explain necessary conditions required for Deadlock.
(c) Explain resource allocation graph.
(d) Explain Thrashing in detail.

Q.7 Attempt any **three** : **15**
(a) Write a note on RAID.
(b) What are different types of security problems?
(c) Explain different File Access methods.
(d) Explain capability based system with example.

P4–Exam.–2019-1–90

Con. 570–19. **PV–6106**

(3 Hours) **[Total Marks : 80**

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

Q.1 Attempt any **two** : **10**
(a) Explain batch processing system and time sharing system.
(b) Explain clustered system in detail.
(c) Define and explain Linkers and Compilers.

Q.2 Attempt any **two** : **10**
(a) What are system programs? Explain any five of them.
(b) Write a note on layered architecture.
(c) Explain different types of system calls.

Q.3 Attempt any **two** : **10**
(a) Write different benefits of threads.
(b) What is critical section problem?
(c) Give 5 star model of a process.

Q.4 Attempt any **two** : **10**
(a) What is an Intrusion detection system?
(b) Explain System boot.
(c) Explain in detail multithreading model.

Q.5 Attempt any **two** : **10**
(a) Discuss in detail page replacement algorithm for external fragmentation.
(b) How does a Java Virtual Machine works?
(c) What is dynamic partitioning?

Q.6 Attempt any **two** : **10**
(a) Write a note on NFS.
(b) Write four conditions necessary for deadlock?
(c) Explain Disk structure and disk management in detail.

Q.7 Attempt any **two** : **10**
(a) Write a note on Peterson's solution.
(b) What are different types of security problems?
(c) Explain RAID.

Q.8 Attempt any **two** : **10**
(a) Explain Swapping using disk and backing store.
(b) Explain resource allocation graph?
(c) Explain application of I/O interface.

S.Y.B.Sc.(IT) (SEM-III) February, 2019

Logic, Discrete Mathematics

p3-D-upq-2019-IDOL 2019- 10

Con. 569–19. PV–6117

(3 Hours) [Total Marks : 80

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

1. (a) Determine whether each of the following is a tautology, a contradiction or neither. **5**

(i) $(p \vee q) \leftrightarrow (q \vee p)$

(ii) $[\, p \rightarrow (q \wedge r)\,] \leftrightarrow [\, (p \rightarrow q) \wedge (p \rightarrow r)\,]$

(b) What is Normal Form ? Construct the Well Formed formula (WFF) for the following statement using Normal Form : $(p \wedge \neg(q \wedge r) \vee (p \rightarrow q)$ **5**

OR

(b) Show that the sum of p (n) = $1+2+2^2+\ldots\ldots 2^n = 2^{n+1}-1$ using mathematical induction. **5**

2. (a) Explain Partial Order Set. Prove the following relation is a POSET : **4**

R1 = { (a, b)/ a, b ∈ z, a ≤ b} R2 = { (a, b / a, b ∈ p(x), a ⊆ b)}

(b) Find the Transitive closure of R, when A = { 1, 2, 3 } and R = { (1, 1) (1, 3) (2, 2) (3, 1) (3, 2) } Using Warshall's Algorithm. **6**

OR

(b) Construct the Hasse diagram of D_{36}, set of all the positive divisors of 36. Is D_{36}, a POSET and check D_{36} is a Lattice ? **6**

3. (a) State and prove Pigeon Hole Principle and Extended Pigeon Hole Principle give one example of each. **10**

OR

(b) Define with example injective, Surjective and Bijective function. Find the inverse function (f^1 (x)) of the $f(x)=\frac{3x+2}{4x-1}$ **10**

[TURN OVER

4. (a) Prove the following is an Equivalence Relation or not ? **6**

   1. R1 = {(a, b) / a - b is an integer }
   2. R2 = { (a, b) / a - b is divisible by 3 }
   3. R3 = { (a, b) / a - b is an odd number }

OR

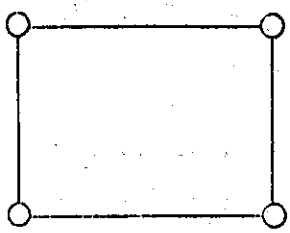
(a) Let f = (A = {6, 4, 8, 9 }) → (B = 5, 9, 6, 8), **6**
g = (B = {5, 9, 6, 8}) → (C = { 9, 10, 12 }) be a function f (6) = 5, f (4) = 9, f (8) = f (9) = 6 and g (5) = g (9) = 9 and g (6) = g (8) = 10. Find gof ?

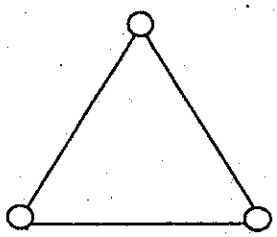
(b) Write a short note on Minimal Spanning Tree. **4**

5. (a) Write Krushkal Algorithm to find the Minimal Spanning Tree in graph. Demonstrate the Krushkal Algorithm using suitable example. **10**

OR

(b) Prove that a Complete Graph can be a Regular Graph ? Check whether the following K_4 and K_3 are regular as well as complete graph : **10**





6. (a) Prove that G = (1, 2, 3, 4, 5, 6) is an abelian group under operation (*7) i.e. (*→%7). **6**

(b) Explain isomorphism and Homomorphism with suitable example. **4**

7. (a) Show that if 7 colors are used to paint 50 bicycles then at least 8 bicycles must have same color. Clearly state the result or theorem used. **10**

OR

(b) Define with the suitable example of each. **10**

1. Hamiltonian Path and Circuit, 2. Euler Path and Circuit, 3. Bipartite Graph, 4. Normal Subgroup, 5. Complete Graph.

8. (a) Solve the recurrence relation $a_{n+2} = 4a_{n+1} - 4a_n$, where $n \geq 0$ and $a_0 = 1$, $a_1 = 3$. **10**

OR

(b) Determine the coefficient of x^6 of generating function $(1-5x)^8$. **10**

Con. 569–19. **PV–6117**

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

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

1. Attempt any **one** of the following.

(a) Let X = { 1, 2, 3, 9, 18, 27 } and the relation Ω be such that "x divides y". Show that Ω is a partial order relation. Draw the Hasse diagram of f (x, Ω). **10**

(b) Consider A = Set of all positive Integers and aRb iff $a^2 - b^2 = 4$. Determine whether the relation R on set A is reflexive, irreflexive, transitive, symmetric, asymmetric or antisymmetric. Provide relevant justification for your answer. **10**

2. (a) Consider the parity check matrix M given by $M = \begin{bmatrix} 1 & 1 & 0 \\ 0 & 1 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ **8**

Determine the group code $e_M = B^2 \rightarrow B^5$

Decode the following words relative to a maximum likelihood decoding function associated with e_M : 01110, 11101, 00001.

(b) Consider (3, 6) encoding function e as follows : **7**

e (000) = 000000 e(001) = 000110 e(010) = 010010 e(011) = 010100

e (100) = 100101 e(101) = 100011 e(110) = 110111 e(111) = 110001

Show that the encoding function e is a group code.

How many errors will e detect ?

OR

(c) Let G be a group. Show that the function f : G → G defined by $f(a) = a^{-1}$ is an isomorphism iff G is abelian. **7**

3. (a) Write a note on Rooted Trees with neat diagrams and relevant examples. 8

(b) Use mathematical induction to prove that $7^{n+2} + 8^{2n+1}$ is dividible by 57 for every nonnegative interger n. 7

OR

(c) Show that $\neg(p \vee (\neg p \wedge q))$ and $\neg p \wedge \neg q$ are logically equivalent by developing a series of logical equivalences. 7

4. (a) Describe the following graphs with neat diagrams and an example for each 8

i. Regular Graphs ii. Bipartite Graphs.

(b) Determine whether the given expression is a contradiction or tautology or neither. Give a justification for your answer. 7

$(Q \wedge P) \vee (Q \wedge \neg P)$

OR

(c) During a month with 30 days, a baseball team plays at least one game a day, but no more than 45 games. Show that there must be a period of some number of consecutive days during which the team must play exactly 14 games. 7

5. (a) Briefly explain Injective, Surjective, Bijective and Inverse functions with pertinent examples. 8

(b) Let {an} be a sequence that satisfies the recurrence relation $a_n = a_{n-1} + 3$ for $n = 1, 2, 3, \ldots\ldots$, and suppose that $a_0 = 2$. What are a_1, a_2 and a_3 ? Solve the recurrence relation and initial condition for the same. 7

OR

(c) Use generating function to determine the number of ways to insert tokens worth '1, '2, and '5 into a vending machine to pay for an item that costs r dollars in both the cases when the order in which the tokens are inserted does not matter and when the order does matter. (For example. there are two ways to pay for 7

an item that costs '3 when the order in which the tokens are inserted does not matter : inserting three '1 tokens or one '1 token and a '2 token. When the order matters, there are three ways : inseting three '1 tokens, inserting a '1 token and then a '2 token, or inserting a '2 token and then a '1 token.)

6. (a) Explain Prim's algorithm for finding the minimal spanning tree in a graph. **8**

(b) State the principle of Inclusion and Exclusion for 3 (three) sets. Therefore, find the number of integers between 1 and 500 that are divisible by the numbers 2, 3 and 5. **7**

OR

(c) Write a note on Tree Search techniques. **7**

7. (a) Using Warshall's Algorithm find the transitive closure matrix for relation R defined on set A = {1, 2, 3, 4} by the matrix $\begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 0 \end{bmatrix}$. **8**

(b) Consider the state transition table for a finite state machine : **7**

	0	1
S_0	S_0	S_1
S_1	S_1	S_2
S_2	S_2	S_3
S_3	S_3	S_0

List the values for the following transition function :

(i) w = 01001, (ii) w = 11100, (iii) w = 00111 and (iv) w = 10110.

Draw a digraph for the above state transition table.

OR

(c) Consider the conditional proposition $p \rightarrow q$. Find the converse, inverse, and contrapositive of the conditional $p \rightarrow q$. Which if any of these propositions are logically equivalent to $p \rightarrow q$? **7**

S.Y. B.Sc. (IT) (SEM -III) February, 2019

Object Oriented Programming with C++

p3-D-upq-2019-IDOL 2019-5

Con. 568–19.

PV–6090

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

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

1. Attempt any **two** of the following. **10**
   (a) Explain the following terms (i) Object (ii) Class.
   (b) What is Inheritance ? Explain any two types with diagram and examples.
   (c) State and explain the various application of Object Oriented programming.
   (d) Explain the difference in between class and structure with example.

2. Attempt any **three** of the following. **15**
   (a) What are the advantages of OOP ?
   (b) Differentiate between procedural and object oriented programming.
   (c) Describe the concept of Polymorphism with example.
   (d) Short note on reusability in C++.

3. Attempt any **three** of the following. **15**
   (a) Short note on Copy constructor.
   (b) How do we declare a member of a class Static ?
   (c) Describe the importance of destructor.
   (d) How member function can define inside class and outside class ?

4. Attempt any **three** of the following. **15**
   (a) Explain what is friend class and friend function.
   (b) Explain different types of conversions.
   (c) Define a class String. Use overload = = operator to compare two strings.
   (d) Short note on overloading and arithmetic assignment operator.

5. Attempt any **three** of the following. **15**
   (a) Explain the abstract class with the help of suitable example.
   (b) Explain the different types of File Mode.
   (c) Explain the different forms of Inheritance.
   (d) Explain the term Virtual function and write e rules for it.

6. Attempt any **three** of the following. **15**
   (a) List the Assignment and Append operator of String.
   (b) Write the use of put(), write(), getline(), & read() function.
   (c) Define the terms Input stream and Output stream.
   (d) Short note on C++ exception Handling.

7. Attempt any **three** of the following. **15**
   (a) Explain the terms Vector and stack.
   (b) Explain the concept of class example with any example.
   (c) What is container ? Explain its types.
   (d) What is class template ? Explain with examples.

PV. 6168

Time: 3 hours **Marks:80**

N.B. : N.B. : 1. All questions are compulsory (Q1-Q8)
2. Each question carries 10 marks.
3. Draw neat and labelled diagram wherever necessary.

Q1		**Attempt any two .**	
	a)	What is object oriented programming? Explain data hiding of object oriented programming with example.	5m
	b)	What is the need of object oriented programming? What are the applications of OOPs?	5m
	c)	What are the characteristics of Object Oriented Programming? Explain.	5m
Q2		**Attempt any two.**	
	a)	Compare object oriented programming with procedural programming approach.	5m
	b)	Write a C++ program with a class to find out the factorial of given number.	5m
	c)	What is constructor? Explain the different types of constructors in C++.	5m
Q3		**Attempt any two.**	
	a)	What is pointer? Explain it with example.	5m
	b)	Explain overloading the increment and decrement operators.	5m
	c)	Write short note on overloading the stream operators.	5m
Q4		**Attempt any two.**	
	a)	What is class and objects in OOP languages?	5m
	b)	Write a short note on static function members.	5m
	c)	Explain the Operator overloading concept.	5m
Q5		**Attempt any two.**	
	a)	What is inheritance? Explain any two types of inheritance.	5m
	b)	Explain the virtual function and polymorphism concept with an example.	5m
	c)	Write short note on i) method overriding ii) Classes for file stream operations.	5m
Q6		**Attempt any two.**	
	a)	Write a short note on i) stream classes, ii) the ios class, iii) ios format flags, iv) ios state	5m
	b)	Write a C++ program to count the number of occurrences of vowels in an input string.	5m
	c)	Write short note on the constructors and destructor.	5m
Q7		**Attempt the following.**	5m
	a)	Write a C++ program to create a function template for swap function.	5m
	b)	Explain the class templates with example.	5m
	c)	Write short note on iterator classes and the standard template library.	5m
Q8		**Attempt any two.**	
	a)	Write short note on i) stream ii) input stream iii) output stream	5m
	b)	Write a C++ program to store the details of sales object into a file. Read the following details from the file (Data Members: sales_id, Salesman_name, Salary).	5m
	c)	What is contents of the standard c headers? Explain string streams, file processing, the standard template library	5m

Feb - 2019

S.Y.B.Sc (I.T) (Sem ~~IV~~ III)