S.Y.B.Sc. (IT) (SEM-III) March 2018

VT-Exam. Paper (IDOL)-Feb.-18-11

Computer Graphics

Con. 562-18. **PN-5804**

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

N.B. : All questions are **compulsory.**

1. Attempt **any two** following question :
   (a) Differentiate between Raster Scan System and Random Scan System. **5**
   (b) What is interlacing ? Describe the working CRT with suitable diagram. **5**
   (c) Write all the steps of mid-point circle generating algorithm. **5**

2. Attempt **any two** following question :
   (a) Explain the composition transformation matrix for translation and Rotation. **5**
   (b) Write down the shear transformation matrix. **5**
   (c) Obtain a transformation matrix for rotating an object about a specified 2D pivot point. **5**

3. Attempt **any two** following question :
   (a) Explain homogenous transformation for 3D. **5**
   (b) Write about parallel projection in detail. **5**
   (c) Explain isometric projection. **5**

4. Attempt **any two** following question :
   (a) What is Computer Graphics ? Also explain types and applications of computer graphics ? **5**
   (b) Give matrix for scaling in 2D transformation and explain. **5**
   (c) Explain reflection in a three-dimensional project. **5**

5. Attempt **any two** following question :
   (a) List the different types of text clipping methods available. **5**
   (b) Explain the window to viewport coordinate transformation. **5**
   (c) Explain the various clipping operations. **5**

6. Attempt **any two** following question :
   (a) Explain the Z-Buffer algorithm. **5**
   (b) Explain in detail about B-Spline curves and surfaces. **5**
   (c) Explain in detail about Bezier curves and surfaces. **5**

7. Attempt **any two** following question :
   (a) Explain RGB color model in detail. **5**
   (b) Explain in detail the various Illuminations models. **5**
   (c) Explain briefly morphing. **5**

8. Attempt **any two** following question :
   (a) Explain in detail about halftone patterns and dithering techniques. **5**
   (b) Explain in detail about CMY color model. **5**
   (c) Explain Cohen-Sutherland Line clipping algorithm. **5**

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[TURN OVER

Con. 562-18. 2 **PN-5804**

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

N.B. : All questions are **compulsory.**

1. Attempt following question :
   (a) How an image is represented mathematically ? 5
   (b) Differentiate between world coordinates system and camera coordinate system. 5

2. Attempt **any three** following question :
   (a) Write a short note on Liquid Crysta1 Display (LCD). 5
   (b) Explain Digital Differential Analyzer (DDA) line Algorithm. 5
   (c) With the help of neat diagram, Explain the working of Cathode Ray Tube (CRT). 5
   (d) Explain the Application of Computer Graphics. 5

3. Attempt **any three** following question :
   (a) Describe in brief about the 2D transformations (i) Translations (ii) Rotations (iii) Scaling. 5
   (b) Write a short note on 2D shearing transformation. 5
   (c) Translate a polygon with the coordinates A(2,5),B(7,10) and C(10,2) by 3 units in x-direction and 4 units in y-direction. 5
   (d) Scale a polygon with the coordinates A(2,5),B(7,10) and C(10,2) by 2 units in x-direction and 2 units in y-direction. 5

4. Attempt **any three** following question :
   (a) Give the matrix representation for the following 3D transformation (i) Translation (ii) Rotation. 5
   (b) Explain the Concept world coordinates and Viewing coordinates. 5
   (c) Discuss about the perspective projection in detail 5
   (d) Write about parallel projection in detail. 5

5. Attempt **any three** following question :
   (a) Explain Clipping techniques. 5
   (b) Describe Cohen-Sutherland algorithm for clipping line under 2D co-ordinate system. 5
   (c) Explain Flood fill algorithm using 8 point connectivity. 5
   (d) Write a short note on Thresholding and Dithering. 5

6. Attempt **any three** following question :
   (a) Explain the Curve Continuity. 5
   (b) What is Bezier curve ? Explain the properties of Bezier curve. 5
   (c) Difference between Bezier Curve and B-Spline Curve. 5
   (d) What is Fractals? State the applications of Fractal. 5

7. Attempt **any three** following question :
   (a) Explain the Phong shading. 5
   (b) Give the procedure of ray tracing. 5
   (c) What is transparency effect ? 5
   (d) Explain the construction of an Animation sequence. 5

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S.Y.B.Sc. (IT) (Sem.-III) March 2018

Advanced SQL

Con. 563–18. PN–5579

(3 Hours) [Total Marks : 100

N.B. : (1) **All** questions are **compulsory.**
(2) Write answer to a **new** question on a fresh page.
(3) **Figures** to the **right** indicate **full** marks.

1. Attempt the following :— **10**
   (a) What is view ? State and explain the benefit of views.
   (b) Explain any five aggregate functions with examples.

2. Answer any **Three** from the following :— **15**
   (a) Explain indexes in brief.
   (b) Explain the concept of sequences and synonyms in brief.
   (c) What are scalar functions ? Explain various scalar functions in detail.
   (d) Create a table named EMPLOYEE with the following columns.

Column Name	Data Type	Size	Constraint
EMPLOYEE_NO	VARCHAR2	4	PRIMARY KEY
EMPLOYEE_NAME	VARCHAR2	10	NOT NULL
DATE_OF_JOINING	DATE		
DEPT_NO	NUMBER	2	FOREIGN KEY REFERRING TO DEPT_NO OF DEPARTMENT TABLE
GENDER	CHAR	1	'M' OR 'F' ONLY
SALARY	NUMBER	10,2	DEFAULT 0
COMMISSION	NUMBER	10,2	DEFAULT 0

3. Answer any **Three** from the following **15**
   (a) Explain correlated sub-queries & scalar queries.
   (b) Explain the concept of access control in brief.
   (c) Explain the Group By clause and its enhancements.
   (d) Replace the JOIN in the following SELECT statement using subquery in a WHERE clause that uses the IN keyword.

```
SELECT DISTINCT vendor_name
FROM vendors JOIN invoices
ON vendors.vendor_id = invoices.vendor_id
ORDER BY vendor_name
```

[TURN OVER

4. Answer any **Three** from the following :– **15**
   (a) Explain identifiers. State & Explain the predefined data types in PL/SQL.
   (b) Explain the advantages or benefits of PL/SQL.
   (c) What is PL/SQL ? Explain the types of PL/SQL blocks.
   (d) Write a PL/SQL function that returns the square of a number.

5. Answer any **Three** from the following **15**
   (a) Explain in brief the control structures in PL/SQL.
   (b) Write a short note on explicit cursors.
   (c) How are exceptions handled in PL/SQL ?
   (d) Explain the % ROWTYPE attribute with an example.

6. Answer any **Three** from the following **15**
   (a) Why are procedures called 'Stored Procedure' in Oracle ? Give syntax & explain the advantages of procedures.
   (b) Why are functions called 'Stored Functions' in Oracle ? Can a function return more than one value ? Can a function have multiple 'RETURN' statements ? Is it possible to use DDL statements within functions ?
   (c) What is a package ? What are its components ? What are its advantages ?
   (d) 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.

7. Answer any **Three** from the following **15**
   (a) Explain INSTEAD OF trigger ? Differentiate between triggers & procedures ?
   (b) Explain triggers. What are the components of triggers ?
   (c) What is Dynamic SQL ? Explain the execution flow of Dynamic SQL.
   (d) 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.

(3 Hours) [Total Marks : 80

N.B. :(1) **All** questions are **compulsory**.
(2) Write answer to a **new** question on a fresh page.
(3) **Figures** to the **right** indicate **maximum** marks.

1. Answer any **Two** from the following :— **10**
   (a) What are joins ? Explain the different types of joins.
   (b) Explain the concept of sequences and synonyms in brief.
   (c) Consider the employee database, where the primary keys are underlined. Give an expression in SQL for each of the following queries.

   Employee Database
   employee (employee-name, street, city)
   works (employee-name, company-name, salary)
   company (company-name, city)
   managers (employee-name, manager-name)

   i. Find the names of all employees who live in Pune.
   ii. Find all employees who do not work for HDFC Corporation.
   iii. Find all employees who earn more than the average salary of all employees.
   iv. Modify the database so that Prakash now lives in Bengaluru.
   v. Give all employees of ICICI a 20 percent raise.

2. Answer any **Two** from the following :— **10**
   (a) Explain the concept of access control in brief.
   (b) Explain the following functions - FLOOR, NVL, SUBSTR
   (c) Solve the following queries.
      i. Write an SQL statement granting the SELECT & INSERT permission on the STUDENT table to the user named 'POOJA' such that she can further grant these permissions to other database users.
      ii Revoke the SELECT permission on the STUDENT table from the user named 'SHWETA'.

3. Answer any **Two** from the following :— **10**
   (a) What is a subprogram ? Explain the advantages of subprograms.
   (b) Explain the advantages or benefits of PL/SQL.
   (c) Explain the functions - TO_CHAR (character) & TRUNC (for numeric & date values).

[TURN OVER

4. Answer any **Two** from the following :— **10**
   (a) List and explain the different types of constraints with example.
   (b) List and explain the SET operators with examples.
   (c) What is PL/SQL block ? Explain the various types of PL/SQL blocks.

5. Answer any **Two** from the following :— **10**
   (a) Explain the % ROWTYPE attribute with an example.
   (b) Explain the different explicit cursor attributes.
   (c) Explain the different types of exceptions in PL/SQL.

6. Answer any **Two** from the following :— **10**
   (a) What is a package ? What are its components ? What are its advantages ?
   (b) Why are procedures called 'Stored Procedures' in Oracle ? Explain difference between procedures & functions.
   (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.

7. Answer any **Two** from the following :— **10**
   (a) Define trigger ? Differentiate between trigger and procedure.
   (b) What are dynamic queries ? How to execute PL/SQL block dynamically ?
   (c) How can triggers be enables, disables and removed ?

8. Answer any **Two** from the following :— **10**
   (a) Write a PL/SQL function that returns the square of a number
   (b) Why are functions called 'Stored Functions' in Oracle ? Explain its syntax and give an example.
   (c) What are the components of a trigger ? Explain the different types of triggers.

S.Y.B.Sc. (IT) (SEM-III) March, 2018

Modern operating Systems

P4–Exam.–1st Half –2017–65

Con. 567–18. **PN–5234**

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

Q.1 Answer the following :– **10**

(a) Discuss NFS in detail.

(b) Write a note on clustered system.

Q.2 Attempt any **three** :– **15**

(a) Explain Multiprocessing system and write its advantages.

(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 in brief virtual machines.

(b) Define system programs and give its types.

(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) Give different benefits of threads.

(d) Define and explain semaphores.

Q.5 Attempt any **three** :– **15**

(a) Explain in detail dynamic partitioning.

(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) Explain swap-space management.

(b) Explain necessary conditions required for Deadlock.

(c) Explain resource allocation graph.

(d) Explain DISK structure in brief.

Q.7 Attempt any **three** :– **15**

(a) Write a note on Access matrix.

(b) What are different types of security problems?

(c) Explain STREAMS.

(d) Explain capability based system with example.

[TURN OVER

(3 Hours) [Total Marks : 80

Q.1 Attempt any **two** :– **10**

(a) Explain batch processing system and time sharing systems.
(b) Explain real time operating system.
(c) Define and explain Linkers and Compilers.

Q.2 Attempt any **two** :– **10**

(a) Define and explain virtual machines.
(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) Write a note on clustered 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) Write a note on segmentation.
(c) What is dynamic partitioning ? Explain in detail.

Q.6 Attempt any **two** :– **10**

(a) Write a note on file sharing and NFS.
(b) What are different conditions necessary for deadlock?
(c) Explain Disk structure and disk management in detail.

Q.7 Attempt any **two** :– **10**

(a) Write a note on Access matrix.
(b) What are different types of security problems?
(c) Explain RAID.

Q.8 Attempt any **two** :– **10**

(a) Write a short note on Swapping.
(b) Explain resource allocation graph.
(c) Explain application of I/0 interface.

B.Sc. (IT) (Sem.-III) March, 2018

Logic Discrete Mathematic

Con. 565–18. PN–5490

(3 Hours) [Total Marks : 80

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

1. Attempt any **two** :—
   (a) How many people you must have to guarantee that at least 9 of them will have birthday's in the same day of the week ? **5**
   (b) Check whether set of Natural numbers with the Operation $a*b=a^2 + b^2$ forms a Group or not. **5**
   (c) Manish has joined a company in 2000 with Annual income of Rs. 30000. Every year Manish received a rise of Rs. 4000 plus 10% of the average of the previous two years. Set up a recurrence relation for the salary of Manish after n years from 2000. **5**

2. (a) State and Prove Demorgan's law of Sets. **6**
   (b) In a class containing 32 students, there are 18 who speak English, 15 who speak Hindi and 22 people who speak Kannada, 9 speak both English & Hindi, 11 speak both Hindi & Kannada whearas 13 persons speak both Kannada & English. Find how many speak all three languages ? **4**

   OR

   (c) Check whether statement $(p \rightarrow q) \leftrightarrow (\sim p \vee q)$ is Tautology or not. **4**

3. (a) Prove that if R is any Equivalence relation on set S then R induces partition of S. **6**
   (b) Relation R on the set A = {1, 2, 3, 4} is defined by xRy iff x + y is Odd. Find domain & Range of R. **4**

   OR

   (c) Check whether Relation R on the set A = {1, 2, 3, 4} defined by xRy iff $x \sim y$ is divisible by 5 is equivalence or not. **4**

[TURN OVER

4. (a) Find the number of functions from n-set to m-set. 6

(b) Show that the mapping $f(x) = x + 3$ from Real numbers to itself is Bijective. 4

OR

(c) In how many ways can we distribute 7 mangoes and 6 bananas among 4 children so that each child receives at least one mango ? 4

5. (a) Define following with examples. 6

(i) complete graph (ii) Tree (iii) Regular graph

(b) Find all Possible Sub graphs of K_4. 4

OR

(c) If a graph has 3 vertices of degree 4 & x vertices of degree 3 & total number of edges 15 find x. 4

6. (a) Define following with examples. 6

(i) Abelian group (ii) Ring (iii) Field

(b) Prove that set of Gaussian Integers in an Integral Domain. 4

OR

(c) Prove that the set of integers with addition modulo 5 forms a group. 4

7. (a) Solve the following recurrence relation with the given initial conditions. 6

$an = 6a_{n-1} + \beta a_{n-2}$ for $n \geq 2$, $a_0 = 4$, $a_1 = 10$.

(b) Find the solution by using an iterative approach for $a_n = a_{n-1} + 2$, $a_0 = 3$ 4

OR

(c) State Tower of Hanoi Problem and derive recurrence relation for it. 4

8. (a) Determine the coefficient of x^6 in generating function $(1+3x)^{-7}$. 6

(b) Derive a formula for number of edges in a complete graph on n vertices. 4

OR

(c) Prove that inverse of an element is unique in a group. 4

10

Con. 565–18. PN–5490

(3 Hours) [Total Marks : 100

N.B. : (1) All questions are **compulsory**.
(2) **Figures** to the **right** indicate **full** marks to the subquestion.
(3) From Question 2 to 7, subquestion (a) is **compulsory** and attempt any **one** from **(b)** & **(c)**.

1. Attempt any one of the following :—
   (a) If the characteristic equation of a recurrence relation $a_n = r_2\, a_{n-1} + r_2\, a_{n-2}$ has two distinct roots s_1 and s_2. Then prove that $a_n = c_1\,(s_1)^n + c_2\,(s_2)^n$ for arbitrary constants c_3, c_2. 10
   (b) State and Prove Handshaking lemma for Graphs. 10

2. (a) Find the truth values of following. 8
   i) $(p \rightarrow q) \leftrightarrow (p \vee r)$ ii) $\sim p \rightarrow q$
   (b) Find the number of integers between 1 to 1000 that are not divisible by 4, 5 or 6. 7
   (c) Prove for any three sets P, Q & R, $P \Delta (Q \cap R) \equiv (P \Delta Q) \cap (P \Delta R)$. 7

3. (a) Define an Equivalence relation & prove that the Relation R on the set A = N defined by x R y iff x - y is even is an equivalence relation. 8
   (b) Relation R on the set A = {2, 3, 4, 5} is defined by xRy iff x + y is Odd. Find the Transitive closure of R. 7
   (c) if A = {x, y, z} and B = {p, q}. Find A x B, B x A and check whether A x B = B x A or not. 7

4. (a) Find the number of Subjective functions from a n-set to m-set. 8
   (b) How many automobile license plates can be made if each plate contains two different letters followed by 4 different digits. 7
   (c) Show that if any five numbers from 1 to 8 are chosen then two of them will add up to 9. 7

[TURN OVER

5. (a) Define subgraph & Draw all Possible Subgraphs of K_3. 8
   (b) Write a note on isomorphic graphs. 7
   (c) Define Planar graph & check whether the following graphs are Planar or Not. 7
   i. K_{23} ii K_4

6. (a) Prove that every finite integral Domain is a field. 8
   (b) Check whether set of Natural numbers with the Operation a*b=a+b-2 forms a Group or not. 7
   (c) What is the minimum number of students required in a class to be sure that at least six will receive the same grade if there are five possible grades ? 7

7. (a) State Tower of Hanoi Problem and derive recurrence relation for it and hence solve the recurrence relation. 8
   (b) Determine the coefficient of x^5 in generating function $(1 + 3x)^{-5}$ 7
   (c) Solve the following recurrence relation with the given initial conditions. 7
   $a_n = 7a_{n-1} + 10a_{n-2}$ for $n \geq 2$, $a_0 = 2$, $a_1 = 1$.

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(12)

S.Y.B.Sc. (IT) (Sem.-III) Nov. 2018

Object Oriented Programming with C++

Con. 564-18 PN-5063

Time: 3 hours Marks:80

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) Differentiate between procedural and object oriented programming approaches. 5m

b) Write short note on polymorphism. 5m

c) State any five features of Object Oriented Programming. 5m

Q2 **Attempt any two.**

a) Describe the different methods of defining member functions in C++. 5m

b) Define constructor. List and explain the different types of constructors used in C++. 5m

c) Write a C++ program with a class to check a number is even or odd. 5m

Q3 **Attempt any two.**

a) What is pointer? Explain the use of pointer with the help of suitable example. 5m

b) Write a short note on overloading the arithmetic assignment operator. 5m

c) Explain the concept of friend function with example. 5m

Q4 **Attempt any two.**

a) Describe the concept of classes and Objects in OOP languages. 5m

b) Write a short note on access functions. Explain the concepts with an example. 5m

c) Explain the Operator overloading concept. 5m

Q5 **Attempt any two.**

a) What is inheritance? Explain any two types of inheritance. 5m

b) Define abstract base. Explain the concept with an example . 5m

c) Define method overriding. Explain the concept with an example. 5m

Q6 **Attempt any two.**

a) Explain the following manipulators of ios showpos, noshowpos, uppercase,nouppercase. 5m

b) Write a C++ program to count the number of occurrences of vowels in an input string. 5m

c) Write short note on Assignment operator. 5m

Q7 **Attempt the following.**

a) Write a C++ program to create a function template for swap function. 5m

b) Write a program to demonstrate function template with multiple argument. 5m

c) Explain class template with example. 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 employee object into a file. Read the following details from the file (Data Members: Emp_id, name, Salary). 5m

c) What is container? Explain its types. 5m

[Turn Over

Time: 3 hours 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.

a) Define inheritance. Explain the different types of inheritance 5m
b) Explain the OOP concept – polymorphism. 5m
c) What are the various applications of Object Oriented programming. 5m
d) Explain the difference in between Class and Structure with example. 5m

Q2 Attempt any three.

a) Describe the concept of classes and Objects in OOP languages. 5m
b) Describe the concept of polymorphism with example. 5m
c) Distinguish between procedural and object oriented approach. 5m
d) Write a short note on OOP concepts reusability and data hiding 5m

Q3 Attempt any three.

a) Define constructor. List and explain the different types of constructors. 5m
b) Explain the concept of static data member of a class with example. 5m
c) Describe the concept of structure with an example program. 5m
d) Explain methods of defining member function member in C++. 5m

Q4 Attempt any three.

a) What is pointer? Explain the use of pointer with the help of suitable example. 5m
b) What is operator overloading? Write the rules for it. 5m
c) Write a short note on increment and decrement operator overloading. 5m
d) Explain the concept of assignment operator with example. 5m

Q5 Attempt any three.

a) Explain the concept of command line argument with an example. 5m
b) Define method overriding. Explain the concept with an example. 5m
c) Explain the abstract class with the help of suitable example. 5m
d) Write a C++ program to store the details of a machine object into a file. Read the details from the file (Data Members: machineid, name price). 5m

Q6 Attempt any three.

a) Write short note on i) input stream ii) output stream 5m
b) Write a C++ program to count the number of 'a' and 'o' in an input stream. 5m
c) Describe the method of using assignment operators with string class. 5m
d) Write a C++ program to find the number of occurrences of a string in an input string. 5m

Q7 Attempt any three.

a) Describe the concept of function template with multiple parameters. 5m
b) List and explain various iterator classes. 5m
c) What is container? Explain its types. 5m
d) Explain function template overloading. 5m

S.Y.B.Sc(I.T) (Sem-III) M9xch 18