

Con. 10 & (a)-15.

QS-1333

Duration : 3 hours

(Old Course)

Total Marks : 100

N.B: 1. Question no. 1 is compulsory.

2. Attempt any four questions from Q.2 to Q.6.

3. Figures to right indicate full marks.

Q.1. a. In how many ways five persons can be seated in a row for a photograph? Also find number of arrangements in which two persons refuse to sit together. (10)

b. Describe FSM which performs addition of binary number of same length. (10)

Q.2.a. Which structures are called mathematical structures?

Write a note on properties of mathematical structures. (10)

b. Construct truth table and show that the statements are logically equivalent.

$\sim(p \Leftrightarrow q) \equiv (p \wedge \sim q) \vee (\sim p \wedge q)$ (10)

Q.3.a. If $f, g, h : \mathbb{R} \rightarrow \mathbb{R}$ are defined as $f(x) = x^3 + 1$, $g(x) = 2x^2$ and $h(x) = x + 4$, then find (i) $((f \circ g) \circ h)$ (2) (ii) $(g \circ h)(3)$ (3) (iii) if $(f \circ g)^{-1} = g^{-1} \circ f^{-1}$. (10)

b. Using Warshall's algorithm find R^∞ if $A = \{1,2,3,4\}$, $R = \{(1,1), (1,2), (2,3), (3,4)\}$. (10)

Q.4.a. Let $A = \mathbb{N}$ and R be a relation on A such that xRy iff $x \leq y$. Show that R is partial order and (\mathbb{N}, \leq) is a poset. (10)

b. Give two Hamiltonian circuits in K_5 that have no edges in common. (10)

Q.5.a. Construct a tree using algebraic expression $((2 * x) + (3 - (4 * x))) + (x - (3 * 11))$. Also give arrays LEFT, DATA and RIGHT to describe the tree. (10)

b. Write truth table for the Boolean function $f : B_3 \rightarrow B$ determined by Boolean polynomial $P(x,y,z) = (x \wedge y) \vee (x \vee (y' \wedge z))$. (10)

Q.6.a. Construct grammer for the language

(i) $L = \{a^4, a^2b^2, b^2a^2, b^4\}$. (ii) $L = \{a^i b^{2i} : i \geq 1\}$. (10)

b. Show that an (2,5) encoding function $e : B^2 \rightarrow B^5$ defined as $e(00) = 00000$, $e(01) = 01110$, $e(10) = 10101$, $e(11) = 11011$ is a group code. Hence, find minimum distance and how many errors can e detect. (10)

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Con. 10 (a)-15.

QS-1333

Duration : 3 hours

(Revised Course)

Total Marks : 100

N.B: 1. All questions are compulsory.

2. Part a is compulsory and attempt any one sub question from part b and c from Q.2 to Q.7.

3. Figures to right indicate full marks.

Q.1. Solve any one of the following.

a. Using Venn diagram, show that

(i) $(A \cup B)' = A' \cap B'$ (ii) $(A \cap B)' = A' \cup B'$ (10)

b. Describe the graphs giving one example each.

(i) Regular graph (ii) Bipartite graph. (10)

Q.2.a. Show that $(p \Rightarrow q) \Leftrightarrow (\sim q \Rightarrow \sim p)$ using truth tables. (8)

b. Using first principle of finite induction prove that

$$1^2 + 2^2 + 3^2 + \dots + n^2 = \frac{n(n+1)(2n+1)}{6}$$
 (7)

c. State principle of inclusion and exclusion for three sets. Further, find number of integers between 1 to 400 that are not divisible by 2, 3 and 5. (7)

Q.3.a. Using Warshall's algorithm find the matrix of the transitive closure 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. Check whether the binary operation * is commutative and associative.

* is defined as $a * b = ab/2$ for $a, b \in Q$. (7)c. Show that R defined on $Z \times Z$ defined by $(x_1, x_2) R (y_1, y_2)$ iff $x_1 + y_2 = y_1 + x_2$ is an equivalence relation. (7)

Q.4.a. Explain the functions giving one example each.

(i) Invertible function. (ii) Bijective function. (8)

b. If $f, g : \mathbb{R} \rightarrow \mathbb{R}$ is defined as $f(x) = 2x^2 + 1$ and $g(x) = x + 2$, then find(i) $(f \circ g)(x)$ (ii) $(g \circ f)(x)$ (iii) if $(f \circ g)(x) = (g \circ f)(x)$. (7)

c. Show that if any five numbers from 1 to 8 are chosen then two of them will add up to 9. (7)

Q.5.a. Write a note on Prim's algorithm to find minimal spanning tree in a graph. (8)

b. Use seven vertices to draw a graph and its complement. (7)

c. Give example of Hamiltonian graph which is not Eulerian. (7)

Q.6.a. Show that $Z[i]$ is an integral domain but not a field. (8)b. Is $(Q, *)$ a monoid? Q is set of rational numbers and * is defined on Q as $a * b = a + b - ab$. (7)

c. Define a subgroup of a group. Is every subgroup of abelian group, a normal subgroup? Justify. (7)

Q.7.a. Solve the relation $a_n = a_{n-1} + a_{n-2}$; $n \geq 2$ with $a_1 = a_2 = 1$. (8)b. Determine the coefficient of x^6 in generating function $(1 + 2x)^7$. (7)c. Find generating function for $f_k = 5 + 2k$. (7)

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

April
2015

Con. 6 & (a)-15.

(OLD COURSE)
(3 Hours)

QS-1236
Total Marks : 100

- N.B.: (1) Question No. 1 is **Compulsory**.
(2) Attempt any four questions from the **remaining**.
(3) Draw neat **diagrams** wherever **required**.

1. (a) Describe TCP/IP Reference Model with a neat diagram. (10)
(b) What do you mean by Multiplexing? Explain its types. (10)

2. (a) Describe High Level Data Link Control and its operation. (10)
(b) What are the different types of network topologies? (10)
Discuss star and bus topologies with their advantages and disadvantages.

3. (a) Explain two types of Line Configurations? (10)
(b) Explain X.25 protocol in detail. (10)

4. (a) What is IP? Explain the IPv4 datagram Header format with diagram. (10)
(b) Explain Flow Control and Protocols (a) Stop -Wait (b) Sliding window. (10)

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5. (a) Explain DNS and resource encoding. Explain how DNS servers work? (10)
- (b) What is checksum? List the steps involved in creating a checksum. (10)
6. (a) Define Distributed System with its examples and goals. (10)
- (b) What is routing? Explain adaptive and alternate routing in detail. (10)
7. Write short notes on (20)
- (a) ATM
 - (b) Fiber Optic cable.
 - (c) Bridges and Routers.
 - (d) Cryptography.
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Con. 6 (a)-15.**(REVISED COURSE)****QS-1236**

MARKS: 100M

Time: 3Hrs.

Note:- Question No.1 is compulsory
All question carry equal marks

Q.1 Attempt following question.

1. Write various applications of computer graphics. 5M
2. Explain computer graphics input devices. 5M

Q.2 Attempt any three.

1. Explain the basic 3-D transformations. 5M
2. Explain: window to viewport transformation. 5M
3. Translate ΔABC ($A(3,1), B(5,1), C(4,5)$) with 1.5 units in x direction. 5M
4. Rotate ΔABC ($A(1,1), B(4,2), C(3,3)$) in ant clockwise direction where $\theta=90$ degree. 5M

Q.3 Attempt any three.

1. Explain line clipping and polygon clipping. 5M
2. Explain b-spline curve. 5M
3. What do you mean by parallel projection? 5M
4. Explain curve continuity. 5M

Q.4 Attempt any three.

1. Write down bresenham's line drawing algorithm.. 5M
2. Explain: cohen-sutherland line clipping algorithm.. 5M
3. Explain fractals and its applications. 5M
4. Explain the convex and concave polygon. 5M

Q.5 Attempt any three.

1. Define Bezier curve and state the property of it? 5M
2. Explain basic concept of painter algorithm? 5M
3. Write a short note on inside/outside test? 5M
4. Write down algorithm for midpoint circle? 5M

Q.6 Attempt any three.

1. What are namable and unnamable curve? 5M
2. Write the procedure for seed fill algorithm? 5M
3. What is windowing and clipping? 5M
4. What is mean by device co-ordinate? 5M

Q.7 Attempt any three.

1. Write a short note on polygon mesh shading? 5M
2. What is shading? Explain? 5M
3. Write a short note on ray casting? 5M
4. Write a short note on morphing & its advantages? 5M

Con. 7 & (a)-15.

(OLD COURSE)

QS-1302

Time : 3 hrs.

Marks : 100

N.B.: (1) Question No. 1 is compulsory.

(2) Attempt any four questions from Q. No. 2 to 6.

(3) All questions carry equal marks.

Q.1] a) Using Gauss Jordan method, Solve $x+2y+6z=22$, $3x+4y+z=26$, $6x-y-z=19$. [10]

b) Find $f(15)$ by Lagrange's interpolation formula also fit polynomial for the data:- [10]

X	10	20	14	16
F(x)	0.25	0.2	0.15	0.1

Q.2] a) Using Taylor's series method the solution of $\frac{dy}{dx} = 3x + y^2$ and $y=1$, when $x=0$.

Find the value of y for $x=0.1$ correct up to 4 decimal places. [10]

b) Find the root of the equation $f(x) = 3x - \cos x - 1 = 0$ by using Newton Raphson's

method with initial value $x_0 = 1$. [10]

Q.3] a) Calculate up to 5 decimal places $\int_4^{5.2} \log_e x dx$ by using Simpson's $\left(\frac{3}{8}\right)^{th}$ rule taking

6 sub interval. [10]

b) Apply Euler's modified method to solve $\frac{dy}{dx} = x + 3y$ subject to $y(0)=1$ and hence

find an approximate value of y when $x=1$ taking $h=0.2$. [10]

Q.4] a) Fit a straight line trend for the following data estimate the sales for the year 2007. [10]

Year	1998	1999	2000	2001	2002	2003	2004	2005
Sales in '000 Rs	120	124	126	130	128	132	138	137

P.T.O...

b) Solve graphically:

[10]

Minimize

$$z = 600x_1 + 400x_2$$

Subject to

$$10x_1 + x_2 \geq 16$$

$$x_1 + 3x_2 \geq 24$$

$$3x_1 + x_2 \geq 24$$

$$x_1 \geq 0, x_2 \geq 0$$

Q5]a) Construct a table of values of the function $f(x) = x^3$ for $x=0$ (2) 10. Use Newton's backward Interpolation formula find $(8.5)^3$.

[10]

b) Find a real root of the equation $x^3 - 2x - 5 = 0$ by method of false position correct to three decimal places.

[10]

Q.6]a) Using Trapezoidal rule. Estimate approximately the area of the cross section of a river 80 meters wide. The depth d (in meters) at a distance x from one bank is given by the following table:

[10]

x	0	10	20	30	40	50	60	70	80
d	0	4	7	9	12	15	14	8	3

b) Suppose that you have the task of measuring the lengths of a bridge and rivet and come up with 9999 and 9 cm respectively. If the true values are 10,000 and 10 cm respectively, compute:

(i) the error, and (ii) the percentage relative error in each case.

[10]

Con. 7 (a)-15.

(REVISED COURSE)

QS-1302

Duration: 3 hrs.

Advanced SQL

[Total Marks : 100

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

Q1.	Attempt the following: a) Explain the following operators : i) %TYPE ii) %ROWTYPE b) Explain any five Aggregate functions with example.	5marks 5marks
Q2.	Attempt any three from the following: a) Consider the following database Salesman(SID, Date_Sale, Sale, Target_Area, Branch_ID) Branch(Branch_ID, Bname, Loc) i) List all the salesman whose name's second character is 'a'. ii) List all the salesman whose sale is in between 10000 to 50000. iii) List all the branches names located in Delhi. iv) List the salesman whose salary is maximum in the month of April. v) List all the salesman of Delhi branch. b) What is Primary Key constraint? Explain with example. c) What is View? Give example for Creating, updating and deleting the view. d) What is a sequence? Explain the syntax for creating a sequence.	5marks 5marks 5marks 5marks
Q3.	Attempt any three from the following: a) Explain different types of set operators with example. b) What is a privilege? Explain Grant and Revoke commands with example. c) What is scalar subquery? Explain with suitable example. d) What is a hierarchical query? Explain with example.	5marks 5marks 5marks 5marks
Q4	Attempt any three from the following: a) What are the benefits of PL/SQL? Explain the PL/SQL block. b) Explain the purpose ROLLBACK AND SAVEPOINT with example. c) What is an identifier? What are the rules for naming them. d) Explain the different types of operators used in PL/SQL.	5marks 5marks 5marks 5marks
Q5	Attempt any three from the following: a) Explain IF-THEN-ELSE statement with example. b) Explain Index By Tables with help of example c) Write a PL/SQL block of code to print even number in between 1 to 100. d) What are the different types of Cursors? Explain with an example.	5marks 5marks 5marks 5marks
Q6.	Attempt any three from the following: a) What are a packages in PL/SQL? What are the advantages of packages? b) Write a PL/SQL block of code for a procedure which displays the information of a student table. c) What is Stored Procedure? Explain how to create stored procedure. d) What are stored functions? Explain its creation and calling example.	5marks 5marks 5marks 5marks
Q7.	Attempt any three from the following: a) Define Triggers. Explain the syntax of creating triggers in the PL/SQL. b) Explain BEFORE and AFTER trigger with example. c) Write a short note on Dynamic SQL. d) Create a trigger to change the commission amount to 2500. Every time the commission amount exceed 1500 an appropriate message is displayed.	5marks 5marks 5marks 5marks

April
2015

Con. 9 & (a)-15.

N.B All questions are compulsory.

Time(3 hours)

Total marks :100

Q.1 what is object oriented programming? Differentiate (10)
Between object oriented and procedural approach in oops.

Q.2

- a) What are objects and classes? Explain with examples. (7)
b) Explain the concept of data hiding and abstraction in oop's. (8)

Q.3

- a) What is constructor? Explain different types of constructor. (7)
B) Write a short note on 1) Destructor 2) Static data members (8)

Q.4

- a) What is operator overloading? Write a program in oops where the (7)
Client will be passing one number and system should display Fibonacci series.
b) Explain the overloading of 1) Relational operator 2) stream operator. (8)

Q.5

- a) What is file handling? Explain the concept of opening a file and closing a file. (7)
b) Explain the concept of private access and protected access in oops with suitable (8)
Example.

Q.6)

- a) What is copy Constructor? Explain the concept of addition operator. (7)
b) What are Stream Classes? Discuss istream and ostream classes with suitable example. (8)

Q.7

- a) Explain function template and class template with suitable example. (7)
b) Write a short note on 1) iterator classes 2) standard template library. (8)

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oop with + c++

2

Con. 9 (a)-15.

(REVISED COURSE)

QS-1418

Marks : 100

TIME : 3 hrs

- Note: - 1. Question No. 1 is compulsory.
2. Every question has an option.
3. All questions carry equal marks.

- Q.1. a) Write a C++ program to multiply two complex numbers using binary operator Overloading. (05)
b) Explain polymorphism with example. (05)
- Q.2. Write any 3 from the following. (05)
a) What is object and class? Explain with example. (05)
b) Differentiate between procedural & object oriented approach. (05)
c) Define the terms Data abstraction and Data encapsulation. (05)
d) Differentiate between Structure & Class. (05)
- Q.3. Write any 3 from the following. (05)
a) Explain static data member and static member function. (05)
b) Explain what is a Destructor with suitable program. (05)
c) Explain dynamic constructor with example. (05)
d) How the member function can define inside class and outside the class. (05)
- Q.4. Write any 3 from the following. (05)
a) What is operator overloading? Write the rules to overload operator. (05)
b) Explain friend class with suitable example. (05)
c) Explain the different types of type conversions. (05)
d) Write a C++ program for overloading the unary operator ++ (05)
- Q.5. Write any 3 from the following. (05)
a) Explain the different types of File mode. (05)
b) What is pure virtual member function? Explain. (05)
c) Design a class for single level inheritance using public and private type derivation. (05)
d) What is an abstract class? Explain. (05)
- Q.6. Write any 3 from the following. (05)
a) Write a C++ program to concatenate & compare two strings. (05)
b) How are exceptions handled in classes? (05)
c) Define the terms:-Input stream & Output stream. (05)
d) Write the use of following functions: (05)
(i) get() (ii) put() (iii) read() (iv) write() (v) getline()
- Q.7. Write any 3 from the following. (05)
a) Explain Function overloading with one example. (05)
b) Differentiate between Function Templates & Class Template (05)
c) Explain the terms vector and stack. (05)
d) Write a short note on container & its types. (05)

April-15

Modern Operating systems
SJS. Proj.

APRIL
2015

Con. 8 & (a)-15.

(OLD COURSE)

QS-1385

(3Hours)

100Marks

N.B (1) Question no.1 is compulsory.

(2) Attempt any 4 from Q.2 to Q.7.

Q.1

- (a) Explain UNIX Operating system architecture. 8
- (b) What is environment variable? Explain with examples. 7
- (c) Explain inode in detail. 5

Q.2

- (a) Explain the following commands with syntax and example: 20
1. mkdir 2. who 3. grep 4. ls 5. man 6. cp 7. wc 8. cmp 9. sort 10. cat

Q.3

- (a) What is shell? Explain various types of Shell. 8
- (b) Write a shell script to display the entered number is even or odd. 7
- (c) Explain chmod command. 5

Q.4

- (a) What is process? Explain different states of process. 8
- (b) Explain semaphores. 7
- (c) Explain system call. 5

- Q.5 (a) What are the file permissions available in UNIX? Give example. 8
- (b) Explain characteristics of good password. 7
- (c) What are the contents of password file. 5

Q.6 Explain with syntax:- 20

- (a) How do you create a file?
- (b) How do you delete a file?

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2002

Linux Operating System

Con. 8-QS-1385-15. 2

(c) Which command is used to see your username?

(d) How do you copy a file?

Q.7

(a) Write a note on grep command. 8

(b) Explain the syntax of awk command. 7

(c) Explain the following commands :- 5

1. calender 2.date 3.echo 4.password 5.banner

April-15

Modern op. sjs.

3

Con. 8 (a)-15.

(REVISED COURSE)

QS-1385

N.B :

- 1) All questions are compulsory.
- 2) Question 1-solve any two questions.
- 3) Draw diagrams wherever necessary.
- 4) Marks are mentioned to the right of each question.

Q1) Answer any two from the following: 10

- a) Explain in brief NFS
- b) Write a short note on PCB.
- c) Explain Tree structured directory.
- d) Write in brief about swapping

Q2) Answer any three from the following : 15

- a) Explain handheld system.
- b) Write the difference between Single batch system and multiprogrammed batch system.
- c) Write short note on : 1) Assembler 2) Compiler
- d) Explain Real time system.

Q3) Answer any three from the following : 15

- a) Give different types of services provided by OS.
- b) Explain System boot.
- c) Define and explain Virtual Machines.
- d) Give different types of system calls.

Q4) Answer any three from the following 15

- a) Explain about Multithreading Models.
- b) How is the communication done between Client and Server.
- c) What is Critical Section Problem
- d) Define and explain semaphores.

Q5) Answer any three from the following 15

- a) Explain Paging.
- b) Write about dynamic partitioning
- c) Explain Optimal Algorithm with example.
- d) Write a short note on Segmentation.

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Q6) Answer any three from the following

15

- a) Explain Acyclic Graph Directory.
- b) Write in brief about RAID.
- c) What is swap-space management.
- d) Give the four conditions required for Deadlock.

Q7) Answer any three from the following

15

- a) Explain STREAMS.
- b) Give different types of security and Network threats.
- c) Explain Access Matrix
- d) What are different principles of protection.