S.E.(Comp) IV Rev 30/11/13
DBMS

01-11-2013-DTP-P-7-MU-17

Con. 6275-13. **LJ - 10494**

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

N. B. : (1) Question No. **1** is **compulsory**.
(2) Out of the remaining **six** solve any **four** questions.
(3) **Assume** suitable data if **required**.

1. (a) Galleries keep information about artists, their names (which are unique birthplace, age, and style of art. For each piece of artwork the artist. The year it was made its unique title, its type of art (e.g. painting, sclpture), and its price must be stored. **10**
   (i) Pieces of artwork are also classified into groups of various kinds e.g. potraits, still life works by Picasso or works by 19th century a given piece may belong to more than one group.
   (ii) Each group is identified by a name (like those given) that describes the group.
   (iii) Galleries keep information about customers like persons (unique name, address, total amt spent, artist and the group of art that the customer tends to like).
   (iii) Draw ER diagram for the database and convert it into equivalent schema.

   (b) Explain the following terms with example (2 marks each) **10**
   (i) Weak entity set
   (ii) Project operator in relational algebra
   (iii) Foreign key
   (iv) Join
   (v) Data manipulation language.

2. (a) Explain first, second and third normal forms with example. **10**
   (b) Explain two phase locking protocol. **10**

3. (a) Person (driver-id, name, address) **10**
   car (license, model, year)
   accident (report-number, date location)
   owns (driver-id, license)
   participated (driver-id, car, report-number, damage, amount)
   (i) Create relations persons owns in sqL
   (ii) Add a new accident to the database, assume any values for required attribute.
   (iii) Delete the SKODA belonging to 'Sachin Parker'.
   (iv) Find the total number of people who owned cars that were involved in accident in 1999.
   (v) Find the person whose names starts with 'S' and arrange in decreasing order of driver-id.

(b) Explain any five relational algebra operators. **10**

4. (a) What is a transaction discuss ACID properties of transaction. **10**
   (b) Explain data dictionary storage. **5**
   (c) Explain data independence. **5**

5. (a) Explain UNDO and REDO operations for log based recovery. How are they used during recovery. **8**
   (b) Describe methods for deadlock recovery. **6**
   (c) Give one protocol that prevents deadlock. **6**

6. (a) Explain differed modification technique for log based recovery. **10**
   (b) Explain conflict serializability. **10**

7. Write short notes on (any **four**):– **20**
   (i) Mapping Cardinality
   (ii) Aggregate functions in SQL
   (iii) Shadow paging
   (iv) Checkpoints
   (v) Views in SQL

S.E Comp. sem IV Nov - 13

Syb. - Am IV

26/11/13

shilpa-2nd half-(c)13-19

Con. 6301–13. **LJ–10460**

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

N. B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from the remaining **six** questions.
(3) **Figures** to the **right** indicate **full** marks.

1. (a) Find the characteristic equation of the maric A given below and hence; find the matrix represented by $A^8 - 5A^7 + 7A^6 - 3A^5 + A^4 - 5A^3 + 8A^2 - 2A + I$. **5**

Where $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$.

(b) Find the orthogonal trajectory of the family of curves $x^3y - xy^3 = c$. **5**

(c) Evaluate $\int_c \frac{\sin^6 z}{\left(z - \pi/6\right)^3} dz$ where c is $|z| = 1$. **5**

(d) Use the dual simplex method to solve the following L.P.P. **5**

Minimise $Z = x_1 + x_2$
Subject to $2x_1 + x_2 \geq 2$
$-x_1 - x_2 \geq 1$
$x_1, x_2 \geq 0$.

2. (a) Find the eigen values and eigen vectors of the matrix. $\begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$ **6**

(b) Find the imaginary part of the analytic function whose real part is $e^{2x}(x \cos 2y - \sin 2y)$. Also verify that v is harmonic. **6**

(c) Use Penalty method to solve the following L.P.P. **8**

Minimise $Z = 2x_1 + 3x_2$
Subject to $x_1 + x_2 \geq 5$
$x_1 + 2x_2 \geq 6$
$x_1, x_2 \geq 0$.

3. (a) Using the method of Lagrange's multipliers, solve the follwoing N.L.P.P. **8**

Optimise $Z = 2x_1^2 + x_2^2 + 3x_3^2 + 10x_1 + 8x_2 + 6x_3 - 100$
Subject to $x_1 + x_2 + x_3 = 20$ and
$x_1, x_2, x_3 \geq 0$.

[TURN OVER

(b) Evaluate $\int_c \frac{z^2}{(z-1)^2(z-2)}\,dz$ where c is the circle $|z| = 2 \cdot 5$. **6**

(c) Show that $A = \begin{bmatrix} 7 & 4 & -1 \\ 4 & 7 & -1 \\ -4 & -4 & 4 \end{bmatrix}$ is derogatory. **6**

4. (a) Show that the matrix $- A = \begin{bmatrix} 8 & -8 & -2 \\ 4 & -3 & -2 \\ 3 & -4 & 1 \end{bmatrix}$ is diagonisable. Find the transforming **6**

matrix and the diagonal matrix.

(b) Show that $f(z) = \sqrt{|xy|}$ is not analytic at the origin although Cauchy - Riemann **6**

equations are satisfied at that point.

(c) Using Duality solve the following L.P.P **8**

Minimize $Z = 430\ x_1 + 460\ x_2 + 420\ x_3$

Subject to $x_1 + 3x_2 + 4x_3 \geq 3$

$2x_1 + 4x_3 \geq 2$

$x_1 + 2x_2 \geq 5$ and

$x_1, x_2, x_3 \geq 0.$

5. (a) Consider the following problem – **6**

Maximize $Z = x_1 + 3x_2 + 3x_3$

Subject to $x_1 + 2x_2 + 3x_3 = 4$

$2x_1 + 3x_2 + 5x_3 = 7$

Determine :–

(i) all basic solutions,

(ii) all feasible basic solutions,

(iii) optimal feasible basic solution.

(b) Obtain Taylor's and Laurent's expansions of $f(z) = \frac{z-1}{z^2 - 2z - 3}$ indicating **6**

regions of convergences.

(c) Verify Cayley - Hamilton theorem for the matrix A and hance, find A^{-1} and A^4 **8**

where – $A = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$

6. (a) If $u = -r^3 \sin 3\theta$, find the analytic function f (z) whose real part is u. **6**

(b) If $A = \begin{bmatrix} -1 & 4 \\ 2 & 1 \end{bmatrix}$ then prove that 3 tan A = A tan 3. **6**

(c) Solve the following L.P.P. by simplex method. **8**

Maximize $Z = 3x_1 + 5x_2 + 4x_3$

Subject to $2x_1 + 3x_2 \leq 8$

$2x_2 + 5x_3 \leq 10$

$3x_1 + 2x_2 + 4x_3 \leq 15$

$x_1, x_2, x_3 \geq 0.$

. (a) Find the bilinear transformation which maps the points $z = \infty$, i, o on to the points o, i, ∞. **6**

(b) Find Laurent's series which represents the function $f(z) = \dfrac{2}{(z-1)(z-2)}$ **6**

when (i) $|z| <$ |

(ii) $1 < |z| < 2$,

(iii) $|z| > 2$.

(c) Use the Kuhn - Tucker conditions to solve the following N.L.P.P. **8**

Minimise $Z = 2x_1 + 3x_2 - x_1^2 - 2x_2^2$

Subject to $x_1 + 3x_2 \leq 6$

$5x_1 + 2x_2 \leq 10$

$x_1, x_2 \geq 0.$

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S.E (Sem IV) NCN - Dec 2013 Comp 21.12.13
Operating system

V-A4-II-Ex-13-E-42

Con. 6478-13. **LJ-10642**

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

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of **remaining**.
(3) Assume **suitable** data if **necessary.**

1. (a) Explain the functions of Operating system. **10**
(b) Explain the system calls. What are the five major categories of system calls ? **10**

2. (a) Consider the following set of processes, with length of CPU bursts given in milliseconds as follows :— **10**

Process	Burst time	Arrival Time	Priority
P_1	8	0	3
P_2	1	1	1
P_3	3	2	2
P_4	2	3	3
P_5	6	4	4

(1) Draw Gantt Charts for FCFS, SJF, preemptive priority and RR(Quantum = 2)
(2) What is turnaround time of each process for above algorithms ?
(3) What is the waiting time of each process for each of the above algorithms ?
(4) Which algorithm results in minimum average waiting time ?

(b) Explain various page replacement policies with example. **10**

3. (a) Explain Multi-level paging. **10**
(b) Explain the solution to dining philosopher problem using semaphores. **10**

4. (a) Explain RAID with different levels. **10**
(b) Explain the different file organization techniques. **10**

5. (a) Explain how logical address is converted into physical address in Paging. **10**
A 16-bit computer is implementing the paging scheme. The page size is of 4096 bytes. The page table for process A is as follows :—

Page No.	Frame No.
0	7
1	2
2	5
3	1
4	12
5	6
6	0

Convert the following logical addresses into corresponding physical addresses :
(i) 22340 (ii) 3720

(b) Explain process management in Linux. **10**

6. (a) Explain the necessary and sufficient conditions for deadlock to occur. Explain the different techniques for deadlock prevention. **10**
(b) What is mutual exclusion ? What are the different ways to enforce mutual exclusion ? **10**

7. Write short notes on (any **four**) :— **20**
(a) SCAN and SEEK disk scheduling algorithms.
(b) Distributed OS.
(c) Architecture of windows OS.
(d) Inodes.
(e) Monolithic Vs. Mikrokernel.

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S.E. (Comp.) (Sem-IV) (Rev.) NOV/DEC 20:

1-11-13-DTP28-NK-10

5/12/13 CGJ

Con. 6454-13. **LJ-10531**

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

N.B. : (1) Question no. **1** is **compulsory**.
(2) Attempt any **four** questions out of the remaining **six** questions.
(3) Assume suitable **data** if **necessary**.
(4) **Figures** to the **right** indicate **full** marks.

1. (a) Explain character generation methods. **5**
(b) Explain inside outside test used in filling algorithm. **5**
(c) What is antialiasing, how can it be reduced. **5**
(d) Explain z-buffer algorithm for removing hidden surfaces. **5**

2. (a) Explain flood fill algorithm using 8-connected approach. Give its advantages and disadvantages. **10**
(b) Derive Bresenham's line drawing algorithm. Plot a line by using Bresenham's line generation algorithm from (1,1) to (5,3). **10**

3. (a) Translate the square ABCD whose co-ordinates are A(0,0), B(3,0), C(3,3) and D(0,3) by 2 units in both directions and then scale it by 1.5 units in x-direction and 0.5 units in y-direction. **10**
(b) List and explain operations on segments. **10**

4. (a) Find the clipping co-ordinates to clip the line segment AB against the window using cohen-sutherland line clipping algorithm. **10**
Line - A (120, 60), B (160, 92)
Xwmin = 100 Ywmin = 80
Xwmax = 150 Ywmax = 100
(b) Explain Warnock's algorithm. **10**

5. (a) State important properties of Bezier curve. Compare Bezier curves and B-spline curve. **10**
(b) Explain parallel and perspective projection? Derive the matrix for perspective projection. **10**

6. (a) Explain 3D object representation methods. **10**
(b) Define the window, view port and derive window to viewport transformation. **10**

7. Write short note on :- (any **four**) **20**
(a) Colour models
(b) Raster techniques
(c) Display file interpreter
(d) Fractals
(e) 3D clipping.

S. E. Comp Sem IV 11/12/15

Analog and Digital Communication

Con. 5755-13. **LJ-10568**

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

N.B. : (1) Question number **1** is **compulsory**.
(2) Solve any **four** questions out of remaining **six** questions.
(3) **Figures** to the **right** indicate **Full** marks.
(4) Make suitable assumptions where necessary.

1. Attempt any **four** of the following :– **20**
   (a) Explain block diagram of basic communication system.
   (b) Explain time division multiplexing.
   (c) Explain the terms noise figure, noise factor and noes temperature.
   (d) List advantages and disadvantages of digital transmission.
   (e) Explain the terms code word, code rate, code efficiency and hamming distance.

2. a) The output of an Am transmitter is given by $500\ (1+0{\cdot}4 \sin 3140\ t) \sin 6{\cdot}28 \times 10^6$. **10**
   This voltage is fed to a load of 600 Ω resistance. Then calculate.
   (i) Carrier frequency and modulating frequency.
   (ii) Carrier power and total power.
   (iii) Power carried by each side band.
   (iv) Frequency spectrum.
   (v) Amplitude modulated waveform.
   b) Explain in detail super heterodyne AM Receiver with waveforms at each block. **10**

3. a) Compare between **10**
   (i) Narrow band FM and Wide band FM.
   (ii) AM and FM.
   b) Explain delta modulator with block diagram and waveforms. Also differentiate between delta modulator and adaptive delta modulator. **10**

4. a) Explain the following terms. **10**
   (i) Information.
   (ii) Information Rate.
   (iii) Entropy.
   (iv) Shannon theorem for channel capacity.
   (v) Shannon Hartley theorem for channel capacity.
   One of the five possible messages Q_1 to Q_5 having possibilities
   $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \frac{1}{16}$ respectively transmitted. Calculate the average information.

   b) Explain Intersymbol interference. **10**

TURN OVER

5. a) Explain M-ary PSK with transmitter and receiver block diagram. **10**
   b) Explain QAM with transmitter and receiver block diagram. **10**

6. a) Give the statement for sampling theorem. Explain PAM, PWM, PPM with proper waveforms. **10**
   b) Explain Armstrong method for FM generation. **10**

7. Write short notes on any **four**. **20**
   a) Pre-emphasis and de-emphasis.
   b) Image frequency and its rejection.
   c) Shot noise and thermal noise.
   d) Frequency division multiplexing.
   e) Companding.

SE | comp. | IV (Rev)

17/12/13

AA&D

28-10-2013-DTP-P-8-KG-12

Con. 5779 -13. **LJ-10604**

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

N.B. : (1) Question No. **1** is **compulsory.**
(2) Attempt any **four** out of remaining **six** questions.
(3) Assume **suitable** data wherever **required.**

1. (a) Explain divide and conquer strategy. Write control abstraction (General Method) for it. List any four problems that can be solved using divide and conquer. **10**
   (b) Explain asymptotic notations. Explain time complexity and space complexity in detail. **10**

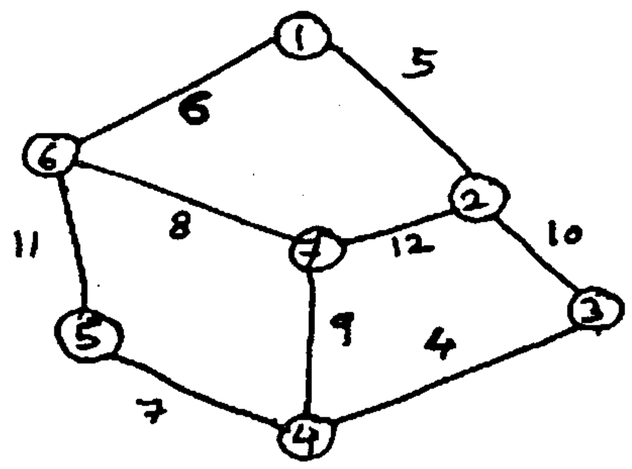
2. (a) Construct the optimal Binary search tree for identifier set **10**
$(a_1, a_2, a_3, a_4,) =$ (cout, float, if, while)

with $p(1:4) = \left(\frac{1}{20}, \frac{1}{5}, \frac{1}{10}, \frac{1}{20}\right)$

and $q(0:4) = \left(\frac{1}{5}, \frac{1}{10}, \frac{1}{5}, \frac{1}{20}, \frac{1}{20}\right)$

   (b) Explain 0/1 knapsack problem using Branch and Bound method. **10**

3. (a) Explain flow shop scheduling with the help of example. **10**
   (b) Solve following problem using kruskal's algorithm which is used to find minimum spanning tree. **10**

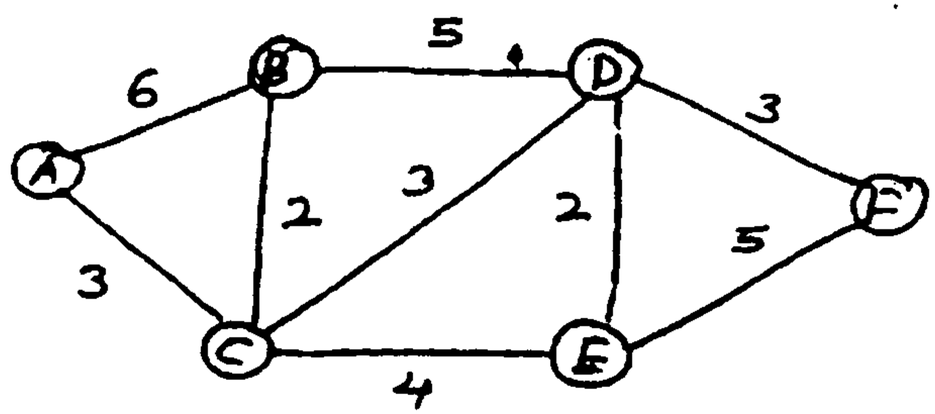


4. (a) State Graph coloring algorithm. Explain strategy used for solving it along with example. **10**

   (b) Consider following set of frequencies. **10**
A = 2 B = 5 C = 7 D = 8 E = 7 F = 22 G = 4 H = 17
Find Huffman code for same.

TURN OVER

5. (a) Explain Binary search. Derive its best case and worst case complexity. **10**
   (b) Find shortest path using Djkstra's algorithm for the following graph assume source node is A. **10**



6. (a) Explain 8 Queen problem and strategy used to solve it. **10**
   (b) Explain job sequencing with dead lines along with example. **10**

7. (a) Write short notes on the following :- **20**
   (i) Radix sort
   (ii) Tries
   (iii) Randomised Algorithm
   (iv) Strassen's matrix multiplication
