Total Marks:80

(3 hours)

NOTE:
I. **Question No. 1** is Compulsory
II. Attempt any **THREE** question from 2 to 6

Q.1 Write a short note on following **(any Four)** 20
(a) Structured Data Types
(b) Strong Entity and Weak Entity
(c) B tree VS B+ Tree
(d) ACID properties of transaction
(e) Objects,Oids and Reference Types
(f) Role of DBA

Q.2 (a) A large bank has several branches at different places. 10
i) Each branch is managed by a manager
ii) Each branch maintains the account details of the customer.
iii) The customer may open the saving current and FD accounts as single and joint operations.
iv) The bank also provides the loan for various purposes
v) Bank keeps record of each transaction by the customer to his account.
vi) All the branches have employees for different operations.

Construct an ER diagram for the above system. Document all assumptions that you make for designing.

(b) Explain the architecture of database system and also explain how it is different from conventional file system. 10

Q.3 (a) Explain 1NF, 2NF, 3NF with the help of an example. Normalize the below table till 3NF. 10

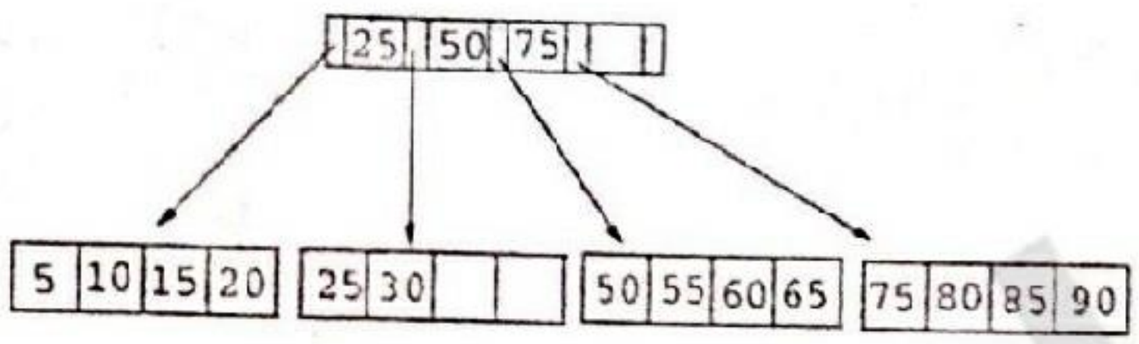
Full Names	Physical Address	Movies rented	Salutation	Category
Janet Jones	First Street Plot No 4	Pirates of the Caribbean, Clash of the Titans	Ms.	Action, Action
Robert Phil	3rd Street 34	Forgetting Sarah Marshal, Daddy's Little Girls	Mr.	Romance, Romance
Robert Phil	5th Avenue	Clash of the Titans	Mr.	Action

(b) Explain architecture of parallel DBMS with the help of diagram. 10

Q.4 (a) Define minimal cover and closure for functional dependencies. .Consider the relation R(P,Q,R,X,Y,Z) and set of functional dependencies are 10
$P \rightarrow Q$, $RX \rightarrow Y$, $RX \rightarrow Z$, $P \rightarrow R$, $Q \rightarrow Y$
Obtain other functional dependencies and compute Closure of PX^+.

(b) Explain hash based indexing. Discuss the use of hash function in identifying a bucket search. 10

Q.5 (a) What is serializability? Explain conflict serializability and view serializability. 10
(b) i) What is B+ tree? Explain with the help of an example. 05
ii) Consider the following B+ tree 05



Perform following operations on B+ tree assuming maximum capacity of node as four

A. Insert 28
B. Insert 70

Q.6 (a) Define the terms fragmentation and replication in terms of where data in stored and also how the object are uniquely identified in distributed database? 10
(b) What is locking protocol? Describe the 2 phase locking protocol and strict two phase locking protocol. 10

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Nov 2017

Q. P. Code: 24279

Java

(3 Hours)

[Total marks : 80]

N.B. : (1) Question No. **1** is **compulsory.**
(2) Attempt any **three** from remaining **five** questions.

1. Attempt **Any Four** 20

a) Explain Life Cycle of Applet with a suitable program
b) Explain the concept of final methods and final variables with a program.
c) Explain Inner Classes
d) Explain difference between method overloading and overriding with example
e) Explain architecture of Spring Framework.

2. (a) What is Session Tracking in Servlets? Write a Program to illustrate use of HttpSession API to maintain state in servlet application. 10
(b) What are Lambda Expressions? Explain syntax and use of Lambda expressions with a suitable program. 10

3. (a) What are actions in JSP? Explain any four actions in JSP with a program. 10
(b) What is Exception? Explain Concept of Checked and unchecked exception with an Example of each. Write a code to generate custom exception in java. 10

4. (a) What is serialization/deserialization of objects? Why do you need it? Give the example with necessary code. 10
(b) What is JDBC? Explain steps to Connect Java program to Oracle database using type 4 drivers. 10

5. (a) Explain Multithreading. Explain Thread Life cycle. Add a note on approaches to implement threads using Java. 10
(b) Explain in brief 10
a) Servlet Life Cycle
b) JSP Life Cycle

6. (a) Add a note on 10
a) Visibility modifiers in Java
b) Interfaces in Java.
(b) What is Event Delegation model? Explain any two event listeners in detail. 10

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Nov 2017

Q.P. Code: 24747

I.S.

(3 Hours)

[Total Marks:80

N.B (1) Question No1 is compulsory.

(2) Attempt any three out of remaining questions.

(3) Figures to the right in parenthesis indicate full marks.

1. (a) Explain overview of DES with one round in detail? [10]

(b) Explain and differentiate between the various architectures of a firewall and its implementation? [10]

2. (a) What do you mean by Intrusion Detection System? Discuss the various types of intrusion detection system [10]

(b) Discuss Authentication? Explain how authentication can be done using tokens? [10]

3. (a) What are Digital certificates? Explain the stepwise process of certificate generation? How is Digital Certificate issue and by whom? [10]

(b) What is the need for database security? Explain database access control and inference control? [10]

4. (a) Define Message Digest. Explain MD5 and compare with SHA? [10]

(b) Define WEP authentication. Explain authentication and key agreement in 802.11i? [10]

5. (a) Discuss email security with respect to PGP and S/MIME. [10]

(b) Analyze RSA and its security. Why is RSA a secure algorithm? Give an example? [10]

6. Write a short note on (Any four) [20]

(i) Digital Signatures

(ii) Web Services Security

(iii) Defense Against Denial-of-Service Attacks

(iv) SET Participants

(v) TKIP

Nov 2017

Q. P. Code: 24552

Operation Research

Time: 3 hours

Marks: 80

Note:
- Question 1 is compulsory
- Answer any 3 from the remaining 5 questions
- Figures to the right indicate marks
- Use of scientific calculator is allowed

Q1 a) A diet for a sick person must contain 4000 units of vitamins, 50 units of minerals and 1400 calories. Two foods A and B are available at a cost of Rs 4 and Rs 3 respectively. If one unit of A contains 200 units of vitamins, 1 unit of minerals and 40 calories; and 1 unit of B contains 100 units of vitamins, 2 units of minerals and 40 calories; find by graphical method what combination of foods should be used at the least cost. [10]

b) Following activity times (in days) are provided: [10]

Activity	to (Optimistic Time)	tm (Most Likely Time)	tp (Pessimistic Time)
1-3	1	3	5
1-2	3	4	5
3-5	4	5	6
2-4	3	5	7
4-5	5	6	13
5-6	4	7	10
4-6	6	8	10

i) Draw the network, identify the critical path
ii) Compute the expected completion time and variance of the project
iii) What is the probability that the project will be completed within 20 days. (Given for SNV area under the normal curve from 0 to 1.64 = 0.4495)
iv) What due date has 90% chance of being met? (Given for SNV area under the normal curve from 0 to 1.28 = 0.3997)

Q2 a) Solve using Two-phase simplex method [10]

Minimize $Z = x1 + x2$

subject to

$$2x1 + x2 \geq 4$$
$$x1 + 7x2 \geq 7$$

and

$$x1, x2 \geq 0$$

Q2 b) A company has four different sales representatives who are to be assigned to 4 different state territories. The monthly sales increase estimated for each sales representative for different sales territories (in lakhs of Rs.) are shown in the following table. Suggest optimal assignment and the total maximum sales increase per month. [10]

Sales Representative	Territories			
	I	II	III	IV
A	200	150	170	220
B	160	120	150	140
C	190	195	190	200
D	180	175	160	190

Q3 a) Five jobs 1, 2, 3, 4 and 5 are to be processed on 4 machines A, B, C and D in the order ABCD. Their processing times (in hours) are given in the table below. Determine the optimal sequence of jobs, minimum elapsed time and idle time for each machine [10]

Jobs	Machines			
	A	B	C	D
1	11	4	6	15
2	13	3	7	8
3	9	5	5	13
4	16	2	8	9
5	16	6	4	11

b) The data collected in running a machine, the cost of which is Rs.60000 are given below. Determine the optimum period of replacement of the machine. [10]

	Year				
	1	2	3	4	5
Resale value (Rs.)	42000	30000	20400	14400	9650
Cost of spares (Rs.)	4000	4270	4880	5700	6800
Cost of labour (Rs.)	14000	16000	18000	21000	25000

[TURN OVER]

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Q4 a) Two firms are competing for business under conditions such that one firm's gain is another firm's loss. Firm A's payoff matrix is given below. Find the optimal strategies to be used by both players and the value of the game. [10]

		Firm B		
Firm A	Strategies	No Advertising	Medium Advertising	Heavy Advertising
	No Advertising	10	5	-2
	Medium Advertising	13	12	15
	Heavy Advertising	16	14	10

b) Solve using Simplex Method [10]

Maximize $Z = 3x1 + 4x2$

subject to

$$2x1 + x2 \leq 6$$
$$2x1 + 3x2 \leq 9$$

and

$$x1, x2 \geq 0$$

Q5 a) A company has three plants and warehouses. The supply and demand in units and the corresponding transportation costs are given. If the solution is as given below in brackets, check if it is optimal [10]

		Warehouse				Supply
		I	II	III	IV	
Plants	A	5	10	4 (10)	5	10
	B	6 (20)	8	7	2 (5)	25
	C	4 (5)	2 (10)	5 (5)	7	20
Requirement		25	10	15	5	55

b) A project has 11 activities whose duration (in days) is given below [10]

Activity	0-1	1-2	1-3	2-4	2-5	3-4	3-6	4-7	5-7	6-7	7-8
Duration	2	8	10	6	3	3	7	5	2	8	3

i) Draw the network
ii) Identify the project completion time, critical activities and critical path
iii) Determine the total, free and independent floats

Q6 a) i) Find the dual of the primal given below [05]

Maximize $Z = 3x1 + 5x2$

subject to

$$2x1 + 6x2 \leq 50$$
$$3x1 + 2x2 \leq 35$$
$$5x1 - 3x2 \leq 10$$
$$x2 \leq 20$$

and

$$x1, x2 \geq 0$$

ii) Define the term redundant constraints in the graphical method [05]

b) Solve using Gomory's Cutting Plane Method [10]

Maximize $Z = 5x1 + 7x2$

subject to

$$-2x1 + 3x2 \leq 6$$
$$6x1 + x2 \leq 30$$

and

$$x1, x2 \geq 0 \text{ and integer}$$

Q. P. Code: 25541

Duration : 3 hours **Total Marks : 80**

N.B. (1) Question No.1 is compulsory
(2) Answer any THREE of the remaining questions
(3) Figures to the right indicate full marks

1. Write short notes on **any four**: (20)
   (a) Integration Testing
   (b) ISO 9126 quality characteristics
   (c) Incident Reporting
   (d) Risk Management
   (e) Review process

2. (a) What is SQA planning ? (10)
   (b)What is defect metrics? (10)

3. (a) What are the different test tool selection criteria? Give steps required to select a tool. (10)
   (b) Explain in detail W-Model. (10)

4. (a) Explain the difference between functional and non-functional testing. Explain load testing, performance testing and stress testing. (10)
   (b) Explain the test objectives, test environment and test strategies for unit testing. (10)

5. (a) Compare black box testing and white box testing. Explain with the help of an example. (10)
   (b) What is State Transition Testing Technique? Draw the transition tree for a Stack. (10)

6. (a) Explain Test Metrics with example (10)
   (b) Explain ISO 9000:2000 requirements. (10)