ICA / Sem-III / Paper / Subject Code: 56301 / Database Management Systems / NOV. 2019

CHOICE BASED

Q.P. Code: 38913

(3 Hours) [Total Marks: 80]

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

Write a short note on following (any Four)

1. (a) Role of DBA (5)
   (b) Weak entity sets (5)
   (c) Clustered index (5)
   (d) ACID Properties (5)
   (e) Distributed deadlock (5)
   (f) Inheritance (5)

2. (a) A university registrar's office maintains data about the following entities: (10)

   (a) courses, including number, title, credits, syllabus, and prerequisites;

   (b) course offerings, including course number, year, semester, section number, instructor(s), timings, and classroom;

   (c) students, including student-id, name, and program; and

   (d) Instructors, including identification number, name, department, and title. Further, the enrollment of students in courses and grades awarded to students in each course they are enrolled for must be appropriately modeled

   Construct an E-R diagram for the registrar's office. Document all assumptions that you make about the mapping constraints.

   (b) Explain Conceptual design with the E R Model. (10)

3. (a) How database recovery is possible in distributed database? (10)

(b) (10)

Staff No	Dentist name	Patient No	Patient name	Appointment Date Time	Surgery No
S1011	Tony smith	P100	Gillian white	12-Aug-02 10:00	S10
S1011	Tony smith	P105	Jill bell	13-Aug-02 12:00	S15
S1024	Helen Pearson	P108	Ian Mackay	12-Sept-02 10:00	S10
S1024	Helen Pearson	P108	Ian Mackay	14-Sept-02 10:00	S10
S1032	Robin Pelvin	P105	Jill bell	14-Oct-03 16:30	S15
S1032	Robin Pelvin	P110	John walker	15-Ocy03 18:00	S13

(a) The above table shown is susceptible to update anomalies. Provide examples of insertion, deletion, and modification anomalies.

(b) Describe and illustrate the process of normalizing the table from 1 to 3NF. State any assumptions you make about the data shown in this table.

Q4 (a) Given the relation schema R = (A, B, C, D, E) and the canonical cover of its set of functional dependencies 10

$$Fc = \{ \quad A \rightarrow BC$$
$$CD \rightarrow E$$
$$B \rightarrow D$$
$$E \rightarrow A\}$$

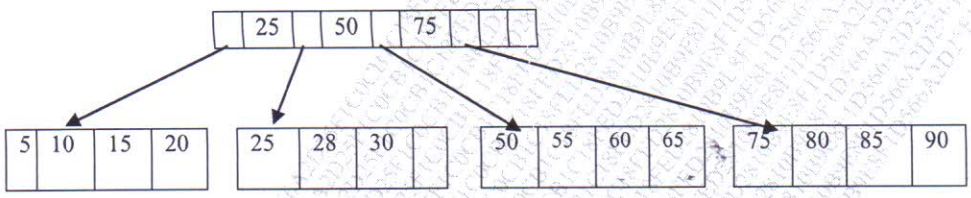
Compute lossless join decomposition in Boyce-Codd Normal Form for R.

(b) What is Extendible Hashing? How does it handle search, insert, and delete? 10

Q5 (a) What is log based recovery in database Explain. 10

(b) (i) What are the main differences between ISAM (indexed sequential access method) and B+ tree indexes? 5

(ii) Consider the following B+ tree 5



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

A .Insert 95

B. Delete 25

Q6 (a) Explain Architecture of distributed database system. 10

(b) What is serializability? Explain conflict serializability and view serializability. 10

MCA | Sem-III / Paper / Subject Code: 56302 / Java Programming / Nov. 2019
CHOICE BASED

[Total Marks: 80]

(3 Hours)

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

Q. 1. Attempt ***any four*** :- **20**

(a) Explain Spring Framework with suitable diagram.

(b) Generic classes in java.

(c) String is Immutable in Java! Justify.

(d) Use of super keyword in Java.

(e) Explain JVM Architecture and differences between JDK, JRE & JVM.

Q. 2. (a) What is exception handling? Explain the concept of checked and unchecked exception with an example of each. **(10)**

(b) Difference between – **(10)**
1. Input streams and output streams
2. GenericServlet and HttpServlet

Q. 3. (a) Explain multithreading. What is thread life cycle? Write a program to create thread and set thread priorities to 1, 5 and 10. **(10)**

(b) What is JDBC? Explain different types of JDBC drivers. Write a JDBC program to show the working with Resultset interface. **(10)**

Q. 4. (a) What is serialization/deserialization of objects? Why do you need it? Give the example with necessary code. **(10)**

(b) Explain JSP Architecture. Write a JSP program for the student field to store student information in database. **(10)**

Q. 5. (a) What is session tracking? Explain HTTP session and demonstrate it using a Java servlet program. **(10)**

(b) What do you mean by interface, what is its requirement in java explain with a suitable example? **(10)**

Q. 6. (a) Explain in brief – **(10)**
1. Custom tag in JSP
2. Lambda Expression

(b) What is Delegation Event model? Explain any two event listeners in detail. **(10)**

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A - Sem-III | Paper / Subject Code: 56303 / Information security | Dec-2019
oice based.

Q.P. code: 40273

Total Marks: 80

(3 Hours)

N.B. (1) Question No. 1 is compulsory.
(2) Attempt any three out of remaining questions.
(3) Figures to the right in parenthesis indicate full marks.

Q.1 (a) Define Network security. Explain different types of attacks in network security. [10]

(b) What is cryptography? Differentiate between private key and public key cryptography. [10]

Q.2 (a) What is Hash? Discuss briefly HMAC. [10]
(b) What are digital certificates? Explain the stepwise process of certificate generation. [10]

Q.3 (a) Explain RSA algorithm with an example. [10]
(b) Explain mutual authentication and reflection attack with the help of an example. Suggest one method for fixing it. [10]

Q.4 (a) Explain working of KDC and multi domain KDC. [10]
(b) Give overview of DES along with problems and variations in DES. [10]

Q.5 (a) Explain firewalls. How is a circuit gateway different from an application gateway? [10]
(b) Explain WEP Authentication. Illustrate data protection in TKIP . [10]

Q.6 Write short Notes on: (Any four) [20]
a) Database Encryption
b) Digital Signatures
c) SET participants
d) PGP
e) Web services security

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MCA/ Sem-III / **Paper / Subject Code: 56304 / Operation Research** / NOV 2019

CHOICE BASED

Q. P. Code: 38579

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) Solve following LPP by graphical method:

Minimize $Z = 4x_1 + 2x_2$

Subject to

$x_1 + x_2 \geq 3$

$x_1 - x_2 \geq 2$

$x_1, x_2 \geq 0$

[10]

b) Using the following cost matrix find:

i) Optimal Job Assignment

ii) The cost of assignment

	1	2	3	4	5
A	10	3	3	2	8
B	9	7	8	2	7
C	7	5	6	2	4
D	3	5	8	2	4
E	9	10	9	6	10

[10]

Q2 a) Based on following data, draw network diagram and determine the following :

i) Critical Path

ii) Probability of Project completion in 135 days(for Z = 1.31, area between mean and value of Z is 0.4049)

iii)Total float

Activity	1–2	1–3	1–4	2–5	2–6	3–6	3–7	4–7	5–8	6–8	7–8
t_o	7	10	5	50	30	50	1	40	5	20	30
t_p	17	60	15	110	50	90	9	68	15	52	50
t_m	9	20	10	65	40	55	5	48	10	27	40

[10]

b) Solve the following LPP using simplex method:

Maximize $z = 3x_1 + 2x_2$

subject to

$-x_1 + 2x_2 \leq 4$

$3x_1 + 2x_2 \leq 14$

$x_1 - x_2 \leq 3$

$x_1, x_2 \geq 0$

[10]

Q3 a) Solve the following TP using :

i) North-West Corner Method

ii) VAM Method

	$D1$	$D2$	$D3$	$D4$	Supply
$S1$	11	13	17	14	250
$S2$	16	18	14	10	300
$S3$	21	24	13	10	400
Demand	200	225	275	250	

b) In the production of 2 types of toys, a factory uses 3 machines A, B and C. The time required to produce the first type of toy is 6 hours, 8 hours and 12 hours in machines A, B and C respectively. The time required to make the second type of toy is 8 hours, 4 hours and 4 hours in machines A, B and C respectively. The maximum available time (in hours) for the machines A, B, C are 380, 300 and 404 respectively. The profit on the first type of toy is 5 dollars while that on the second type of toy is 3 dollars. Find the number of toys of each type that should be produced to get maximum profit by formulating LPP.

Q4 a) Find solution using dual-simplex method:

MAX $Z = -2X_1 - X_2$

subject to

$-3X_1 - X_2 \leq -3$

$-4X_1 - 3X_2 \leq -6$

$-X_1 - 2X_2 \leq -3$

and $X_1, X_2 \geq 0$

b)

From \ To	M_1	M_2	M_3	M_4	Supply
F_1	3	2	4	1	20
F_2	2	4	5	3	15
F_3	3	5	2	6	25
F_4	4	3	1	4	40
Demand	30	20	25	25	

IBFS to the above TP is given below:

Q. P. Code: 38579

	M_1	M_2	M_3	M_4
F_1	3	2	4	[20] 1
F_2	[5] 2	[5] 4	5	[5] 3
F_3	[25] 3	5	2	6
F_4	4	[15] 3	[25] 1	4

Test this solution for optimality.

Q5 a) Two firms are competing for the business under the condition that one's gain is other's loss. Firm A's pay-off matrix is given below:

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

Suggest optimal strategies for both firms. [10]

b) An engineering company is offered a material handling equipment A. It is priced at Rs 60,000 including cost of installation. The costs for operation and maintenance are estimated to be Rs 10,000 for each of the first five years, increasing every year by Rs 3,000 in the sixth and subsequent years. The company expects a return of 10 percent on all its investment. What is the optimal replacement period?

Year	1	2	3	4	5	6	7	8	9	10
Running Cost	10,000	10,000	10,000	10,000	10,000	13,000	16,000	19,000	22,000	25,000

[10]

Q6 a) **Find solution using integer method(Gomory's cutting plane method):**

Maximize $z = x_1 + 4x_2$

subject to

$2x_1 + 4x_2 \leq 7$

$5x_1 + 3x_2 \leq 15$

x_1, x_2 are integers ≥ 0

[10]

b) A firm is considering the replacement of a machine, whose cost price is Rs 12,200 and its scrap value is Rs 200. From experience the running (maintenance and operating) costs are found to be as follows:

Year	1	2	3	4	5	6	7	8
Running Cost	200	500	800	1,200	1,800	2,500	3,200	4,000

When should the machine be replaced?

Q7 a) **Find solution using two phase method for the Problem :**

MIN $Z = x_1 + x_2$

subject to

$2x_1 + 4x_2 \geq 4$

$x_1 + 7x_2 \geq 7$

and $x_1, x_2 \geq 0$;

b) Write a short note on :

i) Application of OR

ii) Special cases of Graphical Method.

Sem III / Dec-2019
ce based.

Paper / Subject Code: 56305 / Software Testing and Quality Assurance

Q. P. Code: 37521

[Total Marks: 80]

(3 Hours)

N.B. : 1) Question No.1 is **compulsory.**
2) Attempt any **three** from the remaining five questions.
3) Answer to sub-questions should be grouped together.

1. (a) Explain in brief the principles of testing **(05)**
   (b) Differentiate between functional testing and non-functional testing **(05)**
   (c) Compare and contrast V model and VV model **(05)**
   (d) What is testing? How is debugging different from testing? **(05)**

2. (a) How are reviews useful tool for static analysis. Explain role and responsibilities of people involved in reviews **(10)**
   (b) What is incident reporting? Explain incident status model. **(10)**

3. (a) Explain data flow anomalies used to reveal defects using suitable example **(10)**
   (b) List and explain principles of testing. **(10)**

4. (a) Draw CFG and calculate statement coverage, branch coverage and path coverage for the given code **(10)**

```
main()
{ int P,Q;
cin>>P;
cin>> Q;
if P+Q > 100
cout<< "Large";
if P > 50
cout<< "P Large";
}
```

   (b) Describe test plan. How are test cases prioritized and what is test Exit criteria **(10)**

5. (a) Discuss the various infrastructure components (TCDB, Defect Repository, and Configuration Management Repository). How would you make these tools operate in unison effectively? **(10)**
   (b) What are the different test tool selection criteria? Give steps required to select a tool. **(10)**

6. Write short notes on (**any four**) **(20)**
   (a) Steps in Measurement
   (b) Software Maintenance Activities
   (c) Five Views of Software Quality
   (d) Testing Object Oriented System
   (e) SQA Plan
