

Knowledge Resource & Relay Centre (KRRC)

AIKTC/KRRC/SoET/ACKN/QUES/2017-18/

Date: _____

School: SoET-CBSGS

Branch: COMP. ENGG.

SEM: IV

To,
Exam Controller,
AIKTC, New Panvel.

Dear Sir/Madam,

Received with thanks the following **Semester/Unit Test-I/Unit Test-II (Reg./ATKT)** question papers from your exam cell:

Sr. No.	Subject Name	Subject Code	Format		No. of Copies
			SC	HC	
1	Applied Mathematics- IV	CSC401		✓	02
2	Analysis Of Algorithms	CSC402			
3	Comp. Org. And Archi.	CSC403			
4	Data Base Management System	CSC404		✓	02
5	Theoretical Computer Science	CSC405		✓	02
6	Comp. Graphics	CSC406			

Note: SC – Softcopy, HC - Hardcopy

(Shaheen Ansari)
Librarian, AIKTC



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Sr. No.	Subject Name	Subject Code	Format		No. of Copies
			SC	HC	
1	Human Machine Interaction	CPC801			
2	Distributed Computing	CPC802			
3		CPC803			
4	Elective-III	CPE803X			
5					
6					

Note: SC – Softcopy, HC - Hardcopy

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19/11/18

SE-SEM-IV-CBSGS-COMPS

Q. P. Code: 37067

(3 hours)

Total Marks:80

N.B:

1. Question No .1 is compulsory.
2. Answer any **three** questions from **Q. 2 to Q. 6**
3. Use of statistical tables permitted.
4. Figures to the right indicate full marks.

- 1) (a) A continous random variable x has the pdf $f(x) = kx^2e^{-x}$ where $x \geq 0$. Find k ,its mean and variance. 5
- (b)State true or false with reasoning: $2x+y=3$ and $x=2y+3$ cannot be the lines of regression. 5
- (c)Find the relative maximum or minimum of the function $z=x_1^2+x_2^2+x_3^2-6x_1-8x_2-10x_3$. 5
- (d)Find the eigen values of $adj.A$ and A^2-2A+I where $A = \begin{bmatrix} 2 & 3 & 4 \\ 0 & 4 & 2 \\ 0 & 0 & 3 \end{bmatrix}$. 5

- 2) (a) Obtain the rank correlation coefficient from the following data. 6

X: 10 12 18 18 15 40

Y: 12 18 25 25 50 25

- (b) The marks obtained by the students in Maths ,Physics & Chemistry in an examination are normally distributed with the means 52,50 & 48 and with standard deviations 10,8 & 6 respectively. Find the probability that a student selected at random has secured a total of i) 180 or above ii) 135 or less. 6

- (c) Is the matrix $A = \begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$ diagonalisable? If so, find the diagonal form and the transformation matrix. 8

- 3) (a) If $A = \begin{bmatrix} 1 & 0 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$, find A^{50} . 6

- (b) A die was thrown 132 times and the following frequencies were observed 6

No: obtained : 1 2 3 4 5 6

Frequencies : 15 20 25 15 29 28

Test the hypothesis that the die is unbiased.

- (c) Use duality to solve the following linear programming problem. 8

Mnimise $Z = 4x_1+3x_2+6x_3$ subject to

$x_1+x_3 \geq 2;$

$x_2+x_3 \geq 5, \quad x_1, x_2, x_3 \geq 0.$

4) (a) A sample of 100 students is taken from a large population. The mean height of the students in this sample is 160 cm. Can it be reasonably regarded that, in the population, the mean height is 165cm and the SD is 10cm? 6

(b) A transmission channel has a per digit error probability $p=0.01$. Calculate the probability of more than one error in 10 received digits using i) Binomial distribution ii) Poisson distribution. 6

(c) Evaluate $\int_0^{2\pi} \frac{1}{3+2\cos\theta} d\theta$. 8

5 .(a) Evaluate $\int \frac{1}{z^3(z+4)} dz$ where C is the circle $|z|=2$. 6

(b) show that the matrix $A = \begin{bmatrix} 5 & -6 & -6 \\ -1 & 4 & 2 \\ 3 & -6 & -4 \end{bmatrix}$ is derogatory. 6

(c) Samples of 2 types of electric bulbs were tested for length of life and the following data were obtained

	Size	Mean	SD
Sample 1	8	1234h	36h
Sample 2	7	1036h	40h

Is the difference in the means sufficient to warrant that type 1 bulbs are superior to type 2 bulbs? 8

6 (a). Using the Big-M penalty method ,solve the following L.P.P 6

Minimise $Z=10x_1+3x_2$

subject to $x_1+2x_2 \geq 3$

$x_1+4x_2 \geq 4$ $x_1, x_2 \geq 0$.

(b) Use the Kuhn-Tucker conditions to solve the following N.L.P.P 6

Maximise $Z=2x_1^2 - 7x_2^2 + 12x_1x_2$

Subject to $2x_1+5x_2 \leq 98$ $x_1, x_2 \geq 0$

(c) Obtain Taylor's and Laurent's expansion for $f(z) = \frac{z-1}{(z-3)(z+1)}$ indicating the 8

regions of convergence.

Paper / Subject Code: 38904 / DATABASE MANAGEMENT SYSTEMS

Q. P. Code:-22552

(3 Hours)

Total Marks: 80

N.B.: (1) Question No.1 is **compulsory**.(2) Solve any **three** questions out of the remaining questions.(3) Make **suitable** assumptions if **needed**.

1. (a). Explain ACID properties. 5
 (b) Discuss Generalization and Specialization in EER model. 5
 (c) Explain Aggregate Functions in SQL. 5
 (d) Describe Triggers with example. 5
2. (a) Define Normalization. Discuss different Normalization Techniques with example. 10
 (b) Consider the following database schema: 10
 Employee(employee_name, street, city, date_of_join)
 Works(employee_name ,company_name, salary)
 Company(company_name, city)
 Manages(employee_name, manager_name)
 Solve the following queries using SQL:
 i. Give all employee of ABC Company a 25% rise.
 ii. Find all employees who live in the same cities and on the same street as their manager.
 iii. Find all employees who join in the month of April.
 iv. Delete the employee Jennifer belonging to XYZ Company.
3. (a) Explain types of integrity constraints with example. 10
 (b) Describe the overall architecture of DBMS with suitable diagram. 10
4. (a) Draw an ER Diagram and convert it into relational model for a Hospital with a set of patients and set of doctors. Associate with each patient a log of various tests and examinations conducted. 10
 (b) Explain Security and Authorization in DBMS. 10
5. (a) Explain the following Relational Algebra Operations with example: 10
 i. Cartesian Product iii. Generalized Projection
 ii. Natural Join iv. Union
 (b) Discuss conflict serializability and view serializability with examples. 10
6. Write Short notes on: 20
 (a) Steps in Query Processing
 (b) Role of Database Administrator
 (c) Deadlocks
 (d) Data Independence

(3 Hours)

[Total Marks : 80]

- N.B. (1) Question No. 1 is compulsory
 (2) Attempt any three out of remaining five questions
 (3) Assumptions made should be clearly stated

1. (a) Write short note on Myhill Nerode theorem 5
 (b) Differentiate between NFA and DFA. 5
 (c) State and explain Closure properties of Context Free Language 5
 (d) Explain Post Correspondence problem. 5

2. (a) Construct the NFA- ϵ
 i for the language in which strings starts and ends different letter over the set $\Sigma = \{ a, b \}$
 ii) for the R.E $(01+2^*)$ 10

- (b) Give and Explain formal definition of Pumping Lemma for Regular Language and prove that following language is not regular. 10

$$L = \{ a^n b^m \mid 1 \leq n \leq m \}$$

3. (a) Convert the given grammar into Griebach Normal Form 10

$$S \rightarrow aSB \mid aA$$

$$A \rightarrow Aa \mid Sa \mid a$$

 (b) Construct PDA for a language $L = \{ wcw^R \mid w \in \{a,b\}^*$ and w^R is reverse of $w \}$ 10

4. (a) Construct TM to check palindrome over $\Sigma = \{0,1\}$ 10
 (b) Design a DFA which accepts all strings not having more than 2 a's over $\Sigma = \{a, b\}$ 10

5. (a) Convert $(0+1)(01)^*(0+\epsilon)$ into NFA with ϵ -moves and obtain DFA. 10
 (b) Design Mealy Machine that accepts an input from $(0+1)^*$ if the input ends in 101, output A; if the input ends in 110, output B, otherwise C. then convert into Moore Machine. 10

6. (a) Draw a parse tree for the string "abaaba" for the CFG given by G where 10

$$P = \{ S \rightarrow aSa$$

$$S \rightarrow bSb$$

$$S \rightarrow a \mid b \mid \epsilon \}$$

 Also Determine whether the given CFG is ambiguous or not.

- (b) Write short note on following 10
 i) Halting problem
 ii) Rice's Theorem