

ADIKAVI NANNAYA UNIVERSITY :: RAJAMAHENDRAVARAM
I Year MCA II Semester
MCA 2.1 Probability, Statistics & Queuing Theory
Model Question Paper

Time: 3 Hrs.

Max. Marks: 75

SECTION - A

Answer ALL Questions (4 X 15 = 60)

- 1) a) (i) State and Prove Bayes' Theorem.
(ii) The probability that a student passes a Physics test is $2/3$ and the probability that he passes both a Physics test and an English test is $14/45$. The probability that he passes at least one test is $4/5$. What is the probability that he passes the English test?
(Or)
b) Given that $f(x) = K/2x$, is a probability distribution for a random variable X that can take on the values $x = 0, 1, 2, 3$ and 4 .
i) Find K ii) Mean, Variance and Standard Deviation.

- 2) a) Fit a Poisson distribution to the following data:
- | | | | | | | |
|-------------------------------|-----|----|----|---|---|-------|
| Number of mistakes per page : | 0 | 1 | 2 | 3 | 4 | Total |
| Number of pages : | 109 | 65 | 22 | 3 | 1 | 200 |

(Or)

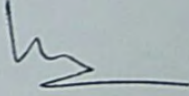
- b) Calculate the correlation coefficient for the following heights (in inches) of fathers (X) and their sons (Y):

X :	65	66	67	67	68	69	70	72
Y :	67	68	65	68	72	72	69	71

- 3) a) Calculate The mean of random sample is an unbiased estimate of the mean of the population 3,6,9,15,27.
i) List of all possible samples of size 3 that can be taken without replacement from the finite population.
ii) Calculate the mean of each of the samples listed in (i) and assigning each sample probability of $1/10$. Verify that the mean of these \bar{x} is equal to 12. Which is equal to the mean of the population θ i.e. $E(\bar{x}) = \theta$ i.e., prove that \bar{x} is an unbiased estimate of θ .
(Or)
c) Random sample of 400 men and 600 women were asked whether they would like to have a flyover near their residence. 200 men and 325 women were in favour of the proposal. Test the hypothesis that proportions of men and women in favour of the proposal are same, at 5% level.
- 4) a) A random sample of size 64 is taken from a normal population with $\mu = 51.4$ and $\sigma = 68$. What is the probability that the mean of the sample will (a) exceed 52.9 (b) fall between 50.5 and 52.3 (c) be less than 50.6.

(Or)


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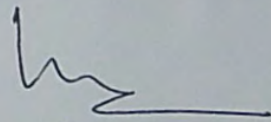

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- b) Random A bank plane to open a single server drive-in banking facility at a certain centre. It is estimated that 20 customers will arrive each hour on average. If on average, it requires 2 minutes to process a customer's transaction, determine.
- The proportion of time that the system will be idle;
 - On the average, how long a customer will have to wait before reaching the server,
 - The fraction of customers who will have to wait.


SECTION-B

Answer any FIVE Questions (5 x 3 = 15)

- 5) a) Two cards are selected at random from 10 cards numbered 1 to 10. Find the probability that the sum is even if,
- The two cards are drawn together.
 - The two cards drawn one after other with replacement.
- b) If a random variable has the probability density $f(x)$ as
- $$f(x) = \begin{cases} 2e^{-2x}, & \text{for } x > 0 \\ 0, & \text{for } x \leq 0 \end{cases}$$
- find the probabilities that it will take on a value
- Between 1 and 3
 - greater than 0.5
- c) A die is thrown 6 times, if getting an even number is a success, find the probabilities of
- At least one success
 - ≤ 3 success
 - 4 success.
- d) Write chief characteristics of the normal distribution
- e) If θ is the angle between two regression lines and S.D. of Y is twice the S.D. of X and $r = 0.25$, find $\tan \theta$.
- f) Write a brief note on types of errors.
- g) A random sample of 500 apples was taken from a large consignment and 60 were found to be bad. Obtain the 98% confidence limits for the percentage of bad apples in the consignment.
- h) Explain the characteristics of a queuing model.



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ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
I Year MCA II Semester
MCA 2.2 Database Management Systems
Model Question Paper

Time: 3 Hrs.

Max. Marks: 75

SECTION- A

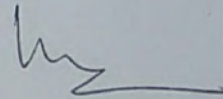
Answer ALL Questions (4 X 15 = 60 M)

1. a) Explain the centralized and Client/Server architecture of DBMS?
(Or)
b) Explain the mapping conventions from E-R model to relational model?
2. a) What are different types of constraints? Create an Employee- Department database and exercise all constraints.
(Or)
b) Explain the significance of relational algebra and its contribution for SQL?
3. a) Explain design guidelines for achieving normalization with examples.
(Or)
b) Hashing techniques (8M)
c) RAID technology. (7M)
3. a) Explain concurrency control techniques one with locking and one with time stamping.
(Or)
b) Explain ARIES recovery algorithm?

SECTION - B

Answer any FIVE Questions (5 X 3 = 15 M)

5. a) Data Independence.
b) Weak and strong entity sets
c) Views in SQL
d) Join operation in Relational Algebra
e) Indexes in SQL.
f) Desirable properties of transaction.
g) Lock Compatibility
h) Write ahead logging.



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I Year MCA II Semester

MCA 2.3 Object Oriented Programming With C++ & Java
Model Question Paper

Max. Marks: 75

Time: 3 Hrs.

SECTION - A

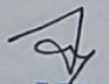
Answer ALL Questions (4 X 15 = 60 M)

1. a) Describe the evolution of programming paradigms.
(Or)
b) What are the advantages of dynamic over static memory allocation? Write a C++ program for adding two matrices with dynamic memory allocation.
2. a) Explain control structures in C++ with examples.
(Or)
b) Explain different forms of inheritance with examples.
3. a) Explain the classes, objects and methods in Java. Differentiate with C++.
(Or)
b) Explain how I/O files are created and operated in Java.
4. a) Explain multi threading concept of Java with suitable examples.
(Or)
b) Describe exception handling in Java with examples.

SECTION - B

Answer any FIVE Questions (5 X 3 = 15 M)

5. a) Scope resolution operator
b) Write a C++ program to perform addition of 2 numbers with function overloading.
c) This pointer
d) Working of abstract classes.
e) Datatypes in Java
f) Vectors in Java.
g) Example program in Java to illustrate implementation of interface.
h) Difference between an applet and an application.



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I Year MCA II Semester
MCA 2.4 Formal Languages and Automata Theory
Model Question Paper

Time: 3 Hrs.

Max. Marks:75

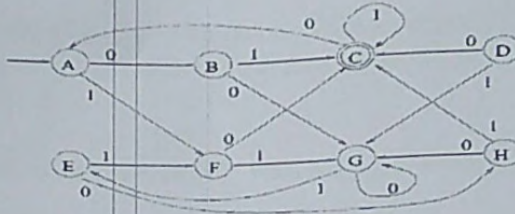
SECTION-A

Answer ALL Questions (4 x 15 = 60)

1. a) Let r be a regular expression. Then there exists some NFA with ϵ -transitions that accepts $L(r)$?

(OR)

- b) What is the use of Membership algorithm and construct the minimum state automaton equivalent to the transition diagram given below



2. a) State and prove pumping lemma for CFL's? 8M
 b) Explain any five closure properties of Regular sets? 7M

(OR)

- c) Construct a PDA to accept $L = \{WW^R / W \text{ in } (0+1)^*\}$?

3. a) Construct a TM to accept $L = \{a^n b^n c^n / n \geq 1\}$?

(OR)

- b) Briefly discuss combining Turing Machines? 8M
 c) Discuss the halting problem of Turing machine? 7M

4. a) Syntax of predicate calculus? 7M
 b) Explain truth assignment? 8M

(OR)

- c) Explain validity and Satisfiability?

SECTION-B

Answer any FIVE Questions (5 x 3 = 15)

5. a) What is transition system?
 b) What are the differences between DFA and Non-DFA?
 c) Explain any three closure properties of regular sets?
 d) Briefly discuss simplification of CFL's ?
 e) Define Turing machine?
 f) What is Post Correspondence Problem?
 g) Explain Normal forms?
 h) Discuss NP-completeness

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I Year MCA II Semester
MCA 2.5 Information Systems & Organisational Behaviour
Model Question Paper

Time: 3 Hrs.

Max. Marks: 75

SECTION-A

Answer ALL Questions (4 x 15 = 60)

1. (a) "Organisation Structure refers to the differentiation and integration of activities and authority, roles, and relationships." Explain.
(or)
(b) What are the essential features of a good organisation structure?
2. (a) Critically examine Herzberg's theory of Motivation. Make a comparison between theories of Herzberg and Maslow. Which of these theories do you prefer in Indian context? Give reasons.
(or)
(b) What are different barriers of communication? What steps can be taken to overcome these barriers?
3. (a) What is meant by Organisation Conflict? Explain its process.
(or)
(b) Explain determinants of OC.
4. (a) What are the characters and functions of MIS?
(or)
(b) What are the different types of computer based information system used in different functional areas of business by organisations?

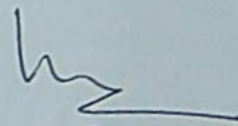
SECTION-B

Answer any FIVE Questions (5 x 3 = 15)

5. (a) Matrix Organisation Structure
(b) Organisation Chart
(c) Management vs Leadership
(d) Theory Y
(e) Formal Groups vs Informal Groups
(f) Conflict Management
(g) Resources of Information System
(h) Information System and its contribution to TQM


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