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25114

M.C.A. EXAMINATION, Dec. 2018

(Full & Re-appear)

(Third Semester)

COMPUTER ORIENTED STATISTICAL METHODS (F)/
STATISTICAL METHOD AND OPTIMIZATION TECH. (R)

Time : 3 *Hours*] [*Maximum Marks :* 80

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory.

1. (a) The discrete random variable X has probability function :

$$P(X=x)=\begin{cases} kx & , x=2,4,6 \\ k(x-2) & , x=8 \\ 0 & \text{otherwise} \end{cases}$$

where k is constant.
Find exact value of F(5). 3

(b) The following data represent a sample of time to complete a certain task (in minutes : seconds).

6 : 30, 11 : 15, 6 : 22, 11 : 32, 8 : 12, 5 : 02, 9 : 17, 6 : 51, 8 : 44, 7 : 45, 9 : 37, 7 : 28, 4 : 29, 7 : 42.

Compute the standard deviation. 3

(c) Write short note on Stratified Random sampling. 3

(d) Let $f(x)$ be the function :

$$f(x)=\begin{cases} 5x^{-1} & \text{for} \quad x<-1 \\ ax+b & \text{for} \quad -1\le x\le \frac{1}{2} \\ 6x^{-1} & \text{for} \quad x>\frac{1}{2} \end{cases}$$

Find value of 'a' and 'b' that makes the function continuous. 3

(e) What is formula of calculating the confidence interval in Confidence Internal Estimation ? 3

(f) Write short note on weighted least square method for point estimation. 3

(g) For a certain game, individual game scores are normally distributed. Two players played 10 games each, and recorded their scores on each game. For player A, the average score is 375, and the sample variance is 17312. For player B, the average score is 360 and sample variance is 13208. Test at the 5% level of hypothesis that the variance of two players' score are the same; considering true means are unknown. 3

(h) What is appropraite use of Wold Test in Statistics. 3

Unit I

2. (a) What do you understand by Expected Value ? Write short note on Bivariate Expected Values. 5

(b) The table below shows the height x (in inches) and pulse rate y(in per minute), for 9 people. Find the correlation co-efficient and interpret your result. **9**

x	y
68	90
72	85
65	88
70	100
62	105
75	98
78	70
64	65
68	72

3. (a) Discuss role of Random Variables in Statistical Analysis. **4**

(b) The following table shows the number of motor registrations in a certain territory for a term of 5 years and sale of motor tyres by a firm in that territory for the same period :

Year	Motor Registration	No. of Types Sold
1	600	1250
2	630	1100
3	720	1300
4	750	1350
5	800	1500

Find regression equation to estimate sale of tyres when motor registration is known. Estimate the sale of tyres when registration is 850. **10**

Unit II

4. (a) Differentiate Census and Sample Method. **4**

(b) Construct a sampling distribution of sample means from the following population :

Population Unit	Observation
1	22
2	24
3	26
4	28

when random sample of size 2 are taken from it without replacement. Also find the means and standard error of the distribution. 10

5. (a) Explain Multistage Random Sampling. 4

(b) A population consists of the following elements :

2, 4, 5, 8, 11

Find :

(i) How many different samples of size 3 are possible, when sampling is done without replacement.

(ii) Find the sampling distribution of $\overline{X}$ (sample mean).

(iii) If all the elements are equally likely, compute the value of population mean (μ). 10

Unit III

6. (a) First four moments of a distribution about $x = 2$ are 1, 2.5, 5.5 and 16. Calculate first four moments about mean. 4

(b) Out of 20,000 customers ladger accounts a sample of 600 accounts was taken to test the accuracy of posting and balancing where in 45 mistakes were found. Assign limits within which the number of defective cases can be expected at 95% level. 10

7. (a) Explain the concept of moment generating function and show how it can be used for the calculation of moments. 4

(b) Write short notes on the following :

(i) Wald Intervals

(ii) Bootstrap Intervals

(iii) Likelihood Intervals

(iv) Maximum Likelihood. 2½×4=10

Unit IV

8. (a) The mean height of random sample of 100 students is 64 inch and standard deviation is 3 inch. Test the statement that the mean height of population is 67 inch at 5% level of significance. 4

(b) The number of automobile accidents per week in a certain city were as follows :

12, 8, 20, 5, 14, 10, 15, 6, 9, 4

Are these frequency in agreement with the belief that accident's numbers were same during these 10 week period. 5

(c) Discuss the precaution which should be kept in mind while using χ^2-test. 5

9. (a) How do you test the equality of two population means and two population proportions in case of large samples ?5

(b) A random sample of 9 boys had height (in inches) :

45, 50, 47, 52, 48, 47, 49, 53, 51

In the light of data discuss the suggestion that the mean height in population is 47.5. 9

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25115

M.C.A. EXAMINATION, Dec. 2018

(Full & Re-appear)

(Third Semester)

DATA & FILE STRUCTURE (F)/OPERATING SYSTEM (R)

Time : 3 Hours] [*Maximum Marks : 80*

Note : Q. No. **1** is compulsory. Attempt *Four* more questions by selecting at least *one* question from each Unit I to Unit IV. All questions carry equal marks.

1. (a) List the applications of Queue in Computer System.

(b) Briefly explain the operation on queue

(c) What do you mean by Binary tree ?

(d) List the applications of Tree in Computer System.

(e) Define the basic terms used in Graphs.

(f) Define the Work, Path and Circuit in Graph.

(g) Differentiate between Hash function and Hash table.

(h) List different types of file organization.

Unit I

2. Write a program to perform PUSH and POP operations on Stack.

3. Explain the operations performed on Linked List.

Unit II

4. Write a program for Binary Search Algorithm.

5. Explain with example any *one* application of Tree Traversal.

Unit III

6. Write a program for Breadth First Search Algorithm.

7. Write short notes on the following :

   (a) Homomorphism

   (b) Reachability

   (c) All pair shortest path.

Unit IV

8. Explain concept, application, advantages and disadvantages of Sequential file organization.

9. Write short notes on the following :

   (a) Index Sequential file organization

   (b) Random file organization.

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25116

M.C.A. EXAMINATION, Dec. 2018

(Third Semester)

(Full & Re-appear)

ARTIFICIAL INTELLIGENCE (F) /
THEORY OF COMPUTATION (R)

Time : 3 Hours] [*Maximum Marks : 80*

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

1. (a) Define Predicate with example.

(b) Discuss role of Frame in Knowledge Presentation.

(c) Explain the term 'Data Driven Search'.

(d) Define Admissibility.

(e) What are Decomposable and Non-decomposable Production Systems ?

(f) Explore the term 'Non-monotonic Logic'.

(g) Write a short note on the Genetic Algorithms.

(h) Explain Transition Network Parsers. 3×8=24

Unit I

2. (a) Write Algorithm for Unification. 7

(b) Write algorithm of Resolution in Predicate Logic. 7

3. (a) Define Conceptual Graph. Give an example of problem and represent it in conceptual graph. 7

(b) Define Frames. Discuss Frames as Sets and Instances. 7

Unit II

4. Write Steepest Ascent Hill Climbing Algorithm. Simulate with the help of example. 14

5. (a) What is Best First Search Strategy ? When would Best First Search will be worse than Simple Breadth First Search. 7

(b) Write Minimax Algorithm. 7

Unit III

6. (a) Differentiate Commutative and Non-commutative Production System. 4

(b) Discuss Standford Certainty Factor Algebra with the help of example. 10

7. (a) What is Production System ? Discuss Monotonic and Non-monotonic Production Systems. 5

(b) Discuss various operators used in Fuzzy Logic. What are applications of Fuzzy Logic ? 9

Unit IV

8. Discuss concept of Natural Language Processing. What are problems faced in Natural Language Processing and how can these be resolved ? 14

9. (a) Write Chomsky Hierarchy of Formal Languages. How are different types of languages are different from each other ? 7

(b) Explain the concept of Augmented Transition Network Parser with example. 7

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25117

M.C.A. EXAMINATION, Dec. 2018

(Full & Re-appear)

(Third Semester)

DATA BASE MANAGEMENT SYSTEM

Time : 3 *Hours*] [*Maximum Marks :* 80

Note : Q. No. **1** is compulsory. Attempt *four* more questions, selecting at least *one* question from Unit I to IV.

1. (a) Define Database. **24**

(b) Discuss the meaning and usage of abstraction.

(c) What do you mean by DML ?

(d) List and explain any three data type in SQL.

(e) Explain Join Dependency.

(f) Define normal form and normalization.

(g) What do you mean by Transaction ?

(h) Define Concurrency.

Unit I

2. Draw and explain Library Management System. 14

3. List and explain constraints in Relational Database. 14

Unit II

4. Explain the working of hierarchical data model. 14

5. Write and explain the queries of DDL and DML. 14

Unit III

6. Explain with example 4NF. 14

7. Discuss role of Information System. 14

Unit IV

8. Discuss security issues in database. 14

9. Explain concurrency and concurrency control techniques. 14

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25120

M.C.A. EXAMINATION, Dec. 2018

(Full & Re-appear)

(Fifth Semester)

Computer Graphics and Multimedia (F)/Mob. Application Development (R)

Time : 3 *Hours*] [*Maximum Marks :* 80

Note : Attempt *Five* questions in all. Q. No. 1 is compulsory. In addition to compulsory question, attempt *four* more questions selecting *one* question from each Unit.

(Compulsory Question)

1. (a) What do you mean by Projection ? 2
   (b) What do you mean by Line Segment ? 2
   (c) What is Image Compression ? 2
   (d) Explain 2-D viewing pipeline. 2
   (e) Explain Scan Line Algorithm. 2

(f) Explain Random and Raster Scan. 2

(g) Explain JPEG Architecture. 2

(h) How to representation Matrix in 30D transformations ? 2

Unit I

2. (a) How can Bresenham's line drawing algorithm be modified so that the antialising effects are produced while generating a straight line ? 8

(b) Explain the approaches of polygon filling algorithms. 8

3. (a) What is Computer Graphics ? Explain its classification and applications. 8

(b) What is Bresenham's circle drawing algorithm ? Explain in detail. 8

Unit II

4. (a) Explain Sutherland–Hodgeman polygon clipping algorithm. 8

(b) How window to view port mapping is done ? Explain. 5

(c) Explain 2-D viewing pipeline. 3

5. (a) What is 3-D transformation ? Explain its types. 8

(b) What is Clipping ? Explain Cohen Sutherland algorithm for line clipping. 8

Unit III

6. What is Hidden Surface Removal Technique ? Explain Z-buffer algorithm for hidden surface removal. 16

7. Explain the different types of Projections in detail. 16

Unit IV

8. Explain the criteria on which multimedia system are classified. Also describe various types of multimedia systems. 16

9. (a) Explain the process of editing and capturing images. 8

(b) Explain different image file formats. 8

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25121

M.C.A. EXAMINATION, Dec. 2018

(Full & Re-appear)

(Fifth Semester)

ADVANCED NETWORK

Time : 3 Hours] [*Maximum Marks : 80*

Note : Q. No. 1 is compulsory. Attempt *one* question from each Section. All questions carry equal marks.

1. Define the following :
   (a) P2P Applications
   (b) Post-office Protocol
   (c) Connectionless Iterative Server
   (d) IPv6 Transition Strategies.

Section A

2. What do you mean by TCP ? Also explain the concept of Flow control, error control and congestion control in detail.

3. What do you mean by UDP ? Explain the concept of SCTP Association, Packet Format and Features of SCTP.

Section B

4. Explain the concept of Web and HTTP in application layer. Also describe Domain name system and Simple Mail Transfer Protocol.

5. What do you mean by FTP ? Also explain the concept of performance of TCP over ATM and types of service related to it.

Section C

6. Explain the concept of Client-Server Paradigm in detail.

7. What do you mean by Memory Management System ? Also explain Address Transformation function and Connection Oriented Concurrent Servers.

Section D

8. Explain the need and features of IPv6. Also explain the concept of authentication and security in IPv6.

9. Explain the various formats and headers in IPv6. Also explain IPv6 routing and autoconfiguration and Mobile IP.

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25122

M.C.A. EXAMINATION, Dec. 2018

(Fifth Semester)

(Full & Re-appear)

ARTIFICIAL INTELLIGENCE

Time : 3 *Hours*] [*Maximum Marks :* 80

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

1. (a) What is the Artificial Intelligence ? Explain various application areas of AI.

(b) What is Modus Ponens ?

(c) What is Dempster-Shafer Theory ?

(d) What do you understand Intelligent Agents ?

(e) Explain the McCullough Pitts Model.

(f) What is Neural Network ?

(g) What is Fuzzy Logic ?

(h) What do you understand by Fuzzy qualifiers ?

Unit I

2. (a) What is Depth-First Search and Breadth-First Search Techniques ? Explain and also write the algorithm for both. **8**

(b) What is Reasoning ? Discuss different characteristics of reasoning. **8**

3. (a) What is Logic ? Explain different types of logic system. **8**

(b) What do you understand by Resolution ? **8**

Unit II

4. (a) What is knowledge representation ? Explain different type of knowledge representation. How Meta knowledge is represented in rule based expert system. **8**

(b) What do you understand by Uncertainty ? Explain various types of Uncertainty ? What is conceptual dependency ? 8

5. (a) What do you understand by Decision Tree ? Explain decision tree learning algorithms. 8

(b) What is Intelligent Agents ? Explain the architecture for Intelligent Agents. 8

Unit III

6. (a) Discuss supervised learning and unsupervised learning in neural network. 8

(b) Describe back propagation and features of back propagation neural network. 8

7. (a) Write about Hebbian learning and Widrow-Hoit learning rule. 8

(b) Define an activation function. What are the various types of neuron activation function ? 8

Unit IV

8. Explain the operation of Fuzzy Sets with a suitable example. 16

9. (a) With a neat sketch discuss the major components of fuzzy controller. 8

(b) What do you understand by Multivalued Logics ? Explain multivalued logics. 8

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25123

M.C.A. EXAMINATION, Dec. 2018

(Full & Re-appear)

(Fifth Semester)

ADVANCE WEB TECHNOLOGIES

Time : 3 *Hours*] [*Maximum Marks* : 80

Note : Attempt *five* questions in all. Q. No. **1** is compulsory. Attempt *one* question from each Unit for rest four questions. All questions carry equal marks.

1. Attempt the following :

(i) Define Web Logs.

(ii) What is a Page rank ?

(iii) What is session management ?

(iv) Explain the process of setting a Breakpoint.

(v) How do you use JavaScript for your web document ?

(vi) Explain DOM in short.

(vii) What do you mean by a Threat in Web Technology ?

(viii) Describe Session Hijacking.

Unit I

2. What do you mean by a Style-Sheet ? Explain its different types with suitable programs.

3. What do you understand by a Page Rank algorithm ? Explain it in detail.

Unit II

4. What are control flow statements in PHP ? Explain all with the program of your choice.

5. (a) Explain Object Oriented concept and its importance in programming.

   (b) Write a program to check the entered number is Prime or not.

Unit III

6. Explain AJAX Web Application Model. With which technologies is it used ? Explain.

7. Explain the working concept of AJAX. Also write a program to create a JavaScript application using AJAX.

Unit IV

8. Explain different types of attacks on web services.

9. (a) Describe Cross-site Request Forgery.

   (b) What is Authentication and Authorization ? Explain.

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25124

M.C.A. EXAMINATION, Dec. 2018

(Fifth Semester)

(Full & Re-appear)

SECURITY IN INFORMATION SYSTEM

Time : 3 Hours] [*Maximum Marks :* 80

Note : Q. No. **1** is compulsory. Attempt *one* question from each Section. Q. No. **1** carries 24 marks and remaining questions carry 14 marks each.

1. Define the following :

(i) Decryption

(ii) Stream and block Ciphers

(iii) Adelman Encryption

(iv) Properties of Modular Arithmetic

(v) Public key

(vi) Role of Digital Certificate

(vii) Encapsulating payloads

(viii) Secure Socket Layer.

Section A

2. Explain the concept of Ciphers in detail. Also describe the Poly-alphabetic Ciphers and Cryptanalysis of Poly-alphabetic Ciphers.

3. Explain the concept of Mono-alphabetic Substitution such as Caesar Cipher in detail.

Section B

4. Explain the concept of Data Encryption Standards. Also describe the analyzing and strengthening of DES. Also explain secure hash algorithm in detail.

5. Explain the concept of Public key Encryption system. Also describe the Knapsacks and digital signature algorithms in details.

Section C

6. What do you mean by Digital Signature ? Explain the structure of Digital Signature in detail.

7. Explain the concept of key management protocol and exchange with public key cryptography in detail. Also describe the concept of Hellman Algorithm in detail.

Section D

8. What do you mean by Network Security. Also describe X.509 authentication service and electronic mail security.

9. What do you mean by IP Security ? Explain the structure of IP security and encapsulating payloads in detail.