PG – 300

III Semester M.C.A. Examination, April/May 2022
(CBCS – Y2K20 Scheme)
COMPUTER SCIENCE
3MCAE2 : Big Data Analytics (Elective)

Time : 3 Hours

Max. Marks : 70

Instructions : 1) *Part – **A** : Answer **any five** questions. **Each** carries **6** marks.*
2) *Part – **B** : Answer **any four** questions. **Each** carries **10** marks.*

PART – A

1. What is Big data ? What are the characteristics of big data ?
2. What is NOSQL ? Differentiate NOSQL from SQL.
3. What is data pre-processing ? What is the importance of data pre-processing ?
4. Write a note on data reduction.
5. Explain Bayesian classification in detail.
6. Explain spatial data mining.
7. Explain the ecosystem of HADOOP.
8. Explain Hive data types.

PART – B

9. Discuss the significance of big data in various industrial applications.
10. Explain data transformation technique in data pre-processing.
11. What is MapReduce ? Explain various levels in MapReduce workflow.
12. Explain HDFS in detail with a diagram.
13. What is Apache Pig ? Explain the various components of the model.
14. Write a note on following :
    a) Hbase **5**
    b) PigLatin. **5**

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III Semester M.C.A. Degree Examination, April/May - 2022

COMPUTER SCIENCE

Cryptography and Network Security

(CBCS Scheme 2020-21)

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

1) Answer any **Five** questions from **Section-A,** each carries Six marks.
2) Any **Four** questions from **Section-B,** each carries Ten marks.

SECTION - A

Answer any FIVE of the following questions. Each carries 6 Marks. **(5×6=30)**

1. Briefly explain security mechanisms in cryptography.
2. With a neat diagram explain the model for network security.
3. Write a note on RC4.
4. Explain the steps involved in AES cipher.
5. With an example explain Euclidean algorithm.
6. Briefly explain Digital Signature.
7. Explain RSA algorithm.
8. Write a note on SSL and TLS.

SECTION - B

Answer any FOUR of the following questions. Each carries 10 Marks. **(4×10=40)**

9. Define Cryptography. Explain the types of attacks on encrypted messages.
10. a) Write the difference between substitution and transposition cipher. **(5+5)**
    b) Write a note on Ceaser Cipher.
11. Explain single round DES algorithm.
12. With a neat diagram explain the different block cipher modes of operation.

[P.T.O.

13. a) Explain Diffie-Hellman key exchange algorithm. (5+5

b) Briefly explain Hash function. (5+5

14. Write a note on PKI and Malicious software.

PG – 301

III Semester M.C.A. Examination, April/May 2022
(CBCS – Y2K20 Scheme)
COMPUTER SCIENCE
3MCA : Cloud Computing (Elective)

Time : 3 Hours Max. Marks : 70

Instructions : *Answer **any five** questions from Section – **A** and **any four** questions from Section – **B**.*

SECTION – A

Answer **any five** questions. **Each** carries **6** marks. **(5×6=30)**

1. Define cloud computing. Enlist and explain the essential characteristics of cloud computing.
2. Give a brief account of cloud service models.
3. What is virtualization ? Discuss about Hypervisor Software Management.
4. Differentiate between cloud computing and distributed computing.
5. Discuss the advantages and disadvantages of PaaS.
6. Discuss the security in public and private clouds.
7. What is parallel programming ? Compare distributed programming with parallel programming.
8. Explain the information security in cloud computing.

SECTION – B

Answer **any four** questions. **Each** carries **ten** marks. **(4×10=40)**

9. Discuss various applications of cloud computing. Explain how cloud computing can be used with respect to social networking.

P.T.O.

10. Explain the cloud reference architecture and discuss the responsibilities of various actors.

11. Define OS virtualization. Discuss the virtual infrastructure requirements.

12. a) What is Google App Engine ? Explain the benefits of Google App Engine. **5**

    b) Define Microsoft Azure. Discuss the components of Microsoft Azure. **5**

13. Define Map-Reduce. Explain Hadoop ecosystem and mention its components.

14. Define cloud security. Discuss access control and authentication in cloud computing.

PG – 235

III Semester M.Sc. (Computer Science) Degree Examination, April/May 2022
(CBCS)
COMPUTER SCIENCE
MSC304 : Cyber Space (Open Elective)

Time : 3 Hours Max. Marks : 70

Instructions : 1) Part – ***A*** : Answer ***all*** the questions.
2) Part – ***B*** : Answer ***any four*** questions.
3) Part – ***C*** : Answer ***any three*** questions.

PART – A

Answer **all** the questions. **Each** question carries **2** marks : **(10×2=20)**

1. Define the term ERP.
2. Expand LAN and MAN.
3. Routing.
4. What is the difference between hyperlink and hypertext ?
5. What is encryption ?
6. Malware.
7. Define the term e-Commerce.
8. What is social media ?
9. What is phishing ?
10. Cyber terrorism.

PART – B

Answer **any four** questions. **Each** question carries **5** marks : **(4×5=20)**

11. Explain text alignment tags in html with suitable example.
12. What are the functions of the controller of certifying Authorities as per the Information Technology Act 2000 ?

P.T.O.

13. Explain the architecture of a web browser.

14. Explain the stages of e-Governance in detail.

15. What is IP Address ? Explain the classes of IP address.

16. Explain the basic features of HTTP.

PART – C

Answer **any three** questions. **Each** question carries **10** marks : **(3×10=30)**

17. a) Explain the components of search engine. **5**

    b) Explain the various driving forces being e-commerce. **5**

18. What are the working strategies of e-Governance in order to provide an efficient service to the society ? Explain.

19. a) Explain the working of e-mail with an example. **5**

    b) What are the provisions of IT Act 2000 for Cyber related offences ? Explain. **5**

20. Discuss the various e-Commerce models.

21. Write a short note on the following : **(4+4+2)**

    a) DNS.

    b) Cryptography.

    c) Spamming.

PG – 299

III Semester M.C.A. Examination, April/May 2022
(CBCS – Y2K20)
COMPUTER SCIENCE
3MCAE1 : Machine Learning (Elective)

Time : 3 Hours Max. Marks : 70

Instructions : *Answer* ***any five*** *from Part –* ***A****.*
Answer ***any four*** *from Part –* ***B****.*

PART – A

Answer **any 5** questions. **Each** question carries **6** marks. **(5×6=30)**

1. Define the terms hypothesis space and version space. Illustrate with example.
2. What is Overfitting ? What are the measures to avoid it in Decision Trees ?
3. What is Clustering ? Differentiate between K-Means and Hierarchical Clustering.
4. Explain basic elements of Hidden Markov Model (HMM). List any two applications of HMM.
5. Explain FP growth algorithm with an example.
6. What is perceptron ? Explain working of a perceptron with a neat diagram.
7. State the mathematical formulation of SVM problem. Give an outline of method for solving the problem.
8. Explain the different operators in Genetic Algorithm.

PART – B

Answer **any 4** questions. **Each** question carries **10** marks. **(4×10=40)**

9. a) Differentiate between supervised and unsupervised learning with suitable examples. **5**
   b) Explain Find-S algorithm and state its disadvantages. **5**
10. a) Explain any two types of activation function. **4**

P.T.O.

b) Suppose 10000 patients get tested for flu; Out of them 9000 are actually healthy and 1000 are actually sick. For the sick people, a test was positive for 620 and negative for 380. For healthy people ,same test was positive for 180 and negative for 8820. Construct a Confusion matrix for data and compute sensitivity and specificity for the data. **6**

11. a) Identify only the first splitting attribute for decision Tree by using ID3 algorithm with following data set : **6**

Major	Experience	Tie	Hired ?
CS	Programming	Pretty	No
CS	Programming	Pretty	No
CS	Management	Pretty	Yes
CS	Management	Ugly	Yes
Business	Programming	Pretty	Yes
Business	Programming	Ugly	Yes
Business	Management	Pretty	No
Business	Management	Pretty	No

b) What are the steps involved in expectation Maximization Algorithm ? **4**

12. a) What is Bayes optimal classifier ? **4**

b) With a suitable example, explain Naive Bayes algorithm. **6**

13. a) What is Market basket analysis ? How Apriori algorithm works ? **5**

b) Using K-means clustering, cluster the following data into two groups. Assume cluster centres are m1 = 2 and m2 = 4.The distance function used is Euclidean distance. {2, 4, 10, 12, 3, 20, 30, 11, 25}. **5**

14. a) Explain the need of mutation in Genetic algorithm. **5**

b) Explain the parameters used to analyse Genetic algorithm. **5**

PG – 298

III Semester M.C.A. Examination, April/May 2022
(CBCS Y2K20 Scheme)
COMPUTER SCIENCE
3MCA3 : Research Methodology

Time : 3 Hours Max. Marks : 70

Instructions : 1) *Answer **any five** questions from Section – **A**, **each** question carries **6** marks.*
2) *Answer **any four full** questions from Section – **B**, **each** question carries **10** marks.*

SECTION – A **(5×6=30)**

1. Define Research. How to frame title of Research ? Explain with examples.
2. All student in a class have age 20. What is the standard deviation ? How to interpret the data ?
3. What is the use of computer in research ?
4. Explain data analysis with GRETL tool.
5. Compare correlation and regression models.
6. Explain optimization using fuzzy system.
7. Summarize the outline of the popular report.
8. Discuss any three phases of genetic algorithm.

SECTION – B **(4×10=40)**

9. Explain various steps of research process.
10. How to test a hypothesis ? Explain the chi-square test steps with example.
11. Explain how statistical measures of central tendency used in research.
12. Discuss any one time series model and its use.
13. Explain the role of simulation in research with example.
14. Explain the mechanism of writing a research report.

PG – 305

III Semester M.C.A. Examination, April/May 2022
(CBCS)
COMPUTER SCIENCE
MCA 304 : Statistical Analysis

Time : 3 Hours Max. Marks : 70

Instructions : *1) Answer **all** Sections.*
*2) Answer **any five** questions from Section – **A** and answer **any four** questions from Section – **B**.*

SECTION – A

Answer **any 5** questions. **Each** question carries **6** marks : **(5×6=30)**

1. a) State and prove addition theorem of probability. **3**

   b) Two fair dice are rolled at once. Find the probability that the sum of the numbers obtained is 7 or 10. **3**

2. Find the unknown 'K' in the following probability distribution and also find E(X), Var(X) and SD(X). **6**

X	0	1	2	3	4
Y	3/8	1/4	K	3/16	1/16

3. State and prove Baye's theorem. **6**

4. Calculate the coefficient of correlation between x and y for the following data : **6**

x	21	22	23	24	25	26	27	28	29	30
y	11	12	13	14	15	16	17	18	19	20

5. Derive mean and variance of Poisson's distribution. **6**

6. Fit an equation of the form $y = ax^b$ to the following data : **6**

x	1	2	3	4	5
y	0.5	2	4.5	8	12.5

P.T.O.

7. The probabilities that a patient recovers from COVID-19 is 0.8. If 10 people are known to have contacted COVID-19, what is the probability that
   i) 7 of them recover
   ii) Atleast 9 of them recover. **6**

8. From the following series of annual data, find the trend line by the method of semi-averages by plotting the trend line, also estimate the value of 2006. **6**

Year	2000	2001	2002	2003	2004	2005
Annual values	170	231	261	267	278	302

SECTION – B

Answer **any 4** questions. **Each** question carries **10** marks : **(4×10=40)**

9. The joint probability distribution of X and Y are given below : **10**

X \ Y	1	2	3
1	0.186	0.148	0.074
2	0.037	0.111	0.111
3	0.111	0.148	0.074

Find :
   i) Marginal probability distribution of X and Y
   ii) E(X) and E(Y)
   iii) V(X) and V(Y)
   iv) Conditional distribution of Y given X = 1
   v) Conditional distribution of X when Y < 2.

10. a) Three machines M_1, M_2 and M_3 manufactures respectively 40%, 50% and 10% of total production. The percentage of defective items produced by M_1, M_2, M_3 are 2%, 4% and 5% respectively. If an item is chosen at random and is found to be defective. Find the probability that it is being a product of M_3. **6**

    b) Define simple random sampling and stratified random sampling with example. **4**

11. Given the bivariate data : **10**

x	1	5	3	2	1	1	7	3
y	6	1	0	0	1	2	1	5

   i) Fit the two regression lines (x on y and y on x)
   ii) Predict x if y = 2.5
   iii) Compute the correlation coefficient.

12. a) Calculate the coefficient of rank correlation from the following data : 5

x	50	81	75	88	95	90	60	80
y	100	142	120	134	150	115	110	140

b) The following are the values of production (in thousand meters) of a cloth mill. 5

Year	2002	2004	2006	2008	2010	2012	2014
Production	75	79	86	92	92	94	96

i) Fit a straight line trend (y = a + bx) using least square method.

ii) Estimate the production in the year 2016.

13. a) In order to test whether the attributes, COVID-19 infection and gender are independent, a survey of 80 people was conducted and the results are as given below. Conduct chi-square test for independence of attributes at 5% level of significance. 5

	COVID –Ve	COVID +Ve
Male	20	30
Female	8	19

b) The orange fruits grown in a large orchard have a mean weight of 19.3 ounces with a S.D. of 2.2 ounces. Assuming that the distribution of the weight of these orange fruits has the shape of normal distribution, find

i) what percentage of the orange fruits weigh less than 18 ounces.

ii) what percentage of the orange fruits weigh atleast 20 ounces. 5

14. A random sample of 5 truck tyres is taken from each of 3 brands manufactured by 3 companies. The life time of these tyres are given below. Use analysis of variance technique to determine whether the average life time of 3 brands of tyres are equal or not. Test 'α'at 5%. 10

Brand 1	35	34	34	33	34
Brand 2	32	32	31	28	29
Brand 3	34	33	32	32	33

PG – 304

III Semester M.C.A. Examination, April/May 2022
(CBCS Scheme)
COMPUTER SCIENCE
MCA 303 : Theory of Computation

Time : 3 Hours Max. Marks : 70

Instruction : *Answer **any five** from Part – **A** and **any four** from Part – B.*

PART – A

Answer **any five** of the following. **Each** question carries **6** marks. **(5×6=30)**

1. Define Regular Expressions. Design $\in$-NFA for regular expression (a+b)*a*b*c*.
2. Define Pumping Lemma for Regular languages.
3. Enumerate the limitations of a Deterministic Finite Automaton (DFA).
4. Define CFG. Show that $L = \{a^n b^n c^n, n \geq 1\}$ is not context free.
5. Show that the grammar $E \rightarrow E + T / T$, $T \rightarrow T \times F/F$, $F \rightarrow a$ is ambiguous.
6. Construct a PDA to accept $L = \{0^n 1^n, n \geq 1\}$ and show the computation for input sequence w = 000111.
7. Define Turing Machine (TM). Explain the Turing Machine model and give any 2 of its variants.
8. Enumerate any five closure properties of Context free languages.

PART – B

Answer **any four** of the following. **Each** question carries **10** marks. **(4×10=40)**

9. Construct DFA to accept strings for $\Sigma = \{a, b\}$.
   a) Strings not containing the substring aba
   b) Strings with length divisible by 3.

P.T.O.

10. Design NFA to accept strings of 0's and 1's ending with 10 or 01. Convert the NFA to its equivalent DFA.

11. a) Given CFG G

$S \rightarrow aB / bA$

$A \rightarrow a / aS / bAA$

$B \rightarrow b / bS / aBB$

For the string bbaabbaa find LMD, RMD and Parse Tree.

b) Simplify the given CFG.

$S \rightarrow ABCa / bD$

$A \rightarrow BC / b$

$B \rightarrow b / \epsilon$

$C \rightarrow d / \epsilon$

$D \rightarrow d.$

12. Define CNF. Convert to CNF where $P = \{S \rightarrow 0A/1B, A \rightarrow 0AA/1S/1, B \rightarrow 1BB/0S/0\}$.

13. Construct a TM as a transducer to determine sum of 2 integers represented as zeroes and separated by a #.

14. Explain the following :

a) ID of a TM

b) Language accepted by a PDA

c) Halting problem of TM

d) Chomsky's Hierarchy.

PG – 402

III Semester M.C.A. Examination, April/May 2022
(CBCS – Y2K20 Scheme)
COMPUTER SCIENCE
Web Programming (Elective)

Time : 3 Hours Max. Marks : 70

Instruction : *Answer **any five** questions from Section – **A** and answer **any four** questions from Section – **B**.*

SECTION – A

Answer **any five** of the following, **each** carries **6** marks. **(5×6=30)**

1. Differentiate between HTML, HTML5 elements and its attributes. **6**
2. Define local storage, session storage with suitable examples. **6**
3. Define Document Object Model (DOM) and list out various events present in it. **6**
4. Explain in detail about MIME. **6**
5. What is AJAX ? Explain the structure of Request-Response mechanism in AJAX ? **6**
6. Write a short note on prototype inheritance in AJAX. **6**
7. List out various key and form related events in Document Object Model (DOM). **6**
8. Write a short note on Cross-Domain Access in AJAX. **6**

SECTION – B

Answer **any four** of the following, **each** question carries **10** marks. **(4×10=40)**

9. What is Javascript ? Explain the role of arrays, functions with suitable examples. **10**
10. Explain in detail about Document Object Model (DOM) event propagation. **10**
11. Explain database access mechanism in AJAX with suitable example. **10**
12. Explain in detail about RSS in AJAX with suitable examples. **10**
13. What is XML ? Explain the role of parsers with example. **10**
14. Explain the similarities and differences between JSON and XML. **10**