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END TERM EXAMINATION

THIRD SEMESTER [MCA] JANUARY-FEBRUARY 2023

Paper Code: MCA253 **Subject: Cyber Security & Cyber Laws**

Time: 3 Hours **Maximum Marks: 75**

Note: Attempt five questions in all including Q.No.1 which is compulsory.

Q1 Attempt the following in brief: **(10x2.5=25)**

a) What is digital media forensics?
b) Differentiate among Worms, Viruses, and Trojan Horses.
c) Is there a difference between "cybercrime" and "cyberfraud"? Explain.
d) Differentiate between passive and active attacks with examples.
e) What is a Blind SQL injection attack?
f) Define digital media forensics?
g) What do you understand by the salient features of the Indian IT Act?
h) What is a virus hoax?
i) Describe the main principles of information security?
j) What is the work of WIPO?

Q2 a) What is the cyber threat? How it is different from cybercrime? How do we classify cybercrimes? Explain each one briefly. **(6.5)**

b) Explain the working of email spoofing. Discuss the preventive measures to protect from email spoofing. **(6)**

Q3 a) Discuss the various type of deliberate software attacks designed to damage, destroy or deny service to target systems? **(6.5)**

b) What are the various essential challenges in mobile security? **(6)**

Q4 a) What are Cyber Security Vulnerabilities and what are the common types of Cyber Security Vulnerabilities? **(6.5)**

b) How to Prevent an SQL Injection and How is an SQL Injection attack performed? **(6)**

Q5 a) Suppose that you have a message consisting of 1024 bits. Design a method that will extend a key that is 64 bits long into a string of 1024 bits, so that the resulting 1024 bits can be XORed with the message, just like a one-time pad. Is the resulting cipher as secure as a one-time pad? Is it possible for any such cipher to be as secure as a one-time pad? **(6)**

b) What is cryptography and also explain Symmetric-key cryptography and Asymmetric cryptography? **(6.5)**

Q6 a) Explain in detail Digital Signatures and the Indian IT ACT. **(6.5)**

b) What are some essential parts of the Information Technology ACT that are used to record cyber-crimes? **(6)**

P.T.O

Q7 a) What are the steps of the forensic life cycle? (6.5)

b) What are the challenges in Computer Forensics? (6)

Q8 Compare and contrast between IDS(Intrusion Detection System) and IPS(Intrusion Prevention System). What are the various intrusion detection methodologies? Also, explain any three types of threats. **(12.5)**

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END TERM EXAMINATION

THIRD SEMESTER [MCA] JANUARY-FEBRUARY 2023

Paper Code: MCA201 **Subject: Design and Analysis of Algorithms**

Time: 3 Hours **Maximum Marks: 75**

Note: Attempt five questions in all including Q.No.1 which is compulsory. Select one question from each Unit.

Q1 Attempt all parts: **[2.5x10=25]**

a) Define "Optimal Substructure" in dynamic programming
b) Can we get more than one minimum spanning trees for a given weighted undirected connected graph?
c) Write your comments on the implications of knowing an exact relationship that is "equality" or "Non-equality" in between P and NP complexity classes.
d) Show that the number of vertices with odd degree in a graph is always even
e) Why Minimum tree spanning is tractable (Solvable in polynomial time), whereas travelling salesman problem is in NP?
f) Whether this statement is true of false "***Some problems in NP complete can not be transformed into satisfiability problem in Polynomial time***"
g) Mention the complexity of the quick sort algorithm for best and worst case.
h) What is a randomized algorithm?
i) What is the complexity of Floyd-warshall algorithm?
j) Write an Optimal Huffman Code for the following Set of Frequencies based on the first 8 fibonacci numbers?
a:1 b:1 c:2 d:3 e:5 f:8 g:13 h:21

UNIT-I

Q2 Comment on the Tradeoff in between the Time and Space Complexity of an Algorithm. State Masters theorem. What is the regulatory condition? **(12.5)**

Q3 Find the Solution of the following recurrence equations **(12.5)**
(a) $T(n) = 2T(n/2) + \log n$
(b) $T(n) = 8\ T(n/2) + n^2$
(c) $T(n) = T(n-1) + T(n-2)$

UNIT-II

Q4 Explain Divide and conquer. How Strassen applied it to the matrix problem? Compare the asymptotic time complexity of the classical matrix multiplication algorithm to Strassen's algorithm? **(12.5)**

Q5 Explain KMP Algorithm for String Matching. Illustrate its working when the text is aaabaadaabaaa and the pattern is aabaa? Repeat the process for Naive string pattern matching algorithm **(12.5)**

P.T.O.

UNIT-III

Q6. What dopes Dynamic Programming have common with Divide and conquer and what are the differences? Write a function that takes two parameters n and k and returns the value of Binomial Coefficient C(n, k) using dynamic programming **(12.5)**

Q7. Define the basic ingredients of Greedy Method in the Context of Kruskal's Algorithms and Explain and analyze it's time Complexity **(12.5)**

UNIT-IV

Q8 What would be the characteristics of problems that are harder than NP complete problems? Prove that vertex cover problem is poly-time reducible to clique problem. **(12.5)**

Q9 Prove that CNF satisfiability problem is NP Complete **(12.5)**

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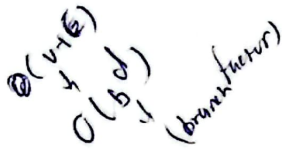

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END TERM EXAMINATION

THIRD SEMESTER [MCA] JANUARY-FEBRUARY 2023

Paper Code: MCA-215 **Subject: Software Project Management**

Time: 3 Hours **Maximum Marks: 75**

Note: Attempt all questions as directed. Internal choice is indicated.

Q1. Answer the following briefly: **(Any Five)** **(3x5=15)**

(a) Justify the need and meaning of software project management?

(b) Distinguish between different software projects?

(c) Justify the role of a software manager in the success of a software project?

(d) You set out on a long car trip to an unfamiliar destination and got lost midway. What was missing in your trip?

(e) Enlist the advantages of a project schedule?

(f) List out the common sources of risk in IT project?

(g) List the benefits of review in the process of project monitoring and control?

(h) Identify the different reason for which a project may need to be terminated.

(i) What do you understand by the term critical path?

(j) Discuss the need to Time sheets, review plans in project management?

UNIT-I

Q2. (a) A programmer was assigned the task to convert a static website of a magazine into a dynamic website because the web has become more sophisticated and that there has been a major shift of "print" audience to the internet. Enlist the financial, organizational and technological issues in planning of the said project? **(6.5)**

(b) Elaborate the software project life cycle management? **(6)**

OR

Q3. (a) A programmer was assigned the task to design dynamic website of a radio station because the web has become more sophisticated and that there has been a major shift of audience to the internet. Enlist the financial, organizational and technological issues in planning of the said project? **(6.5)**

(b) Elaborate the steps of software project planning? **(6)**

UNIT-II

Q4. (a) Through an appropriate example explain how to visualize a project using Gantt chart? **(6.5)**

(b) Discuss the COCOMO hierarchy of estimation models in details. How these model differ from the dynamic estimation models. **(6)**

P.T.O.

MCA-215

OR

Q5. (a) According to the COCOMO model, cost is the fundamental attribute of a software product, based on which size and effort are estimated. Justify your answer? What is Jacobian. Derive its expression for 2 Degree of freedom robot. **(6.5)**

(b) Compare PERT and Gantt Charts? **(6)**

UNIT-III

Q6. (a) Elaborate the issues to be taken care of in staff acquisition for a new project? **(6.5)**

(b) Enlist the different quality control standards? **(6)**

OR

Q7. (a) What is the importance of Software Quality? Discuss six major external software quality characteristics identified by ISO 9126. **(6.5)**

(b) What do you mean by team structure? Explain different types of team structures. **(6)**

UNIT-IV

Q8. (a) Create a suitable example using decision trees for quantifying risk? **(6.5)**

(b) How would you identify the major risks that might affect your project and identify the strategies for minimizing each of those risks? **(6)**

OR

Q9. (a) Create a suitable example using Monte Carlo analysis for quantifying risk? **(6.5)**

(b) Discuss the reasons for project closure? **(6)**

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END TERM EXAMINATION

THIRD SEMESTER [MCA] JANUARY-FEBRUARY 2023

Paper Code: MCA203 **Subject: Artificial Intelligence and Machine Learning**

Time: 3 Hours **Maximum Marks: 75**

Note: Attempt five questions in all including Q.No.1 which is compulsory. Select one question from each unit.

Q1 Attempt **any five** from the following: **(5x5=25)**

a) Difference between Boosting and Bagging?
b) Compare Over fitting and Under fitting?
c) Compare Depth First Search with Breath First Search?
d) What is difference between informed and uninformed search?
e) What is AI? Mention application of AI.
f) What is constraint satisfaction Algorithm?
g) What is Heuristic Search?
h) What are the various types of Neural Network?

UNIT-I

Q2 a) Explain the following search algorithms with example: **(3x2=6)**
i) MEA
ii) AO*

b) Difference between AI, ML and Deep Learning? Give Suitable Example **(6.5)**

Q3 a) Define States Spaces in AI? Why they are useful? Write state spaces for any suitable problem? **(6)**

b) Discuss various problems in Hill Climbing Algorithm and how they can be prevented? **(6.5)**

UNIT-II

Q4 a) What are the various Inferences rule? Explain. **(6.5)**

b) Difference between Predicate and Propositional Logic? Provide example **(6)**

Q5 a) What are the importance of Knowledge Representation? Explain with Example? **(6.5)**

b) Explain the difference between Forward and Backward Reasoning? **(6)**

UNIT-III

Q6 a) Difference between Bias and Varience? **(6)**

b) What are various types of Machine Learning's Problems? **(6.5)**

P.T.O.

Q7 a) How Least Square, Total sum of squares and sum of square of residuals are different from each other give example? **(6.5)**

b) What is confusion matrix? Explain with suitable example? **(6)**

UNIT-IV

Q8 a) Why Dimensionality Reduction is important? Explain with suitable example? **(6)**

b) What is activation function? Why it is important in Machine Learning? **(6.5)**

Q9 a) Difference between Feed Forward and Back Propagation Algorithm? **(6)**

b) Explain Recommender system? With Suitable example? **(6.5)**

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