Rastriya Beema Sansthan
Syllabus (Level – 7, Computer Engineer)

राष्ट्रिय बीमा संस्थान
रामशाहपथ, काठमाडौं
पाठ्यक्रम

स्तर : अधिकृत स्तर

पद : नायव ब्यवस्थापक (कम्प्यूटर ईञ्जिनियर)

तह : ७ (सात)

परीक्षाको किसिम : खुला प्रतियोगितात्मक परीक्षा

प्रथम चरण : लिखित परीक्षा पूर्णाङ्कः २००

द्वितीय चरण : अन्तर्वार्ता पूर्णाङ्क ४०

प्रथम चरणः लिखित परीक्षा योजना (Examination Scheme)

पत्र	बिषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	प्रश्न संख्या र अंकभार	समय
प्रथम	कम्प्यूटर इञ्जिनियरिङ्ग सम्बन्धि बिषय	१००	४०	बस्तुगत बहुउत्तर (Multiple Choice)	१००×१=१००	१ घण्टा ३० मिनेट
द्वितीय	कम्प्यूटर इञ्जिनियरिङ्ग सम्बन्धि बिषय	१००	४०	बिषयगत (Subjective)	१६×५=८० २×१०=२०	३ घण्टा

द्वितीय चरण

बिषय	पूर्णाङ्क	परीक्षा प्रणाली
व्यक्तिगत अन्तर्वार्ता	४०	**मौखिक**

१. लिखित परीक्षाको माध्यम नेपाली वा अंग्रेजी अथवा दुवै हुनेछ ।

२. पश्नहरु सोध्दा सबै खण्डहरुबाट सोधिनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

४. प्रथम पत्रमा बस्तुगत बहुउत्तर प्रश्नहरुको उत्तर सही दिएमा प्रत्येक सही उत्तर बापत १ (एक) अंक प्रदान गरिनेछ भने गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अर्थात ०.२० अंक कट्टा गरिनेछ । तर उत्तर नदिएमा त्यसबापत अंक दिइनेछैन र अंक कट्टा पनि गरिने छैन ।

५. यस पाठ्यक्रममा जेसुकै लेखिएको भएता पनि प्रत्येक बिषयमा परेका ऐन, नियमहरु परीक्षाको मिति भन्दा ३ महिना अगाडि संशोधन भएको र खारेज भएको जतिको हकमा संशोधन वा खारेज भई कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ ।

६. प्रथम चरणको लिखित परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको अन्तर्वार्तामा सम्मिलित गराइनेछ ।

Section – A (20 %)

1. Computer Networks

1.1 Protocol stack, switching

1.2 Link Layer: services, error detection and correction, multiple access protocols, LAN addressing and ARP (Address Resolution Protocol), Ethernet, CSMA/CD multiple access protocol, Hubs, Bridges, and Switches, Wireless LANs, PPP (Point to Point Protocol), Wide area protocols

1.3 Network Layer: services, datagram and virtual circuits, routing principles and algorithms, Internet Protocol (IP), IP addressing, IP transport, fragmentation and assembly, ICMP (Internet Control Message Protocol), routing on the internet, RIP (Routing Information Protocol), OSPF (Open Shortest Path First), router internals

1.4 IPv6: Addressing format and types, Quality of Service (Qos) in IPv6, Open Shortest Path First (OSPF) for IPv6, Protocol Independent Multicast - Sparse Mode (PIM-SM) for IPv6, IPv6 Domain Name System (DNS) and deployment plans, IPv6 enabled proxy and mail server

1.5 Transport Layer: principles, multiplexing and demultiplexing, UDP, TCP, flow control, principles of congestion control

1.6 Application Layer: Web and web catching, FTP (File Transfer Protocol), Electronic mail, DNS (Domain Name Service), socket programming)

1.7 Distributed system, Clusters

2. Computer Architecture & Organization and Microprocessors

2.1 Basic Structures: sequential circuits, design procedure, state table and state diagram, von Neumann / Harvard architecture, RISC / CISC architecture

2.2 Addressing Methods and Programs, representation of data, arithmetic operations, basic operational concepts, bus structures, instruction, cycle and excitation cycle.

2.3 Processing Unit: instruction formats, arithmetic and logical instruction.

2.4 Addressing modes

2.5 Input Output Organization: I/O programming, memory mapped I/O, basic interrupt system, DMA

2.6 Computer Arithmetic: Addition Algorithm Subtraction Algorithm, Multiplication Algorithm and Division Algorithm

2.7 Memory Systems: Cache memory principles, Elements of cache design

2.8 808X and Intel microprocessors: programming and interfacing

2.9 Thread and Process-level Parallel Architecture: Uniform Memory Access (UMA) machines, Cache-coherent Non-uniform Memory Access (CC-NUMA) machines, and Cache-only Memory Architecture (COMA) machines

3. Principles of Electronic Communications

3.1 Analog Communication System (Block Diagram)

3.2 Digital communication system (Block Diagram)

3.3 Analog Modulation Techniques: Amplitude Modulation (AM), Frequency Modulation (FM), Phase Modulation (PM)

3.4 Digital Modulation Techniques: Quantization & Sampling, Pulse Code Modulation (PCM), Delta Modulation (DM), Sigma Delta Modulation

3.5 Fundamentals of Error Detection and Correction

3.6 Performance evaluation of analog and digital communication systems: SNR and BER

4. Structured and Object Oriented Programming

4.1 Data types, ADT (Stack, Queue, List, Graph, Set)

4.2 Operators, variables and assignments, control structures

4.3 Procedure/function

4.4 Object and Class definitions: Encapsulation, Inheritance, Object Composition, Polymorphism

4.5 Operator Overloading: Overloadable Operators, Rules of Operator Overloading

4.6 Templates: Class Template, Derived Class Template

5. Data structures

5.1 General concepts: Abstract data Type, Time and space analysis of algorithms, Big oh and theta notations, Average, best and worst case analysis

5.2 Linear data structures

5.3 Trees: General and binary trees, Representations and traversals, Binary search trees, balancing trees, 2-3 trees, red-black trees, self-adjusting trees, Splay Trees

5.4 Algorithm design techniques: Greedy methods, Priority queue search, Exhaustive search, divide and conquer, Dynamic programming, Recursion

5.5 Searching: Sequential, Binary and Tree Search, Hashing (Hash Function and Collision Resolution Techniques)

5.6 Graphs and digraphs

5.7 Sorting (Insertion, Selection, Exchange, Merge, Radix, Shell, Heap)

Section – B (25 %)

6. Software Engineering principles (System Analysis, Design & Quality Testing)

6.1 Software process: The software lifecycle models, risk-driven approaches

6.2 Software Project management: Relationship to lifecycle, project planning, project control, project organization, risk management, cost models, configuration management, version control, quality assurance, metrics

6.3 Software requirements: Requirements analysis, requirements solicitation, analysis tools, requirements definition, requirements specification, static and dynamic specifications, requirements review.

6.4 Software design: Design for reuse, design for change, design notations, design evaluation and validation

6.5 Implementation: Programming standards and procedures, modularity, data abstraction, static analysis, unit testing, integration testing, regression testing, tools for testing, fault tolerance

6.6 Maintenance: The maintenance problem, the nature of maintenance, planning for maintenance

6.7 SE issues: Formal methods, tools and environments for software engineering, role of programming paradigm, process maturity and Improvement

6.8 Software Quality Assurance Standards: ISO 9000 and Companion ISO Standards, Capability Maturity Model (CMM), Capability Maturity Model Integration (CMMI), People Capability Maturity Model (PCMM), Malcolm Baldrige Assessment, 3 Sigma Quality Level, 6 Sigma Quality Level

7. Database Management System

7.1 Introduction: The relational model, ER model, SQL, Functional dependency and relational database design, File structure

7.2 Transaction Management and Concurrency Control: Concurrent execution of the user programs, transactions, Concurrency control techniques

7.3 Crash Recovery: types of failure, Recovery techniques

7.4 Query Processing and Optimization

7.5 Indexing: Hash based indexing, Tree based indexing

7.6 Distributed Database Systems and Object oriented database system

7.7 Data Mining and Data Warehousing

7.8 Security Management System

8. Operating System

8.1 Processes and Threads: Symmetric Multiprocessing, Micro-kernels, Concurrency, Mutual Exclusion and Synchronization, Deadlock.
8.2 Scheduling & Memory Management
8.3 Input Output and Files: I/O devices and its organization, Principles of I/O software and hardware, Disks, Files and directories organization, File System Implementation
8.4 Distributed Systems: Distributed Message passing, RPC, Client/Server Computing, Clusters.
8.5 Security: Authentication & Access Authorization, System Flaws & Attacks, Trusted systems
8.6 Different types of OS (DOS, UNIX, LINUX, WINDOWS)

9. Internet Programming

9.1 Common Gateway Interface (CGI) Application
9.2 Input to CGI: Environment Variables, Accessing from Input
9.3 Output from CGI: CGI and Response Headers
9.4 Forms and CGI: Sending Data to the Server Using HTML Tags
9.5 Executing External Program and CGI Program
9.6 Hypermedia Documents: Creating Dynamic Pages Using CGI, PHP
9.7 Introduction to JAVA: JAVA Evolution, JAVA History, JAVA Features, Difference between JAVA and C/C++, Simple JAVA Program, JAVA Program Structure, JAVA Statements, JAVA Virtual Machine

10. Distributed Systems and Client Server Computing

10.1 Characteristics of Distributed Systems
10.2 Networked vs. Centralized Systems
10.3 Process Synchronization and Inter-Process Communication
10.4 Principles of Fault Tolerance
10.5 Transaction Processing Systems & Distributed File Systems
10.6 Operating Systems for Distributed Architectures
10.7 Client Server Computing Concepts: Building blocks, Client Server Infrastructure
10.8 SQL Database Services: Functions, Procedures, Triggers and Rules

10.9 SQL Middleware Basics: SQL API, Open SQL Gateway
10.10 Concept of Data Warehouses
10.11 Client Server Transaction Processing: Transaction Concepts, Transaction Models, Transaction Processing Monitors, Transaction Management Standards

Section – C (20 %)

11. Cryptography and Network Security

11.1 Introduction to Cryptography: Basic Elements of Security, Security Attacks, Conventional Encryption Model, Simplified DES, Block Cipher Principle
11.2 Public Key Cryptosystems: RSA Algorithm, Diffie-Hellman Key Exchange
11.3 Digital Signature and Authentication Protocols: Digital Signatures, Digital Signature Standards, Authentication Protocols
11.4 Network Security: Kerberos, Electronic Mail Security
11.5 Web Security: Secure Sockets Layer, Transport Layer Security, Secure Electronic Transaction
11.6 Intruders and Viruses related Threats
11.7 Firewall Design Principles

12. Management Information Systems (MIS)

12.1 Management Systems for Strategic Advantage
12.2 Information Systems in Enterprises
12.3 Data and Knowledge Management
12.4 IT Cost Structures and Financial Information Systems
12.5 Organizational Decision-Making
12.6 System Development Life Cycle (SDLC)
12.7 Tactical Human Resource Information Systems\
12.8 Enterprise Resource Planning (ERP)
12.9 Transaction Processing Systems (TPS)
12.10 Customer Relationship Management (CRM)
12.11 On-line Analytical Processing (OLAP)
12.12 Group Decision Support Systems (GDSS)
12.13 Risk Management and Disaster Preparedness
12.14 Supplier Relationship Management (SRM)
12.15 Program Evaluation and Review Technique (PERT)
12.16 Project Management Technique: Critical Path Method (CPM)

13. Cloud Computing and Big Data

13.1 Introduction Cloud Computing: Nutshell of cloud computing
13.2 Vision, feature Characteristics and components of Cloud Computing. Challenges
13.3 Evaluating the Cloud's Business Impact and economics
13.4 Cloud Computing Architecture: Cloud Reference Model, Layer, Cloud Types
13.5 Data center Design and interconnection Network
13.6 Virtualization of Server , Desktop, Network, and Virtualization of data-center
13.7 Data Security in Cloud: Business Continuity and Disaster Recovery
13.8 Cloud Platforms in Industry: Amazon web services, Google AppEngine, Microsoft Azure Design, Aneka

14. Machine Learning and Applications

14.1 Machine Learning Algorithms (Support Vector Machine, Principal Component Analysis and Clustering)
14.2 Pattern Recognition (Classification and Validation)
14.3 Neural Networks (Concept and Perceptron method)
14.4 Image Processing (Image enhancement, Histogram, Image Filtering)
14.5 Real Time Systems (Real-time Operating System, Operating System functions needed for real-time computing)
14.6 Semantic Web

15. System and Network Administration

15.1 Change Network Interface Settings
15.2 Network Diagnostic Tools (ping, traceroute, host, dig, netstat)
15.3 Linux based networking
15.4 Network Topologies (Bus, Star, Ring, Mesh, Hybrid, Tree, Single Node)
15.5 Knowledge of configuring Network Interface cards (NIC)
15.6 NetBIOS Name Service
15.7 Configuring and Installing Repeaters, Hubs, Switches, Bridges, Routers
15.8 Hardware for networks (Coaxial cables, Twisted-pair cables, Optical fiber cables, and wireless technology)
15.9 Network File Systems
15.10 Disk configuration and backups
15.11 Managing accounts: users, groups and other privileges
15.12 Job scheduling with Cron, Crontab, Anacron and system log analysis
15.13 HTTP Server Configuration & FTP principles
15.14 SMTP, POP and IMAP principles

Section – D (15%)

16. Information Technology (IT) Application in the Public Sector

16.1 General concept of IT planning
16.2 Importance of IT in nation development
16.3 Social and cultural aspects of IT
16.4 IT investment in developing countries
16.5 Success and failures of IT management

17. Information Technology (IT) Strategy

17.1 Strategic use of IT
17.2 Porter's Five Forces Model
17.3 Formulating long-term objectives
17.4 Value chain analysis
17.5 Strength, Weaknesses, Opportunity, and Threats (SWOT) analysis
17.6 Core competencies
17.7 Strategy control and continuous improvement

18. E-Commerce and E-Governance

18.1 Business Models of E-Commerce
18.2 Business-to-business (B2B) E-Commerce and Electronic Data Interchange (EDI)
18.3 Electronic Payment System
18.4 Security Issues of E-Commerce
18.5 Public Key Infrastructure (PKI) and Digital Signatures
18.6 E-Governance Strategy and E-Governance System Life Cycle
18.7 E-Governance risk assessment and mitigation
18.8 E-Governance master plan of Nepal
18.9 Focal agencies of E-governance such as National Information Technology Center (NITC)
18.10 सूचना प्रविधि नीति, २०६७, विद्युतीय (इलेक्ट्रोनिक) कारोबार ऐन, २०६३ र रष्ट्रिय बीमा संस्थान ऐन, २०२५

Section – E (20%)

19. Reasoning

This section consists of two sub-sections, i.e. Technical Writing and Case Study.

19.1 Technical Writing (1 question carrying 10 marks)

This section may ask the examinee to write technical proposal on given specifications, essay, and views/critics. The topic must be related to computer technology or the matter related therewith and the examinee should be encouraged to put his/her views and reasoning rather than facts/information.

19.2 Case Study (1 question carrying 10 marks)

This section is dedicated to the analysis of IT and Computer systems. Examinee should be given a scenario of existing system and asked to analyze and design it following one particular paradigm. This section should include the various domains of knowledge in one platform (Example: A case study may incorporate questions from Software Engineering and Database management and Operating System domains)

Sample Multiple Choice Questions

Internet Programming

1) When trying to access a URL, the following message is displayed on the browser: "Server Error 403". What could be the reason for the message?
   (A) The requested HTML file is not available
   (B) The path to the interpreter of the script file is invalid
   (C) The first line of the output from the script is not a valid HTTP header
   (D) The requested HTML file or CGI script has insufficient permission

Answer: (D)

2) In what way is JavaScript related to Java?
   (A) They are the same
   (B) They can both be used to perform client-side processing on the Internet
   (C) JavaScript is a simplified form of Java
   (D) JavaScript is the abstract machine language that is produced by all Java compilers

Answer: (B)

Distributed Systems and Client Server Computing

1) In which of the following invocation does the client invoke the request, continue processing while the request is dispatched, and later collect the response?
   (A) Deferred Synchronous Invocation
   (B) One-way Invocation
   (C) Synchronous Invocation
   (D) Two-way Invocation

Answer: (A)

2) Which of the following allows clients to invoke requests without having access to static stubs, and allows servers to write without having skeletons for the objects being invoked compiled statically into the program?
   (A) The Object Adapter
   (B) Dynamic Skeleton Interface
   (C) Server Process Activation
   (D) Client Process Activation

Answer: (B)

Cryptography and Network Security

1) Man-in-the-middle attack can endanger security of Diffie-Hellman method if two parties are not:
   (A) Authenticated
   (B) Joined
   (C) Submitted
   (D) Separated

Answer: (A)

2) Which of the following is a cryptographic protocol used to secure HTTP connections?
   (A) Stream Control Transmission Protocol (SCTP)
   (B) Transport Layer Security (TSL)
   (C) Explicit Congestion Notification (ECN)
   (D) Resource Reservation Protocol (RRP)

Answer: (B)

Management Information Systems (MIS)

1) Which type of system is most often used for analyzing semi-structured problems?
   (A) Transaction processing system
   (B) Management information system
   (C) Decision support system
   (D) Executive support system

Answer: (C)

2) Which type of enterprise application stores directories of employees with special areas of expertise?
   (A) Enterprise system
   (B) Supply chain management system
   (C) Customer relationship management system
   (D) Knowledge management system

Answer: (D)

Cloud Computing and Big Data

1) Which customer scenario is best suited to maximize the benefits gained from using a virtual private cloud?
   (A) An enterprise that does not want to sacrifice security or make changes to their management practices, but needs additional resources for test and development of new solutions
   (B) An enterprise that requires minimal security over their data, and has a large existing infrastructure that is capable of handling future needs
   (C) A small start-up business focused primarily on short-term projects and has minimal security policies.
   (D) An enterprise whose IT infrastructure is underutilized on average, and the system load is fairly consistent

Answer: (A)

2) What does "velocity" mean in Big Data?
   (A) Speed of input data generation
   (B) Speed of individual machine processors
   (C) Speed of only storing data
   (D) Speed of storing and processing data

Answer: (D)

Machine Learning and Applications

1) The network that involves backward links from output to the input and hidden layers is called as:
   (A) Self organizing maps
   (B) Perceptrons
   (C) Recurrent neural network
   (D) Multilayered perceptron

Answer: (C)

2) For real time operating systems, interrupt latency should be:
   (A) Minimal
   (B) Maximal
   (C) Zero
   (D) Dependent on the scheduling

Answer: (A)

System and Network Adminstration

1) You work as a network administrator at XYZ Company. You need to reduce the bandwidth used between the XYZ Company and the Internet. Which one of the following could be implemented to accomplish this?
   (A) WINS server
   (B) Proxy server
   (C) DHCP server
   (D) HTTP server

Answer: (B)

2) There is a suspected SMTP virus on the workstation. Email programs are not currently running. Which of the following utilities should be run to see if there are any open SMTP sockets?
   (A) nbstat
   (B) netstat
   (C) arp
   (D) nslookup

Answer: (B)

Information Technology (IT) Application in the Public Sector

1) Which of the following is a contribution of IT to improve the access to education
   (A) Distance learning
   (B) Interactive multi-media
   (C) Virtual reality
   (D) All of the above

Answer: (D)

2) Which of the following sectors of society has been influenced by IT?
   (A) Health
   (B) Education
   (C) Commerce
   (D) All of the above

Answer: (D)

Information Technology (IT) Strategy

1) As seen in Porter's Five Forces model, condition under which a supplier group can be powerful include all the following except:
   (A) Lack of importance of the buyer to the supplier group
   (B) High differentiation by the supplier
   (C) Readily available substitute products
   (D) Dominance by a few suppliers

Answer: (C)

2) In SWOT analysis, situations where organization are able to convert weaknesses into strengths and threats into opportunities, are called:
   (A) Strategic windows
   (B) Strategic leverage
   (C) Conversion strategies
   (D) Vulnerability

Answer: (C)

E-Commerce and E-Government

1) What is the process in which a buyer posts its interest in buying a certain quantity of items, and sellers compete for the business by submitting successively lower bids until there is only one seller left?
   (A) B2B market place
   (B) Auction
   (C) Reverse auction
   (D) C2C market place

Answer: (C)

2) Which of the following is used in B2B to pay for purchases?
   (A) E-commerce
   (B) Financial Electronic Data Interchange
   (C) Electronic Data Exchange
   (D) Electronic Checks

Answer: (B)

Sample Subjective Questions

Internet Programming

1) Write a JAVA program that correctly implements producer consumer problem using the concept of inter-thread communication. [10]

2) Write an HTML code to create a form containing dropdown list. The dropdown list should contain the colors red, green, blue, and grey. What is the need of cookies? How can cookies be used to set up a counter which shows the number of times a user has visited a webpage? [5 + 1 + 4]

Distributed Systems and Client-Server Computing

1) Discuss the right-sizing and down-sizing concept of client-server computing. Discuss about the various SQL database server architectures with their advantages and disadvantages. [5 + 5]

2) Compare between 2-tier and 3-tier client-server architectures. Explain how the transaction processing monitors manage the client-server transactions. [5 + 5]

Cryptography and Network Security

1) What are the requirements for Kerberos? Give the steps of Diffie-Hellman key exchange algorithm. [5 + 5]

2) Analyze the attacks on Packet Filtering Firewall. List any three benefits of IPSec. Explain with a neat sketch about the DES modes of operation. [3 + 2 + 5]

Management Information System (MIS)

1) Explain the concept of organizational decision making. Explain the methods of conflict resolution and methods of dealing with uncertainty. [5 + 5]

2) What are the different ways in which a system analyst ascertains the information requirement from users? What does the system analyst do to reduce the communication gap between the end-user and the designer of the MIS? [5 + 5]

Cloud Computing and Big Data

1) How big data analysis helps business increase their revenue? Give an example. Explain the concept of the Hadoop framework. [5 + 5]

2) List and explain the various service models and deployment models of cloud computing. Differentiate between normal web hosting and Paas based web hosting. [5 + 5]

Machine Learning and Applications

1) Explain the Kohonen self-organizing map with learning algorithm. How is Hopfield network converted to Boltzman machine? [6 + 4]

2) Explain in detail segmentation based on thresholding. What is morphology? Explain the basic operations in morphology. [5 + 1 + 4]

System and Network Administration

1) One of the central problems in account management is the distribution of passwords. If we are unable to use a password distribution system like NIS, passwords have to be copied from host to host. Assume that user home-directories are shared amongst all hosts. Write a script which takes the password file on one host and converts it into all of the different file formats used by different Unix-like operating systems ready for distribution. [10]

2) Suppose you are performance tuning, trying to find out why one host is slower than another. Write a program which tests the efficiency of CPU-intensive work only. Write programs which test the speed of memory-intensive work and disk-intensive work. Would comparing the time it takes to compile a program on the hosts be a good way of comparing them? [10]

Information Technology (IT) Application in the Public Sector

1) The digital divide is actually a manifestation of other underlying divides, spanning economic, social, geographic, and gender divides. Attempting to address the digital divide as a cause instead of a symptom of other divides has led to many failures of information technology (IT) driven development projects. Explain the above statement with real-life examples. [10]

2) Explain the role of information technology (IT) in promoting gender equality and empowering women in the context of Nepal. [10]

Information Technology (IT) Strategy

1) Porter's five forces model enables any company to outperform their competitors. Illustrate your answer by analyzing any industry of your choice. [10]

2) Explain the process of strategic management in any organization. What are the various steps of strategic management process? [5 + 5]

E-Commerce and E-Government

1) What are the key technologies for B2B E-commerce? Explain the architectural models of B2B E-commerce? Differentiate between E-commerce and E-business. [4 + 4 + 2]

2) Explain the role and support of E-commerce in the real-estate business and in the insurance sector. [10]

Reasoning

1) *The 2007 Electronic Monitoring and Surveillance Report, sponsored by the American Management Association (AMA) and published by the AMA/e Policy Institute Research (2008), noted that 43% of American companies monitor employee e-mail, and 96% of those companies "track external (incoming and outgoing messages)." The report also noted that 45% of companies track the amount of time an employee spends at the keyboard. An increasing number of these companies now also monitor the blogosphere to see what is being written about them in various blogs, and some also monitor social networking sites such as Facebook. As a result of increased monitoring, many employees have been fired for misusing a company's e-mail resources or its Web resources, or both. The lower cost of monitoring tools has made them available to many employers who, in the past, might not have been able to afford them. And the miniaturization of these tools has made it far easier to conceal them from employees. Employees can be monitored with respect to e-mail usage, and URLs visited while Web surfing.*

   Prepare a technical proposal that supports the case of "**Electronic monitoring of employees in the workplace using computerized surveillance tools**". Your proposal should mention in detail the tools required for surveillance, their deployment and installation techniques.

2) *WikiLeaks was founded in 2006 by the Sunshine Press organization (allegedly under the direction of Julian Assange). Describing itself as a "not-for-profit media organization," WikiLeaks claims that its main objective is "to bring important news and information to the public" by publishing original source material so that readers "can see evidence of the truth". Comparing itself to other "media outlets" that conduct "investigative journalism," WikiLeaks states that it accepts (but does not solicit) sources of information that are anonymous. However, Wikileaks also states that unlike the other outlets, it provides a "high security anonymous drop box" and that when it receives new information, the organization's journalists analyze and verify the material, before writing a "news piece about it describing its significance to society." The organization then publishes "both the*

news story and the original material" so that readers can analyze the story "in the context of the original source material themselves".

(a) Explore technical options of securing sensitive material, from the point of view of WikiLeak-type websites, individuals involved in whistle blowing, and government agencies involved in hacking.

(b) Use you technical knowledge to discuss some of the common vulnerabilities existing in commercial software, and how they can be exploited by rogue institutes and individuals.