


CREST Cyber Olympiad (CCO)

Sample Paper

Pattern and Marking Scheme

Grade	Topic/Section	No. of Questions	Marks per Question	Total marks
Grade 10	Computer & IT	40	1	40
	Achiever's Section	10	2	20
Grand Total		50		60

The total duration of the exam is 60 minutes.

Syllabus

Section 1: Computer & IT

1. Advanced Networking & Internet Concepts

- Ports and Protocols – e.g., port 80 for HTTP, port 443 for HTTPS
- Public vs Private IP addresses (IPv4 basics)
- Static vs Dynamic IP allocation (DHCP)
- Web hosting basics – Domain, web server, hosting providers, uptime
- Packet switching, Packet loss, Routers, Throughput

2. Algorithms and Flowcharts

- Algorithm Design: nested conditions, Designing modular algorithms using sub-processes
- Flowchart Techniques: Loops (Representing iterations in flowcharts), Nested conditions in flowcharts (if-else, switch cases)
- Iteration: Using loops in algorithms (for, while)
- Problem-Solving Activities (Algorithms): Find the LCM and GCD of two numbers, Check if a string is a palindrome, Count the number of vowels in a string
- Problem-Solving Activities (Flowcharts): Create a flowchart to: Simulate a basic calculator with addition, subtraction, multiplication, and division; Sort an array of numbers in ascending order (e.g., bubble sort)
- Integration with Programming Languages: Convert flowcharts into working code
- Logical Operators in Conditions (AND, OR, NOT)

3. Computer Fundamentals

- Operating System
- Number System
- User interface
- Memory
- Task Management

4. Cybersecurity and Digital Forensics

- Digital Forensics: Investigating Cyber Incidents: Investigating and analyzing digital devices (computers, mobile phones, networks, etc.) to uncover evidence of crimes or unauthorized activities
- Digital Evidence: Deleted files, Emails, messages, or call logs, Browser history, Photos or videos, Logs from network traffic or server activity
- Types of Digital Forensics: Computer Forensics, Mobile Device Forensics, Network Forensics, Cloud Forensics, Memory Forensics
- Process of Digital Forensics: Identification, Preservation, Analysis, Reporting, Presentation
- Relationship Between Cybersecurity and Digital Forensics

5. Data Management and E-commerce

- Key Components of Data Management: Data Collection, Data Storage, Data Organization, Data Quality and Accuracy, Data Security and Privacy, Data Analytics and Reporting
- Types of E-Commerce Models: Business to Consumer (B2C), Business to Business (B2B), Consumer to Consumer (C2C), Consumer to Business (C2B)
- Key Features of E-Commerce: Online Stores, Payment Systems, Shopping Cart, Customer Reviews, Order Management
- Challenges of Data Management in E-Commerce: Data Privacy and Security, Data Overload, Data Integration, Data Accuracy
- Technologies Supporting Data Management in E-Commerce: Cloud Computing, Big Data Analytics, Machine Learning and AI, Database Management Systems (DBMS)

6. Latest Developments in the Field of IT

- Machine Learning (ML) – difference from AI, usage in prediction and personalisation
- Green Computing – energy-efficient devices, e-waste reduction

7. MS Office

- MS Word
- MS PowerPoint
- MS Excel
- MS Access

8. Python Programming (Text-Based Coding)

- Use of Python Modules (math, random, datetime, statistics)
- Data Validation and Error Handling
- List & Dictionary (Nested lists, List comprehensions, Dictionary methods (update(), pop(), items(), etc.), Use of in, not in, get(), setdefault())
- Functions (Default and keyword arguments, Return vs print, Lambda functions)
- File Handling – Text Files (Read, write, append (r, w, a), Using with for automatic file closing, Reading line-by-line, Writing logs, reports, and summaries)

9. Web Development

- Types: front-end development, Client-Side), Back-End Development (Server-Side), Full-Stack Development
- Web Design
- Web Hosting & Deployment
- Web Development Tools
- Web Security
- Web Performance Optimization

10. Working with Databases using MS Access / Database Management System (DBMS)

- Querying (Set conditions using relational/logical operators, Use multiple conditions in queries)
- Working with Multiple Databases - Explain relationships (One-to-one, One-to-many, Many-to-one, Many-to-many (with real-life examples))
- Object Linking & Embedding (Understand linking vs. embedding, Insert/link external objects into databases)

Section 2: Achievers Section

Higher Order Thinking Questions - Syllabus as per Section 1.

Questions are based on Windows 11 and MS Office 2016.

For more details, visit <https://www.crestolympiads.com/cyber-olympiad-cco>

Computer & IT (Each Question is 1 Mark)

- Which out of the following audio format can be inserted into MS Powerpoint?
 - .wmv
 - .mp3
 - .avi
 - .mov
- Which command will take you to the first slide of your presentation in MS PowerPoint?
 - Ctrl + End
 - Ctrl + Home
 - Next Slide Button
 - Page Up
- Which of the following is a type of software that controls the internal operations of the computer and controls how well the computer works with its parts?
 - Shareware
 - Public domain software
 - Application software
 - Operating system software
- Which layer is international standard organisation's OSI model responsible for creating and recognising frame boundaries?
 - Physical layer
 - Data link layer
 - Transport layer
 - Network layer
- What device separates a single network into two segments but lets the two segments appear as one to higher protocols?
 - Switch
 - Bridge
 - Gateway
 - Router
- Which of the following method is used to create queries in MS Access?
 - You can drag and drop fields on query builders
 - You can type the SQL command in SQL view.
 - You can use query wizard or design view.
 - Any of the above method will work
- Which of the following is the correct HTML tag to left-align the content inside a table cell?
 - <tdleft>
 - <td ralign = "left">
 - <td align = "left">
 - <tdleftalign>
- What is the hexadecimal value of the color red?
 - #FF0000
 - #00FF00
 - #0000FF
 - #00CBF0

17. Which tag inserts a line horizontally on your web page?
- a. `<line direction="horizontal">`
 - b. `<line>`
 - c. `<hr>`
 - d. `<tr>`
18. Fill in the blank:
With _____ only one process can execute at a time; meanwhile all other process are waiting for the processor. With _____ more than one process can be running simultaneously each on a different processor.
- a. Multiprocessing, Multiprogramming
 - b. Multiprogramming, Uniprocessing
 - c. Multiprogramming, Multiprocessing
 - d. Uniprogramming, Multiprocessing
19. Which of the following is the role of system software?
- a. Control hardware and provide services for applications
 - b. Create user documents
 - c. Execute user-defined programs
 - d. Run multimedia applications
20. What is the main purpose of memory management in an operating system?
- a. Data is stored on disk
 - b. Applications are not conflicting with each other
 - c. Users can access the system interface
 - d. Files are organized in directories
21. What type of digital evidence would forensic investigators look for when investigating a data breach in an organization?
- a. Employee personal information
 - b. Password hashes, network logs, and database access logs
 - c. Promotional material
 - d. Employee productivity reports
22. What type of evidence can be retrieved from call logs during a forensic investigation?
- a. IP address of the attacker
 - b. Phone numbers, time, and duration of calls
 - c. Detailed social media activity
 - d. Payment details
23. In an OLE (Object Linking and Embedding) scenario, what is a disadvantage of linking external objects?
- a. The object data is permanently stored inside the database
 - b. The external object must be accessible for the link to work
 - c. The linked object cannot be updated
 - d. The link always breaks

- 24.** What is web performance optimization?
- Increasing the quality of the website's design
 - Securing the website from attacks
 - Adding more features to the website
 - Making the website load faster and more efficiently
- 25.** What does full-stack development involve?
- Only server-side scripting
 - Only client-side programming
 - Both front-end and back-end development
 - Database management and hosting
- 26.** What is the purpose of `random.randint()`?
- It performs string manipulation
 - It returns a fixed value
 - It provides random access
 - Returns a random integer between two values
- 27.** What is the purpose of `statistics.median()`?
- Returns the middle value in a dataset
 - It performs string manipulation
 - It returns a fixed value
 - It provides random access
- 28.** Which of the following allows a function to be called with parameters in any order?
- Positional arguments
 - Nested functions
 - Anonymous functions
 - Keyword arguments
- 29.** In Microsoft Word, which feature allows you to create a professional-looking document with predefined styles, such as headers, footers, and page numbers?
- Templates
 - Layout
 - Styles
 - Themes
- 30.** In Microsoft Excel, which function would you use to find the average of a range of cells, say from A1 to A10?
- `#REF!`
 - `#REF!`
 - `#NAME?`
 - `#REF!`
- 31.** In web hosting, which of the following defines the website name that users type in a browser?
- Hosting provider
 - Server
 - Domain
 - Port
- 32.** Which of the following best ensures that stored data is not lost in case of hardware failure?
- Data mining
 - Data encryption
 - Regular data backups
 - Data redundancy removal

- 33.** In data organisation, what is the role of database tables and fields?
- a. To secure data from cyberattacks
 - b. To categorise and structure data for easy access
 - c. To analyse data using charts
 - d. To delete unnecessary data automatically
- 34.** Which of the following is most critical in preventing unauthorised access to personal data in an organisation?
- a. Data visualisation tools
 - b. Cloud storage services
 - c. Strong access control mechanisms
 - d. PDF file formats
- 35.** A company collects real-time data from website visits, app usage, and social media. What problem might arise?
- a. Better product photography
 - b. Data overload without proper filters
 - c. Fewer customer sign-ups
 - d. Reduced shipping fees
- 36.** Which of these algorithms is used to find the GCD (Greatest Common Divisor) of two numbers?
- a. Euclidean algorithm
 - b. LCM calculation
 - c. String reversal method
 - d. Vowel counting method
- 37.** How does the NOT operator affect a condition?
- a. It changes true to false and false to true
 - b. It removes the condition
 - c. It repeats the condition
 - d. It checks for multiple conditions
- 38.** Which of the following logical operators would you use to combine two conditions that both need to be true?
- a. AND
 - b. OR
 - c. NOT
 - d. XOR
- 39.** When using Machine Learning for prediction in healthcare, what type of data might be used?
- a. Patient medical history
 - b. Machine learning algorithms themselves
 - c. System hardware logs
 - d. Clinic schedule
- 40.** How does green computing impact the life cycle of electronic devices?
- a. It promotes quicker disposal of old devices
 - b. It encourages longer use and repair of devices
 - c. It increases the production rate of new devices
 - d. It prevents the reuse of parts

- a. 1 – c, 2 – d, 3 – b, 4 - a
- c. 1 – b, 2 – a, 3 – d, 4 - c

- b. 1 – d, 2 – a, 3 – c, 4 - b
- d. 1 – d, 2 – c, 3 – b, 4 - a

45. Fill in the blanks in context to HTML:

- i. The _____ list is used when the list items are not to be displayed in any particular order.
 - ii. The three values that can be defined with _____ tag are disc, square and circle.
 - iii. The _____ tag is used to display the list of items in a specific order.
 - iv. To specify the starting point of the numbering scheme _____ attribute is used.
 - v. If one set of elements is embedded within another set, it is called _____ list.
-
- a. (i) Unordered
(ii)
(iii)
(iv) Begin
(v) Structured
 - b. (i) Ordered
(ii)
(iii)
(iv) Start
(v) Nested
 - c. (i) Ordered
(ii)
(iii)
(iv) Begin
(v) Structured
 - d. (i) Unordered
(ii)
(iii)
(iv) Start
(v) Nested

46. Fill in the blank:

The tag which is used to create Hyperlinks in a web page is _____.

- a. <html>
- b. <a>
- c. <alink>
- d. <vlink>

47. Which of the following is considered a digital device for forensic investigation?

- a. Television
- b. Mobile phone
- c. Refrigerator
- d. Microwave

48. Which of the following would most likely require embedding instead of linking in a database?

- a. A video file that needs to be accessed offline
- b. A database entry that references a customer's social media profile
- c. A frequently updated spreadsheet
- d. A document with frequently changing content

49. What is the result of `mylist = [4, 5, 8]; mylist.pop()`?

- a. 4
- b. 8
- c. 5
- d. All of the above

50. How does a for loop differ from a while loop in algorithms?

- a. A for loop runs with a known count; a while loop runs till a condition.
- b. A for loop repeats endlessly; a while loop ends at a fixed count.
- c. A for loop cannot use logic; a while loop can use logical checks.
- d. A for loop is always slower; a while loop is faster in all cases.

Answer Key

1.	b	2.	b	3.	d	4.	b	5.	b	6.	d	7.	c
8.	a	9.	b	10.	a	11.	d	12.	c	13.	c	14.	c
15.	a	16.	b	17.	c	18.	d	19.	a	20.	b	21.	b
22.	b	23.	b	24.	d	25.	c	26.	d	27.	a	28.	d
29.	a	30.	a	31.	c	32.	c	33.	b	34.	c	35.	b
36.	a	37.	a	38.	a	39.	a	40.	b	41.	a	42.	d
43.	d	44.	a	45.	d	46.	b	47.	b	48.	a	49.	b
50.	a												