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CUET · COMPUTER SCIENCE · CLASS XI · CODE 308

Societal Impact

CUET unit: Societal Impact (Digital Footprint, Digital Society and Netizen, Data Protection, Cyber Crime, Indian IT Act, Impact on Health)

By **UniDrill** · NCERT-grounded study material

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📌 Snapshot

- Digital technologies have transformed society — from banking and e-commerce to education — while also introducing new risks to privacy, security and health.
- A digital footprint is the trail of data a user leaves online; active trails are intentionally submitted, passive trails are generated unintentionally, and both persist even after attempted deletion.
- Responsible online behaviour rests on net etiquettes, communication etiquettes and social media etiquettes — the framework for being an ethical netizen.
- Data protection concepts — IPR (copyright, patent, trademark), plagiarism, FOSS, and open-source licensing (CC, GPL) — are explained in detail, making this a high-yield section for CUET's ethics-and-law questions.
- Cyber crime (hacking, phishing, ransomware, identity theft) and India's IT Act 2000 (amended 2008) are covered, along with ergonomics and health impacts of prolonged device use.

📖 Detailed Notes

2.1 Core concepts

- **Digital Technologies and Society (§11.1, p. 229):** The introduction of PCs, the Internet, and smartphones has made digital technologies available to the common person. Banking, aviation, industrial production, and e-commerce are now dependent on computers and digital technologies. While these bring convenience and efficiency, they can also be misused. (NCERT §11.1, p. 229)
- **Digital Footprint defined (§11.2, p. 229–230):** Whenever we surf the Internet using smartphones, tablets, or computers, we leave a trail of data reflecting activities performed online — this is our digital footprint. It includes websites visited, emails sent, information submitted, IP address, location, and device-specific details. Such data can be used for targeted advertising or exploited. (NCERT §11.2, p. 229–230)
- **Active vs. Passive Digital Footprints (§11.2, p. 230):** Active digital footprints include data intentionally submitted online — emails written, posts made, form responses. Passive digital footprints are the data trail left unintentionally — website

visit records, cookies, app usage data. Most digital footprints are stored on remote servers; there is no guarantee they can be fully erased. (NCERT §11.2, p. 230)

- **Digital Society and Netizen (§11.3, p. 231):** A digital society is one where daily activities — communication, banking, shopping, entertainment, education, transportation — are increasingly driven by online transactions. Anyone using digital technology along with the Internet is a digital citizen or netizen. A good netizen practises safe, ethical, and legal use of digital technology. (NCERT §11.3, p. 231)
- **Net Etiquettes (§11.3.1, p. 231–232):** Three categories — Be Ethical (no copyright violation; share genuine expertise), Be Respectful (respect privacy and diversity of other users), and Be Responsible (avoid cyber bullying; don't feed the troll). An Internet troll deliberately sows discord; the best response is to ignore them. (NCERT §11.3.1, p. 231–232)
- **Communication Etiquettes (§11.3.2, p. 232–233):** Digital communication (email, chat, audio/video conferencing) requires being Precise (respect time; respect data limits — use compressed files or cloud links), Polite (avoid aggression even in disagreement), and Credible (comments build long-term credibility; verify before relying on another's post). (NCERT §11.3.2, p. 232–233)
- **Social Media Etiquettes (§11.3.3, p. 233–234):** Social media platforms enable sharing content with the community. Users must Be Secure (choose strong passwords, frequently changed; know who you befriend; beware of fake news) and Be Reliable (think before uploading — once uploaded to a remote server it is effectively permanent). (NCERT §11.3.3, p. 233–234)
- **Data Protection and Sensitive Data (§11.4, p. 235):** Data protection is about the privacy of digitally stored data. Sensitive data includes biometric information, health information, financial information, and personal documents. Countries have data protection policies (laws) providing guidelines on processing, storage, and transmission of sensitive information. (NCERT §11.4, p. 235)
- **Intellectual Property Right — Copyright (§11.4.1A, p. 235–236):** Intellectual Property refers to inventions, literary and artistic expressions, designs, symbols, names and logos. Copyright grants legal rights automatically to creators for original works (writing, photograph, audio recordings, computer software, etc.). Rights include: right to copy/reproduce, create derivative works, distribute, and publicly display. To use copyrighted material, one must obtain a license. (NCERT §11.4.1A, p. 235–236)
- **Patent (§11.4.1B, p. 236):** A patent is granted for inventions; unlike copyright, the inventor must apply (file) for a patent. When granted, the owner gets an exclusive right to prevent others from using, selling, or distributing the protected invention. A patent protects an invention for 20 years, after which it can be freely used. (NCERT §11.4.1B, p. 236)

- **Trademark (§11.4.1C, p. 236):** A trademark includes any visual symbol, word, name, design, slogan, label, etc., that distinguishes a brand from others. It prevents use of confusingly similar marks. A software product, for example, would have its code protected by copyright, its functional expression by patent, and its name/logo by trademark. (NCERT §11.4.1C, p. 236)
- **Violation of IPR — Plagiarism (§11.4.2A, p. 237):** Presenting someone else's idea or work as one's own is plagiarism. It is a serious ethical offence and sometimes considered fraud. Even content that is open for public use must have the original source cited to avoid plagiarism. (NCERT §11.4.2A, p. 237)
- **Copyright Infringement and Trademark Infringement (§11.4.2B–C, p. 237):** Copyright infringement occurs when someone uses another person's work without permission or without paying, if it is being sold. Trademark infringement means unauthorised use of another's trademark on products and services. (NCERT §11.4.2B–C, p. 237)
- **Public Access and Open Source Software — FOSS (§11.4.3, p. 237–238):** Two major public license categories: Creative Commons (CC) — used for creative works (websites, music, film, literature), enables free distribution while retaining some rights; and GNU General Public License (GPL) — primarily for software, grants end users freedom to run, study, share and modify. Free and Open Source Software (FOSS) examples include Ubuntu, Fedora, LibreOffice, Mozilla Firefox. Software piracy (unauthorised use or distribution) is copyright infringement and harms the economy. (NCERT §11.4.3, p. 237–238)
- **Cyber Crime defined (§11.5, p. 239):** Criminal activities or offences carried out in a digital environment. Either the computer is the target (disabling/damaging data) or a tool (extortion, theft). Cyber crimes include hacking, ransomware attacks, denial-of-service, phishing, email fraud, banking fraud and identity theft. A computer virus is malicious code that copies itself and has detrimental effects; malware is software designed to gain unauthorised access. (NCERT §11.5, p. 239)
- **Hacking (§11.5.1, p. 239–240):** Unauthorised access to a computer, network or digital system. Ethical hacking (white hat hacking) — done with positive intent to find vulnerabilities and report them to the owner. Non-ethical hacking (black hat / cracking) — done for illegal purposes like identity theft, monetary gain, or bringing down a competitor's system. (NCERT §11.5.1, p. 239–240)
- **Phishing and Fraud Emails (§11.5.2, p. 240):** Phishing uses fake websites or emails that look authentic to fraudulently collect sensitive personal details (usernames, passwords, banking/credit card details). The most common method is email spoofing where a forged email address mimics a trusted source. Identity theft (financial, criminal, medical) is a key sub-type of phishing. (NCERT §11.5.2, p. 240)
- **Ransomware (§11.5.3, p. 241):** An attacker gains access, encrypts the victim's data, and demands a ransom for decryption. Ransomware reaches systems via

malicious websites, doubtful software repositories, spam email attachments, or malicious advertisements. (NCERT §11.5.3, p. 241)

- **Combatting Cyber Crime (§11.5.4, p. 241–242):** Safety measures include: regular data backup; updated antivirus software; avoiding pirated software; keeping system and browser software updated; using strong, unique, periodically changed passwords; using private browsing on shared computers; securing wireless networks; performing transactions only on well-known HTTPS sites. (NCERT §11.5.4, p. 241–242)
- **Indian IT Act 2000 (§11.6, p. 242):** The Information Technology Act, 2000 (amended 2008) provides guidelines on processing, storage and transmission of sensitive information; gives legal recognition to electronic records and digital signatures; outlines cyber crimes and penalties. The Cyber Appellate Tribunal resolves disputes from cyber crimes. Digital signatures are the digital equivalent of a paper certificate, issued by a Certified Authority (CA) licensed under Section 24 of the IT Act. (NCERT §11.6, p. 242)
- **Impact on Health and Ergonomics (§11.7, p. 242–244):** Excessive screen time can be physically and psychologically harmful. Ergonomics is the branch of science dealing with designing workplaces (furniture, equipment, systems) to be safe and comfortable, reducing fatigue and injury. Recommended posture: viewing distance 19–24 inches, viewing angle 30°, seat-back angle 90°, knee angle 90°, wrist straight. Eye strain is a common complaint. Overuse of keyboards can cause wrist and finger pain. Stress, fatigue, and obesity are other health impacts. (NCERT §11.7, p. 242–244)

2.2 Definitions to memorise

Term	Definition	Page
Digital Footprint	The trail of data left behind when a user surfs the Internet, submits information online, or uses any online application or portal	229–230
Active Digital Footprint	Data intentionally submitted online (emails written, posts made, form responses)	230
Passive Digital Footprint	Data trail left unintentionally (cookies, browsing history, app usage records)	230
Netizen	Anyone who uses digital technology along with the Internet; also called a digital citizen	231
Cyber Bullying	Any insulting, degrading or intimidating online behaviour — repeated posting of rumours, threats, posting a victim's personal information, sexual harassment or public ridicule — repeatedly targeting someone with intent to hurt or embarrass	232
Internet Troll		232

Term	Definition	Page
	A person who deliberately sows discord on the Internet by starting quarrels or upsetting people through inflammatory or off-topic messages	
Sensitive Data	Data that can cause substantial harm, embarrassment, inconvenience or unfairness if breached; includes biometric, health, financial information, personal documents/images/audios/videos	235
Intellectual Property (IP)	Inventions, literary and artistic expressions, designs, symbols, names and logos — intangible creations of the mind	235
Copyright	Automatic legal right granted to creators of original works giving them exclusive rights to copy, distribute, display, and create derivative works	235–236
Patent	An exclusive right granted to an inventor (upon application) to prevent others from using, selling, or distributing the invention; valid for 20 years	236
Trademark	Any visual symbol, word, name, design, slogan, or label that distinguishes a brand from others; prevents use of confusingly similar marks	236
Plagiarism	Presenting someone else's idea or work as one's own without giving adequate credit; a serious ethical offence	237
Copyright Infringement	Using another person's copyrighted work without permission or without payment if the work is being sold	237
FOSS	Free and Open Source Software — software whose source code is open for anyone to access, modify, correct and improve	238
GNU GPL	GNU General Public License — the most widely used free software license; grants freedom to run, study, share and modify software, with the same rights preserved in all derivative works	238
Creative Commons (CC)	A set of copyright licenses that give recipients rights to copy, modify and redistribute creative material while giving the author liberty to decide conditions of licensing	238
Cyber Crime	Criminal activities or offences carried out in a digital environment where the computer is either the target or the tool	239
Hacking	Unauthorised access to a computer, computer network, or any digital system	239
Phishing	An unlawful activity using fake websites or emails that look authentic to fraudulently collect sensitive personal details	240
Ransomware	Malware that encrypts the victim's data and demands payment (ransom) for decryption	241
Ergonomics	Branch of science dealing with designing workplaces, furniture, equipment and systems to be safe and comfortable for users, reducing fatigue and injury from prolonged use	243

Term	Definition	Page
IT Act 2000	India's Information Technology Act, 2000 (amended 2008) — provides legal framework for electronic governance, recognises digital signatures and electronic records, and outlines cyber crime penalties	242
Digital Signature	Digital equivalent of a paper certificate, issued by a Certified Authority licensed under Section 24 of the IT Act	242
Cyber Appellate Tribunal	Tribunal that resolves disputes arising from cyber crimes under the IT Act 2000	242
White Hat Hacker	Ethical hacker who finds vulnerabilities with permission and reports them to the owner	239–240
Black Hat Hacker / Cracker	Non-ethical hacker breaking into systems for illegal gain	240
Malware	Software designed to gain unauthorised access to a computer system	239
Computer Virus	Malicious code that copies itself and causes detrimental effects on a host system	239
Identity Theft	Sub-type of phishing where personal identifiers are stolen for financial, criminal or medical fraud	240
Email Spoofing	Forging the sender address of an email to mimic a trusted source	240
Software Piracy	Unauthorised use or distribution of copyrighted software; a form of copyright infringement	238
HTTPS	Hypertext Transfer Protocol Secure — used for safe online transactions	242
Cookie	Small data file stored on a user device by a website; a common source of passive digital footprints	230

2.3 Diagrams / processes to remember

- **Figure 11.1 (p. 230):** Exemplar web applications (Facebook, LinkedIn, YouTube, WhatsApp, etc.) that result in digital footprints — illustrates passive footprint generation from everyday apps.
- **Figure 11.2 (p. 231):** Net Etiquettes wheel — three segments: Be Ethical (no copyright violation; share expertise), Be Respectful (respect privacy; respect diversity), Be Responsible (avoid cyber bullying; don't feed the troll). Useful as a recall diagram for MCQs on netizen duties.
- **Figure 11.3 (p. 233):** Communication Etiquettes — five elements: Be Precise (Respect Time; Respect Data Limits), Be Polite, Be Credible. The visual groups Respect Time and Respect Data Limits under "Be Precise."

- **Figure 11.4 (p. 234):** Social Media Etiquettes — Be Secure (Choose password wisely; Know who you befriend; Beware of fake information) and Be Reliable (Think before you upload).
- **Figure 11.5 (p. 243):** Correct ergonomic posture at a computer — viewing distance 19–24 inches, viewing angle 30°, wrist straight, seat-back angle 90°, knee angle 90°, feet flat or on footrest. Numbers are frequently tested.

2.4 Common confusions / NTA trap points

- **Active vs. Passive footprint confusion:** NTA often swaps the definitions. Remember — Active = intentional (you chose to send that email or post); Passive = unintentional (the site stored your visit without you actively doing anything).
- **Copyright is automatic; Patent requires application:** Students confuse the two. Copyrights are granted automatically upon creation; patents must be filed for and are limited to 20 years. Trademarks protect brand identity, not the creative content or the invention.
- **Plagiarism vs. Copyright Infringement:** Plagiarism is an ethical violation (presenting others' work as your own without credit); copyright infringement is a legal violation (using without permission or payment). You can plagiarise public-domain content (ethical offence) without infringing copyright.
- **FOSS vs. Freeware:** FOSS allows the user to run, study, share and modify the source code. Freeware (e.g., Skype, Adobe Acrobat Reader) allows free personal use but the source code is not open and commercial distribution is prohibited. These are commonly confused in MCQ distractors.
- **Ethical hacking = white hat; Non-ethical = black hat/crackers (NCERT §11.5.1, p. 239-240).** NTA may call non-ethical hackers "crackers." Their primary focus is security cracking and data stealing for illegal or malicious purposes.
- **Patent term = 20 years (NCERT §11.4.1B, p. 236).** Not 10, not 25. After this, the invention enters public domain.
- **Copyright is automatic (NCERT §11.4.1A, p. 236).** No registration is needed for copyright to apply — protection begins at creation. NTA distractor: claims copyright requires registration.
- **GPL is for software; CC is for creative works (NCERT §11.4.3, p. 237-238).** NTA confuses these — Mozilla Firefox uses an open-source license like GPL, not Creative Commons.
- **Sensitive data categories (NCERT §11.4, p. 235).** Biometric, health, financial, and personal documents — NOT general public posts. NTA distractor lists all browsing data as sensitive.
- **Ransomware demands ransom (NCERT §11.5.3, p. 241).** It encrypts the victim's data. Phishing tricks for credentials. Don't confuse the two.

- **Ergonomic viewing distance 19-24 inches; angle 30° (NCERT Figure 11.5, p. 243).** Specific numbers tested by NTA — memorise.
- **Digital signature ≠ scanned signature (NCERT §11.6, p. 242).** Digital signature is a cryptographic certificate issued by a CA, not a scanned image of a paper signature.

🎯 Practice MCQs

Q1. Which of the following is the CORRECT distinction between active and passive digital footprints?

A. Active footprints are created by websites without the user's knowledge; passive footprints are data the user intentionally submits online.

B. Active footprints are data the user intentionally submits online; passive footprints are data trails left unintentionally when visiting a website or using an app.

C. Active footprints include only the IP address and location; passive footprints include emails and forum posts.

D. Both active and passive footprints are created only when the user logs in to a social media account.

Q2. Consider the following statements about net etiquettes: 1. Sharing genuine expertise online is part of "Be Ethical." 2. Respecting the privacy of other digital citizens falls under "Be Responsible." 3. Avoiding cyber bullying is part of "Be Responsible." 4. Not feeding an Internet troll is classified under "Be Respectful." Which of the above statements are CORRECT?

A. 1 and 3 only

B. 2 and 4 only

C. 1, 3 and 4 only

D. 1 and 2 only

Q3. Match the following IPR categories with their correct descriptions: | Column A | Column B | |---|---| | (i) Copyright | (P) Exclusive right granted upon application; protects inventions for 20 years | | (ii) Patent | (Q) Automatically granted to creators of original literary, artistic and software works | | (iii) Trademark | (R) Protects any visual symbol, word, name, slogan or label that distinguishes a brand |

A. (i)–P, (ii)–Q, (iii)–R

B. (i)–Q, (ii)–P, (iii)–R

C. (i)–Q, (ii)–R, (iii)–P

D. (i)–R, (ii)–P, (iii)–Q

📊 PYQ Alignment

Chapter 11 (Societal Impact) appears regularly in CUET Computer Science papers, with questions typically drawn from the cyber crime sub-section (hacking types, phishing, ransomware) and IPR definitions (copyright vs. patent vs. trademark, plagiarism vs. copyright infringement). Scenario-based and match-the-following questions on digital footprints, net etiquettes, and FOSS licensing are also common, making every part of this topic examinable. See PYQ archive for Computer Science.