UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

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IT5105 - Professional Issues in IT

14th May, 2016
(TWO HOUR)

To be completed by the candidate

BIT Examination Index No: .....

Important Instructions:

- The duration of the paper is **2 (two) hour**.
- The medium of instruction and questions is English.
- This paper has **4 questions** and **19 pages**.
- **Answer all questions.** All questions carry equal marks.
- **Write your answers** in English using the space provided **in this question paper**.
- Do not tear off any part of this answer book.
- Under no circumstances may this book, used or unused, be removed from the Examination Hall by a candidate.
- Note that questions appear on both sides of the paper.
  If a page is not printed, please inform the supervisor immediately.

Questions Answered
Indicate by a cross (×), (e.g. [X]) the numbers of the questions answered.

	Question numbers				
To be completed by the candidate by marking a cross (×).	1	2	3	4	
To be completed by the examiners:					

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CASE STUDY - Scenario 1

1) Given below are some scenarios associated with Intellectual Property Rights – Copyrights, Patents and Trademarks.

Mr. Perera operated a personal, non-profit Web site on which he included electronic versions of classic books that are in the public domain. While helping his daughters locate some older and out-of-print books for a GCE A Level English literature project, Mr. Perera discovered that it was difficult to find electronic versions of books such as The Scarlet Letter, so he decided to set up a Web site (www.pererapress.org) dedicated to online versions of older books. He included on his site, for example, the complete works of Nathaniel Hawthorne. Legally, Mr. Perera was allowed to include electronic versions of these books on his site because their copyright protection had expired. However with the passage of Sony Bono Copyright Term Extension Act (SBCTEA) in 1998 which is applicable internationally, some of the books that were about to enter the public domain (and would thus be eligible for inclusion on Mr. Perera's site) would instead remain under copyright protection.

Corporations have been especially concerned about the ways that their proprietary information can be pirated over a computer network. This is of concern to the world-wide software industry. Cyber piracy applies to more than the mere unauthorized copying of software; it also covers the unauthorized distribution (or facilitation of the distribution) of digital information on a computer network. The software industry confronted this phenomenon for the first time in 1994 in an incident involving Mr.XYZa, then a student at MIT.

XYZ operated an online forum at MIT called Cynosure. He invited Cynosure's users to upload and download (for free) copyrighted software to and from an anonymous server that resided in India. XYZ was arrested on charges that he had pirated software, but since he did not make unauthorized copies of the proprietary software, and since he did not receive a fee for his services, law enforcement authorities had a difficult time bringing piracy charges against him. In fact, they had a difficult time finding any clear criminal grounds for prosecuting XYZ at that time—there were no explicit provisions in the 1986 Computer Fraud and Abuse Act of USA under which he could be prosecuted. Eventually, federal authorities decided to bring charges against him by appealing to the Wire Fraud Act, a federal statute. Charges against XYZ were eventually dropped, however, and the indictment was officially struck down by a district judge who ruled that any criminal copyright charge must be brought under copyright laws and not under general federal criminal laws.

Although computer hardware inventions clearly satisfied the requirements of patent law, this was not initially the case with computer software. John Snapper (1995) points out that in the 1960s, most of the discussion involving the protection of software focused on patents. He also notes that in a series of decisions beginning with Gotshalk v. Benson (1972), the U.S. Patent Office and the courts established a strong opposition to patenting software. Benson applied for a patent for an algorithm that translated the representation of numbers from base 10 to base 2; such an algorithm is an important feature of all programs. So, critics worried that if Benson had been granted a patent for his algorithm, he would have controlled almost every computer in use for a number of years. However, Benson was denied the patent because his algorithm was viewed as an abstract process or mathematical formula that could be performed by a series of mental steps with the aid of pencil and paper (Snapper 1995). However the goal of obtaining patents for computer programs did not end with Benson.

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In 1981, the U.S. Supreme Court ruled in what many now consider a landmark case for patents affecting computer software: Diamond v. Deihr. In that pivotal case, the Supreme Court decided 5–4 that a patent could be awarded for a computer program under certain conditions; in this instance, the program assisted in converting rubber into tires. On the one hand, Deihr had developed a new process that physically transformed raw rubber into rubber tires; on the other hand, Deihr had only a new computer program, since every other part of the machinery used in the conversion process consisted of traditional technology. Initially, Deihr's request for a patent was denied by Diamond, the director of the Patent Office. However Deihr appealed, and his case was eventually heard by the Supreme Court, which ruled in Deihr's favour. However, in their ruling, the justices also continued to affirm the view that computer algorithms themselves are not patentable. They pointed out that the patent awarded to Deihr was not for the computer program but for the rubber tire transformation process as a whole. Since the Deihr case, numerous patents have been granted to computer programs and software applications.

Consider the trade mark "apple" that has come to symbolize Apple and Macintosh computers and products. Trade mark is a type of intellectual property which is excludable (Called excludable because it is possible to prevent people (consumers) who have not paid for it from having access to it).

As Debora Halbert (1999) notes, however, the trademark "uh-huh," which is not very "distinctive," was granted to Pepsi-Cola. Because of decisions such as this, critics have argued that trademark protections are being expanded in ways that are inappropriate. Consider the following example, which may support the view that some entrepreneurs have tried to expand the scope of trademark protection inappropriately. America Online (AOL) applied for trademarks for its expressions "You've Got Mail", "Buddy List" and "IM" (Instant Messenger). If AOL had been allowed to own these trademarks, other ISPs that used these or very similar expressions could have been sued for infringing on AOL's registered trademarks. So, AT&T decided to challenge AOL. In this case, the court ruled that the expressions were not unique to AOL.

Use the above scenarios to answer the questions below: **[Topic 4]**

(a) What is intellectual property?

(02 marks)

ANSWER IN THIS BOX
Intellectual property is defined as "property (as an idea, invention, or process) that is
derived from the work of the mind or intellect." or "Term used to describe works of
the mind distinct and "owned" or created by a person or group.

(b) How is intellectual property/objects different from tangible property/objects?

(04 marks)

ANSWER IN THIS BOX

Unlike physical objects that an individual can own, such as Land, a Motor Car, articles of clothing, or a stamp collection intellectual property consists of objects that are not tangible. Non tangible, or intellectual objects represent literary/creative works and inventions, which are the manifestations or expressions of ideas.

- **Unlike tangible objects, which are exclusionary in nature (a good or service is called excludable if it is possible to prevent people (consumers) who have not paid for it from having access to it), intellectual objects (e.g. software programs) are non-exclusionary.**
- **Scarcity (which often causes competition and rivalry when applied to physical objects) need not exist in the case of intellectual objects, which can be easily reproduced. There are practical limitations to the number of physical objects one can own and that there are natural as well as political limitations to the amount of land that can be owned; however, countless digital copies of a software program can be produced and each at a relatively low cost.**

(c) What is the DMCA?

(02 marks)

ANSWER IN THIS BOX

In 1998, the US Congress passed the Digital Millennium Copyright Act (DMCA) with Civil and criminal penalties included and it:

- **Governs distribution of tools and software that can be used to circumvent**

Continued…

technological measures used to protect copyrighted works.

- **Provides safe harbours for ISPs whose customers/subscribers may be breaking copyright laws ISP must comply with "notice and takedown procedures" that grant copyright holders a process to halt access to alleged infringing content.**

(d) What is the principle of fair use?

(02 marks)

ANSWER IN THIS BOX

Fair use is a limitation on copyright law that allows for the use of protected works without prior authorization in specific cases.

(e) (i) Discuss the conditions under which a company's customer list can be considered a trade secret.

(02 marks)

ANSWER IN THIS BOX

Legally, a customer list is not automatically considered a trade secret. If a company does not treat the 1) list as valuable, 2) confidential information internally, neither will the court. The courts must consider two main factors in making this determination.

- **First, did the firm take prudent steps to keep the list secret?**
- **Second, did the firm expend money or effort to develop the customer list? The more the firm invested to build its customer list and the more that the list provides the firm with a competitive advantage, the more likely the courts are to accept the list as a trade secret.**

(e) (ii) Trade secret law has a few key advantages over patents and copyrights. Name one of them.

(01 mark)

ANSWER IN THIS BOX
Any one of these 4: No time limitations, No need to file an application, Patents can be
ruled invalid by courts, No filing or application fees.

(f) (i) Define what plagiarism is.

(01 mark)

ANSWER IN THIS BOX
Stealing someone's ideas or words and passing them off as one's own.

(ii) Why do students resort to plagiarism most of the time?

(02 marks)

ANSWER IN THIS BOX
Because they do not know what constitutes plagiarism and believe that all electronic
content is in the public domain.

(iii) How do Plagiarism detection systems work?

(01 mark)

ANSWER IN THIS BOX
They check submitted material against databases of electronic content.

(iv) What steps would you suggest to combat student plagiarism?

(05 marks)

ANSWER IN THIS BOX

Steps to combat student plagiarism

- **Help students understand what constitutes plagiarism and why they need to cite sources.**
- **Show students how to document Web pages.**
- **Schedule major writing assignments in portions due over the course of the Term.**
- **Tell students that instructors are aware of Internet paper mills and plagiarism detection services.**
- **Incorporate detection into an antiplagiarism program.**

(g) Name three conditions that an invention must pass to be accepted as a patent?

(03 marks)

ANSWER IN THIS BOX

(i) usefulness

(ii) novelty

(iii) non-obviousness

2) Given below are some scenarios associated with Intellectual Property Rights – Copyrights, Patents and Trademarks. **[Topic 5]**

(a) Name four common types of computer security attacks?

(04 marks)

ANSWER IN THIS BOX

Any four from the list given below:

Continued…

Virus, Worm, Trojan horse, Distributed denial of service,

Rootkit, Spam, Phishing.

(b) Table below shows some perpetrators (in Column X) of computer crime and their objectives (in Column Y). Match correctly a perpetrator from Column X with a phrase from Column Y.

	Column X		**Column Y**
A	Cybercriminal	**P**	Cause problems, steal data and corrupt systems
B	Cyber terrorist	**Q**	Capture trade secrets and gain competitive advantage
C	Industry spy	**R**	Common criminals looking for financial gain
D	Cracker	**S**	Promote political ideology
E	Hacker	**T**	Thrill seekers wanting a challenge out of intellectual curiosity
F	Hacktivist	**U**	Destroy infrastructure components of financial institutions, utilities and emergency response units

(06 marks)

ANSWER IN THIS BOX

Column X	**Column Y**
A	**R**
B	**U**
C	**Q**
D	**P**
E	**T**
F	**S**

(c) What is meant by risk assessment of an organization's computers & networks?

(01 mark)

ANSWER IN THIS BOX

Risk assessment is the process of assessing security-related risks to an

organization's computers and networks from both internal and external threats.

(d) Outline the eight steps in the risk assessment process.

(08 marks)

ANSWER IN THIS BOX

1. **Identify assets of most concern**
2. **Identify loss events that could occur**
3. **Assess likelihood of each potential threat**
4. **Determine the impact of each threat**
5. **Determine how each threat could be mitigated**
6. **Assess feasibility of mitigation options**
7. **Perform cost-benefit analysis**
8. **Decide which countermeasures to implement**

(e) What would one do to prevent the following type of computer crimes/security breaches in your computer systems?

(i) An employee of a company initiates electronic purchase orders which then are approved by himself. This allowed him to input large invoices on behalf of a "friendly vendor" and approve the invoices for payment. He then disappeared from the company to split the money with the vendor.

(02 marks)

ANSWER IN THIS BOX

Organizations need to define employee roles carefully and separate key responsibilities properly, so that a single person is not responsible for accomplishing a task that has high security implications.

(ii) Repeated failed login attempts, recurring attempts to download a program to a server, unusual traffic at odd hours or a user in a human resource department trying to accesses an accounting program for which he/she has no authority have been observed.

(02 marks)

ANSWER IN THIS BOX

Install an intrusion detection system (IDS) which is software and/or hardware that monitors system and network resources and activities, and notifies network security personnel when it identifies possible intrusions from outside the organization or misuse from within the organization.

(iii) Unwanted Internet traffic which cannot be permitted is observed entering your corporate network.

(02 marks)

ANSWER IN THIS BOX

Installation of a corporate firewall is the most common security precaution that can be taken by businesses.

A firewall stands guard between an organization's internal network and the Internet, and it limits network access based on the organization's access policy.

3) (a) Describe the components of an IT environment. **[Topic 6]**

(08 marks)

ANSWER IN THIS BOX

Answer could be one of the following two

(i) In computers, the term environment when unqualified usually refers to the combination of hardware, software , telecommunications and data.

Hardware refers to the physical components within a computer system. These include: Input devices (keyboards, mouse, scanners, remote sensors, barcode readers, etc.)

Storage devices (primary storage such as hard disk drives and secondary storage – DVDs, CDROMs, etc.) Output devices (screens, printers, audio speakers, etc.) (Most important) the central processing unit (CPU), which manipulates data and controls the computer system.

Software is a set of instructions written in a specialised code that controls the operation of the computer and how it communicates with other computers. This is divided into systems software (managing the resources of the computer, such as the CPU, communications links and output devices) and application software (enabling

users to apply the computer to specific tasks, such as email, word processing and stock control).

Telecommunications -Telecommunications refers to the communication of information by electronic means over distance. In the past this meant voice transmission over the telephone. Today a great deal of telecommunication is digital data transmission, using computers, software and devices such as modems and cables to transmit data from one location to another. There is a worldwide digital telecommunications network that enables business and private individuals to obtain and distribute information – sending emails or visiting a website. The most significant development of the past 15 years has been the explosion of communications networking. Communications networks are a linked group of computers and can be arranged locally, say within a single building, called a LAN (local area network). Alternatively, networks may cover greater distances, and are then known as a WAN (wide area network). The most significant development of a WAN is the internet.

Data - The combination of all of this hardware, software and telecommunications equipment makes it possible for people in organisations to analyse data much more effectively than when they could analyse it only with traditional paper-based systems. The growth in this computing power has made it possible for a far greater depth of analysis to be carried out, so much so that organisations invest a great deal in capturing the data that is generated with each transaction. They do this effectively by creating databases.

(ii) IT Systems Services, IT Operational Services, IT Operating Environment Services and the Systems Development Life Cycle (SDLC).

1 - IT Systems Services: This area or section of the framework represents all technical solutions and services put in place around Systems, big or small, that are considered critical for the purpose of meeting a set of functional or behavioural goals within one or more specific Operating Environment. Examples of such technical solutions or Systems could be as small as those considered to be Atomic Systems, such as Computing Devices, Storage, and Software, or as large as those considered to be Composite Systems, such as Document Management Systems, Application Monitoring Systems, Business Intelligence Systems, or even business related Systems, such as Accounting or Payroll Systems. Big or small, a System is a System and no Environment is complete until all relevant Systems are completely accounted for, made available, made stable, made repeatable, and are properly supported for the Environment or Environments that leverage such Systems.

2 - IT Operational Services: This area or section of the framework represents all Operating Services that are put in place to help maintain or use any and all Systems made available in one or more specific Operating Environment. This includes, both, the Services that are directly related to specific Systems, such as Release Management and Deployment Management, as well as those that are more general in nature and non-System specific, such as Project Management, Incident Management, Problem Management, etc.

3 - IT Operating Environment Services: In addition to the previous two components of

Continued…

the framework, this area or section represents the controlled and bounded Operating Environments, themselves, that enable System and Technology related work to occur in contained areas that do not impact other areas of work, as well as all the relevant Services put in place to support such activities. Such Services include but are not limited to the work necessary to construct or reconstruct an Environment, the work necessary to tear down an Environment, the work necessary to Deploy to an Environment, and the work necessary to support an Environment. These Services obviously become even more complex when the owners and managers of such Environments must deal with many Organizations trying to run multiple types of work, simultaneously, throughout a common Environment, in a manner that allows what the industry often refers to as a multi-tenancy model for operations.
4 - The Systems Development Life Cycle (SDLC): This area or section of the framework represents the SDLC for which a specific Environment is a part of, including all the policies, standards, procedures, and work necessary to move a System through such an SDLC in an effective and productive manner. It is the SDLC that drives the purpose of a specific Operating Environment and, therefore, all the work necessary to create, deploy to, operate, support and/or tear down an Environment. A well-defined SDLC not only defines what Environments must exist but also helps an Organization and its Resources understand how best to move Systems and other relevant Solutions through such Environments and, ultimately, through the SDLC, itself.

(b) List the steps involved in creating an ethical organizational culture.

(08 marks)

ANSWER IN THIS BOX

Selecting the right leader

A clear purpose & strategy

A focus on doing the right thing

Hiring the right people

Firing the wrong people

Run ethical training courses

Reward people for doing the right thing

Tolerate mistakes (but not when they are made repeatedly)

(c) Why do many organizations now seek out an ISO 9000 certification (ISO is an acronym for International Standards Organization).

(02 marks)

ANSWER IN THIS BOX

Many organizations now claim that they are using best practices when it comes to business processes. In order to set themselves apart and prove to their customers (and potential customers) that they are indeed doing this, these organizations are seeking out an ISO 9000 certification.

(d) (i) What is "Business Process Reengineering"?

(03 marks)

ANSWER IN THIS BOX

Business Process Reengineering is fully understanding the goals of a process and then dramatically redesigning it from the ground up to achieve dramatic improvements in productivity and quality.

It is a complete redesign requiring thinking on a larger scale.

(ii) Give reason(s) for why Business Process Reengineering had got a bad name in many organizations.

(04 marks)

ANSWER IN THIS BOX

Business Process Reengineering (BPR) had got a bad name in many organizations because it was used as an excuse for cost cutting that really had nothing to do with BPR. For example, many companies simply used it as an excuse for laying off part of their workforce.

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4) (a) Questions (A) to (E) are of the MCQ type. Each question may have one or more correct answers. Marks will be deducted for providing incorrect answers.

(A) Given below are some statements associated with technical writing and expository writing. Identify the correct statements from among them.

(i) The writer of an expository text can assume that the reader or listener has prior knowledge or prior understanding of the topic that is being discussed.

(ii) The information that technical writers convey is often not as complex as the information that writers of expository text convey.

(iii) An example for expository documents is instructions and procedures used as help to either developers or end users to operate or configure a device or a program.

(iv) Press releases, memos, business proposals, product descriptions and specifications, white papers, Résumés, and job applications are but a few examples of documents that are considered forms of technical writing.

(v) One of the most important mechanisms to improve skills in expository writing is to improve the organization of the text.

(02 marks)

ANSWER IN THIS BOX
(iii), (iv), (v)
[Topic 1, last objective]

(B) The following statements are associated with different types of leaderships. Identify the correct statements from among them.

(i) Traits of an authoritarian leader are - sets goals individually, engages primarily in one-way and downward communication, controls discussion with followers.

(ii) One of the good traits of a paternalistic leader is that this type of leader tends to play favourites in decisions. This leader would include the workers more apt to follow and start to exclude the ones who were less loyal.

(iii) Democratic leadership works best in situations where group members are skilled and eager to share their knowledge.

(iv) Laissez-faire type of leadership is good when the following conditions are satisfied: a) when followers are highly skilled, experienced, and educated b) When Followers have pride in their work and have the drive to do it successfully on their own. c) When outside experts, such as staff specialists or consultants are being used and d) when followers are trustworthy and experienced.

(v) A transactional leader is positively affected when the emotional level is high.

(02 marks)

ANSWER IN THIS BOX

(i), (iii), (iv).

[Topic 2, 6th objective]

(C) The statements given below are associated with the Digital Divide, Gender-related issues and Social impact of IT on society Which of these statements can be considered as true?

(i) Computers equipped with assistive technologies and "adaptive devices" can be "equalizers" in the era of information technology because they enable people with disabilities to participate in and compete for jobs that require computer access.

(ii) Women are well represented in the managerial ranks in the computing field because of the "glass ceiling".

(iii) The use of the latest technology such as social media in a state or national election can influence the voter turnout to some extent and the outcome of that election.

(iv) 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. So, the threats posed by computerized monitoring would clearly seem to contribute to employee stress.

(v) Outsourcing practices have affected the displacement of jobs not only for employees in industries within countries but also across them, and thus have had international implications.

(02 marks)

ANSWER IN THIS BOX

(a), (c), (d), (e).

[Topic 3]

(D) The statements given below are from the Professional and Ethical Issues & Responsibilities given in the syllabus. Identify the correct answers.

(i) Green computing is a term applied to a variety of efforts directed toward the efficient design, manufacture, operation, and disposal of IT-related products, including personal computers, laptops, servers, printers, and printer supplies.

(ii) Computer companies looking to manufacture green computers are not challenged to produce computers that use less electricity, include fewer hazardous materials that may cause harm to the environment.

(iii) Because of the high cost of U.S.- based application developers and because a large number of IT professionals are readily available in certain foreign countries, it is now quite common to use offshore outsourcing for major software programming projects in US.

(iv) Whistle-blowing is an effort to attract public attention to a negligent, illegal, unethical,

abusive, or dangerous act by a company or some other organization.

(v) Trip & Trace is a technique frequently employed by identity thieves.

(02 marks)

ANSWER IN THIS BOX

(a), (c), (d).

[Topic 7. Note 7.7.2 of Ref 1]

(E)The statements given below are based on Professional Codes of Ethics. Identify the true statements from among them.

(i) There is a universal code of ethics for all IT professionals.

(ii) Codes of ethics generally include commitment to continuing education for those who practice the profession.

(iii) They contain rules and principles by which members of the organization are expected to abide.

(iv) No single, formal organization of IT professionals has emerged as preeminent.

(v) Following a professional code of ethics can produce benefits for the individual, the profession, and society as a whole.

(02 marks)

ANSWER IN THIS BOX

(b), (c), (d), (e).

[Topic 7]

(b) Column A of the table shown below contains various Privacy Laws and Data Protection Principles implemented by some countries. Column B contains statements associated with these Acts or Laws. Match a cell from Column B correctly with one from Column A and write your answer in the space given below. One cell in Column A may have more than one cell from Column B matching with it.

Column A		Column B	
1	FERPA	**P**	was designed to improve the portability and continuity of health insurance coverage; to reduce fraud, waste, and abuse in health insurance and healthcare delivery; and to simplify the administration of health insurance.
2	EU Directive on Data Protection	**Q**	uses standardized electronic transactions, codes, and identifiers to make available fully digitized medical records, which can then be exchanged over the Internet.
			Continued…

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3	HIPAA	**R**	is a federal law that assigns certain rights to parents regarding their children's educational records.
4	Gramm-Leach-Bailey Act	**S**	protect the personal data of its citizens by prohibiting the "trans-border flow" of such data to countries that lack adequate protection of personal data
		T	safeguards rule forces financial institutions to take a closer look at how they manage private data and to do a risk analysis on their current processes.
		U	components of this law/act/directive are the principles of Data Quality, Legitimate Purposes, Sensitive Data, and The Right to Be Informed.
		V	some medical personnel and privacy advocates fear that between the increasing demands for disclosure of patient information and the inevitable complete digitization of medical records, patient confidentiality will be lost.
		W	financial privacy rule requires financial institutions to provide each consumer with a privacy notice at the time the consumer relationship is established and annually thereafter. The privacy notice must explain the information collected about the consumer, where that information is shared, how that information is used, and how that information is protected.

(08 marks)

ANSWER IN THIS BOX

1 - **R**

2 - **S & U**

3 - **P, Q & V**

4 - **T & W** **[Topic 9]**

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(c) Table shown below gives a summary of Four Phases of Cyber ethics. Fill the blanks labelled (a) to (f) in the table with an appropriate word selected from list 1 to 10 and write your answer in the space given below the table.

Phase	Time Period	Technological Features	Associated Issues
1	1950s–1960s	**…** (a) **…** were large mainframe computers.	Artificial intelligence (AI), database privacy ("Big Brother").
2	1970s–1980s	Minicomputers and the **…** (b) **…,** desktop computers interconnected via privately owned networks.	Issues from Phase 1 plus concerns involving **…** (c) **…** and software piracy, computer crime, and communications privacy.
3	1990s – present	Internet, World Wide Web and early **…** (d) **…** environments and forums.	Issues from Phases 1 and 2 plus concerns about free speech, anonymity, **…** (e) **…,** behavioural norms in virtual communities.
4	Present to near future	Convergence of information and **…** (f) **…** with nanotechnology and biotechnology has increased use of autonomous systems.	Issues from Phases 1–3 plus concerns about artificial electronic agents ("bots") with decision-making capabilities, and developments in nano-computing, bioinformatics, and ambient intelligence.

(06 marks)

ANSWER IN THIS BOX

1. ARPANET	**(b)**
2. legal jurisdiction	**(e)**
3. stand-alone machines	**(a)**
4. intellectual property	**(c)**
5. early "Web.2.0" applications	**(d)**
6. communication technologies	**(f)**
7. cyber technology	**-**
8. networked computers	**-**
9. database privacy	**-**
10. electronic agents	**-**

[Topic 8, Ref 1, Chapter 1]

(d) Give one disadvantage of having to obtain a vendor certification.

(01 mark)

ANSWER IN THIS BOX
Any one of the following three. 1) Require passing a written exam, or in some cases,
a hands-on lab to demonstrate skills and knowledge
2) Can take years to obtain necessary experience 3) Training can be expensive.
[Topic 9]

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