



The
University
Of
Sheffield.

DEPARTMENT OF ELECTRONIC AND ELECTRICAL ENGINEERING

Spring Semester 2012-13 (Resit) 2012-2013 (2 hours)

EEE222OR Professional Issues in Engineering 2

Answer **THREE** questions. **No marks will be awarded for solutions to a fourth question.** Solutions will be considered in the order that they are presented in the answer book. Trial answers will be ignored if they are clearly crossed out. **The numbers given after each section of a question indicate the relative weighting of that section.**

This paper is not to be removed from the Examination Hall

Registration number from U-Card (9 digits) – to be completed by student

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1.

- a.** Mrs. Hill wishes to buy a new car and so applies to borrow money from a company called AutoLoans. The application form requires her to provide her name, address, age, telephone number, profession, annual income and details of other loans she currently has or has had in the past.

AutoLoans send the application form by post to a data processing agency (DBC Associates) who use a computerised database system (written by Mysoft Ltd) to process the application for the loan.

DBC Associates produce a statement of Mrs Hill's credit worthiness by applying a points system algorithm to her financial details, and recommend whether or not she should be given a loan. The report is printed out and returned to AutoLoans by courier. In the report is a recommendation that credit should be refused.

Several areas of The Data Protection Act of 1998 are relevant in this context.

Discuss:

- (i) the objectives of the Act (2)
- (ii) the method of implementation of the Act (1)
- (iii) the obligations of Autoloans under the Act (3)
- (iv) the obligations of DBC Associates under the Act (3)
- (v) the rights of Mrs. Hill under the Act (5)

Mrs. Hill discovers, via an anonymous email, that an error was made by DBC Associates' computer system and that she was, after all, eligible for a loan. Discuss the liabilities in law of the parties concerned. (3)

- b.** The Data Protection Act draws a distinction between 'Personal Data' and 'Sensitive Data'. Give two examples of Sensitive Data and state how it is treated differently under the Act. (3)

2.

HB Safety Systems Ltd (HBSS) is a small start up company which develops, manufactures and sells bespoke electronic devices and systems associated with the detection and prevention of noxious gas leaks. Its principal product is called the 'Canary Plus'. This is designed to be used in industrial and research environments in which there is a risk of H₂S (a highly poisonous gas) leaking into the working environment. The system consists of series of wall- and ceiling-mounted detectors connected to a central monitoring system. If H₂S is detected, warning lights and evacuation sirens are set off, actuators on safety doors automatically seal off the affected area and extractor fans are switched on. Each installation of the 'Canary Plus' system is uniquely designed to fit into the particular working environment in which it will operate. A large part of HBSS' revenue comes from the consultancy it supplies in order to settle on the most appropriate design of a particular system in view of the customer's needs.

- a. HBSS and nearly all of its clients have ISO9000 certification. This requires HBSS to do various things and maintain certain records of how it executes these various activities. Briefly describe examples of *five* such activities or documents that might be relevant to HBSS in relation to ISO9000. (5)
- b. The term 'total quality management' is nowadays used to describe rather broad aspects of the way an organisation runs itself, outside formal quality systems such as ISO9000. Give three examples of the sort of issues or activities that may form part of a broader quality system in a company such as HBSS. (3)
- c. Give four examples of activities at HBSS which are likely to be subject to Health and Safety law. (4)
- d. Suppose you are newly employed by HBSS as Chief Engineer. On your first day at work you are asked by the Managing Director to take on the role of Health and Safety Officer. You quickly discover that though HBSS supplies equipment which is an integral part of their clients' compliance with Health and Safety law, it has not itself established any sort of health and safety management structure for its own premises and activities. Describe briefly what the law broadly would require you to do in order to make HBSS compliant with Health and Safety legislation. (8)

3.

- a. When he was an EEE undergraduate, Andrew Dale did not bother to turn up to any of the lectures on 'Professional Issues'. When he graduated from university, he joined a small company 'Aeroacts' where he was employed to design actuators for the aerospace industry. After about four years, it occurs to him it might be important to become a Chartered Engineer. Andrew applies to the IET. He assumes that because he has MEng degree from the University of Sheffield, he will automatically be able to become Chartered Engineer. In fact, he discovers he must provide evidence of his continuing professional development.

- (i) Give three examples of the type of activities that would count as '*continuing development*' in this context. (3)
- (ii) What processes will Andrew have to undergo to become Chartered? (2)
- (iii) Give some indication of how Andrew would persuade the IET that he had accomplished this development? (2)

- b. After a few years Andrew becomes a Chartered Electrical Engineer and decides to leave 'Aeroacts' to start work as an independent consultant. He is approached by a small company called 'Aircraft Doors Ltd.' (ADL) which designs and builds the passenger and cargo hold doors for aircraft.

ADL are designing a new type of door which is much lighter and can be opened much more quickly than a normal aircraft door. When the door is closed a control system is used to activate locking actuators to prevent the doors opening when the aircraft is in flight.

ADL have asked Andrew to design the locking actuators and the control system. They tell him that they have drawn up a contract which specifies the system and describes what they expect Andrew to do. The contract has certain sections.

For each heading listed below, describe what you think Andrew would be expected to find under this section of the contract:

- (i) Definitions (2)
 - (ii) Assignments (2)
 - (iii) Termination (2)
 - (iv) Confidentiality (2)
- c. When he finally receives the contract, Andrew is not happy. He imagines that if he designs the control system with a fault in it which he does not notice, and as a result a door on an aircraft opens during a flight and many people get injured or killed as a result of the failure of the control system, he might be held responsible. Comment on the legal and professional position of Andrew. (3)
- d. If you were advising Andrew, what other precautions would you suggest that he should take under these circumstances? (2)

4.

- a. (i) Discuss the advantages and disadvantages of owning, maintaining and defending a patent. (3)
- (ii) Describe the main sections of a patent specification. (3)
- (iii) Outline the application process for a UK patent. (3)

- b. Henry Moore is a newly-qualified Chartered Engineer who specialises in high-fidelity ('hi-fi') audio equipment design. He works with a company called Digital Acoustic Reality Ltd (DAR). His main activity has been involved with developing advanced compression software for audio signals. The standard file format which he helped to invent and design is only fractionally larger than a typical MP3 file, but gives much better clarity when played back on a high quality audio system. Some of the algorithms developed by Henry have been filed (but not yet published) with the UK patent office. He was approached by Delsy Surround Systems Ltd (DSS), the major competitor of DAR who have offered him a job in Sheffield at twice his current salary. Since Henry is originally from Sheffield (much of his family is based there), he finds the offer irresistible.

Katherine is an experienced Chartered Engineer and a personal friend of Henry. Henry tells her about his intentions to move to Sheffield. He also says that his new job will be very easy because he will be able to teach the people at DSS about all the things he has invented and discovered while he was at DAR. He also tells her that he has copies of all his work and algorithms which he developed at DAR on his personal laptop.

- (i) Katherine advises Henry to examine his employment contract with DAR before he accepts the job with DSS. Give examples of two types of condition that he might find when he re-reads his employment contract and which could affect his plans. (2)
- (ii) Katherine goes on to suggest that even if there is no reason to be concerned about the terms of his current employment contract, when he leaves DAR he should quite deliberately destroy all the data concerning his work at DAR. Do you think this is good advice? Briefly explain your reasoning. (2)
- (iii) Do you think there are any ethical reasons why Henry should not change jobs under these circumstances? (3)
- (iv) Henry discovers that due to an oversight of the Human Resources department at DAR, he never actually signed an employment contract with them. Explain what area of law may still apply to his use of the data on his PC and in his own memory. (2)
- (v) What is meant by 'restraint of trade' in the present context? (2)

KM / PIR