

**OLLSCOIL NA hÉIREANN**  
**THE NATIONAL UNIVERSITY OF IRELAND, GALWAY**

SUMMER EXAMINATIONS 1999

---

**SECOND YEAR BA INFORMATION TECHNOLOGY**

***CT221 TECHNOLOGICAL FRAMEWORKS***

---

Prof. D. Bell  
Dr. G. Lyons  
Ms. P. Byrne

Time allowed: THREE hours

**ANSWER ANY FIVE QUESTIONS**

**All questions carry equal marks**

1. (a) Choose *two* of the following and describe briefly their contribution to the history of early computing:  
John Napir ; Blaise Pascale ; Charles Babbage ; Herman Hollerith  
  
(b) What factors do you think dictated the rise and acceptance of the personal computer in business environments?
2. (a) Show how a half adder is derived, using logic diagrams and truth tables to illustrate your answer.  
  
(b) Convert the following numbers to binary, then to hexadecimal:  
15 ; -15 ; 100 ; 10 ; -32
3. (a) Choose *three* of the following terms and explain their meaning when used in computer architecture. Use diagrams to illustrate your answer where appropriate:  
address bus ; cache memory ; flip-flop ; ALU ; encoder  
  
(b) Explain the actions carried out in the central processing unit when data is being sent from the ALU to an output device.

4. (a) Derive the logic operands NAND and NOR and draw truth tables to illustrate your answer. Why are these gates of particular relevance to circuit design?  
  
(b) Distinguish between a compiler and an interpreter, stating the advantages and disadvantages of each to the programmer.
5. Compare the development of the telegraphic network and computer networks, including the impacts of each on business communication.
6. (a) Outline the main problems causing errors in the transmission of data over networks and explain how these might be minimised or correction applied to the data.  
  
(b) Explain how messages might be routed in a packet switched network.
7. (a) Choose *three* of the following terms and explain their use in data communications:  
asynchronous ; token passing ; codec ; ISDN ; frequency modulation  
  
(b) Compare the LAN topologies of ring and star with particular reference to data security.
8. (a) In what ways can multimedia sources of data be used to enhance aids for the disabled?  
  
(b) What do you think will be the main impacts of increased computerisation and improved communications on work practices?