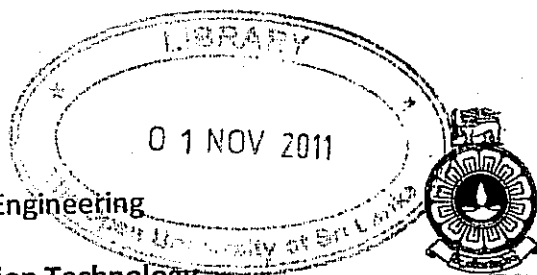


The Open University of Sri Lanka
Department of Electrical and Computer Engineering



ECX3233 – Communications & Information Technology

Final Examination 2010/2011

Closed Book Test

Date: 11th March 2011

Time: 09.30-12.30

Part A is compulsory. Answer both questions. Answer any two questions from Part B. Show all relevant steps of calculations for Q3.

Part A - Answer both questions.

Q1 The school development society (SDS) is introducing SP/MR Chinthana MV, a secondary school with a student population of about 1200. You are requested to provide with a proposal to provide MRC MV with a computer system that provides the best possible service at their limited budget.

Following ideas/suggestions came up during the special SDS meeting called to discuss the computerisation.

- *We need a Computer Lab with about*
- *The Principal's office needs a computer, and another couple should be in the staffroom.*
 - a) Do you agree with above suggestions? Comment (03)
 - b) Based on your suggestions, put together a list of computer hardware needed to fulfil the school's needs. You need to give specifications for all parts of the system, including relevant model/ version/technology where appropriate. (15)
- *The students need to access information and resources using the internet.*
 - c) What are the advantages and challenges of giving internet access at school? Describe. (06)
 - d) What solutions do you suggest to overcome above challenges? Explain. (02)
 - e) What do you suggest as the appropriate cost-effective technology to provide internet access? What are the changes / additions you would make to your specifications of above b)? (04)
- *The computer lab is to be made available to all students to make use of the computer facilities to enhances / supplement their studies.*
 - f) What main software do you recommend to facilitate above requirement. Give reason(s) for choosing each software. (08)
- *All above should take into consideration the needs as well as financial constraints of the school. We need to be able to use the facilities for a long time, without burdening the School.*
 - g) The sustainability, maintenance and upgrading/updating are very important factors that need to be considered when planning the computerisation. The finances needs to be

generated, and steps taken to reduce the running costs. Give your suggestions on how the computer system can be sustained – maintained for the next 5 – 6 years. (07)

- Q2. a) Describe briefly the following terms. (06)
- Amplitude Modulation
 - Frequency Modulation
 - Attenuator
 - Decibel representation of gain
 - Threshold level
 - Psophometric weighting
- b) Describe values given in dBm, dBu, dBmo, and dBr. (04)
- c) In standard audio systems 0 dBm is defined with respect to a load termination of 600 ohms. What is the voltage measured across a 600 ohm load for a 0 dBm level? (05)

Part B - Answer any 2 questions. Each question is worth 20 marks.

- Q3. a) Convert $13B_{16}$ to a decimal value.
- b) Convert 113.125_{10} to a binary value.
- c) Convert 637 to a $13B_{16}$ to a hexa-decimal value.
- d) Perform the following binary operations.
- $1101101_2 \times 1111_2$
 - $10001101_2 \div 1100_2$
- e) Find the value of m if $645_m = 327_{10}$.
- f) Subtract 6 from -3, using two's complement method.
- Q4. a) Describe a typical LAN.
- b) What are the typical topologies used in LANs? Describe and compare three of them.
- c) What are the three main medium-access control protocols used in LANs? Describe them briefly.
- d) Describe how collision detection / collision avoidance is realised in any two of the above protocols.
- e) Describe briefly, in correct order, the different layers specified by the ISO OSI reference model.
- Q5. a) Describe the 5 main functions of a microprocessor.
- b) Describe the actions taking place during READ and WRITE operations of the processor.
- c) Describe the fetch-execute cycle.
- d) Describe the 3 main addressing modes of a general purpose MPU using suitable examples to illustrate their differences.