

***KFUPM - COMPUTER ENGINEERING DEPARTMENT***

**COE-202 – Fundamentals of Computer Engineering (section 02)**

**Student Name:**

**Student Number:**

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**You MUST SHOW your work – correct results without showing leading work do not count!**

- 1) (15 points) Analog versus Digital Systems:
  - a. What is the difference between analog and digital systems?
  - b. Which systems are easier to design?
  - c. What is meant by “Quantization”? and what is the device that performs quantization?
  
- 2) (40 points) Number systems:
  - a. What is the octal equivalent of  $(32.57)_{10}$ ?
  - b. What is the binary equivalent of  $(32.57)_{10}$ ?
  - c. If a BINARY number A is represented by  $A_1A_0.A_{-1}$  (i.e. 2 digits for the integer part and 1 digit for the fraction part), what are the smallest nonzero and largest numbers that can be represented? specify the decimal value as well.
  - d. What is  $16^3 - 16^2$  in hex and decimal systems? *Hint: Perform the subtraction in hex and then convert to decimal.*

*Note: in your number conversions, include only the first four fraction digits*