

#### Begum Rokeya University, Rangpur Department of Computer Science and Engineering Course: CSE 4206(Simulation and Modeling)

Full Marks: 50 Time: 3 hours N.B. a) There are  $\underline{SEVEN}$  questions in this course. Answer any  $\underline{FIVE}$  questions. b) The figures in the margin indicate full marks. c) The questions are equal marks. a) What do you mean by simulation? When simulation is the appropriate tool? b) What do you mean by system and system environment? c) Name several entities, attributes, activities, events and state variables for following systems: A cafeteria i) A fast food restaurant A hospital emergency room iii) A grocery store iv) 2. a) Which points should be considered with importance while designing random number generation 3 subroutines? b) What is meant by pseudo random number? Why are they called pseudo? c) Use the linear congruential method to generate at least six pseudo random numbers with X0= 15, a = 7, c = 17 and m = 100. a) Develop the poker test for Four-digit numbers. b) Consider the following sequence of 120 digits: 1 3 7 4 8 6 2 5 1 6 4 4 3 3 4 2 1 5 8 7 0 76260 57801126763759 0 8 8 2 6 7 8 1 3 5 3 8 4 0 9 0 3 0 9 2 2 3 6 5 6 0 0 1 3 4 4 6 9 9 8 5 6 0 1 7 5 6 7 9 4 9 3 1 8 3 3 6 6 7 8 2 3 5 9 6 6 7 0 3 1 0 2 4 2 0 6 4 0 3 9 3 6 8 1 5 Test whether these digits can be assumed to be independent based on the frequency with which gaps occur. Use  $\alpha$ =0.05. 2 a) What are the goals of the validation process? 3 What do you mean by calibration and validation of models? What types of common-sense suggestions can be given for use in the verification process? 5 Explain the approach of forward pass while finding the critical path of an activity network. 6 a) b) What is fractal object? What are its characteristics? 4 3 a) Describe parametric continuity conditions. b) Determine the Hermite Interpolation blending function for control points. Plot each function and 5 label the maximum and minimum values. 2 Define the following terms with example Interpolation spline ii) Approximation spline 7. a) Determine the Bezier blending function for five control points. Plot each function and label the 5 maximum and minimum values. 5 b) Obtain an expression for the fractal dimension of a self-similar object.

#### Begum Rokeya University, Rangpur Department of Computer Science and Engineering

4-1

4th Year 2nd Semester Final Examination, 2013 (2009-2010)

Subject Title: Digital Image Processing

Subject Code: CSE4204

Marks:50

Time: 3hrs

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(Answer any FIVE of the following questions) a. What is digital image processing? What are the areas of applications of digital image processing? b. Briefly explain the idea of sampling and quantization when generating digital images from sensed

c. What is the key difference between boundary and edge in a digital image? For an image pixel p with

coordinates (x,y), find the coordinates of  $N_s(p)$  and  $N_4(p)$ .

a. Define Euclidian, city-block, and chessboard distance metric for pixels p and q with coordinates (x,y) 2

b. What is image enhancement? Briefly describe some basic intensity transformation functions.

c. Discuss region based image segmentation techniques.

a. Explain the mechanics of spatial filtering. 3

b. What are correlation and convolution? Briefly explain these two ideas for performing linear spatial

c. Suppose you want to write an application that would convert a digital photograph to painted photograph having all the geometric properties of the digital photograph are unchanged. How would you solve this problem?

a. Derive the equation of Laplacian operator for a function (image) f(x,y) of two variables. b. A binary image contains straight lines oriented horizontally, vertically, at 45°, and at -45°. Give a set 3 of 3 × 3 masks that can be used to detect 1-pixel breaks in these lines. Assume that the intensities of the

lines and background are 1 and 0, respectively. c. The following array shows the intensity values of a 1-D digital function representing a section of a scan line ,say intensity values against x (arrow indicated direction) (intensity profile). Compute the first-

and second-order derivatives at each value.

|   |   |   |   |   |   |   | 1 | 1 | 1 | 1 | 1 | 1 | 6 | 6 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 6 | 6 | 5 | 4 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | U |   | - |
| U | U | U |   |   |   |   |   | - |   |   |   |   |   |   |   |
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|   |   |   |   |   |   |   |   |   |   |   |   | _ | - |   |   |
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a. Explain histogram of a digital image? 5

b. Write short notes on dilation and erosion.

c. Why image compression techniques are useful tools?

a. What is image gradient?

1st 2nd

b. Write short notes on the following image compression techniques: I) Huffman coding II) Arithmetic

c. What is pattern recognition? Discuss the structural method of pattern recognition.

a. Formulate a point detection mask.

b.The arithmetic decoding process is the reverse of the encoding procedure. Decode the message

0.233355 given the coding model.

| Symbol | Probability |
|--------|-------------|
| a      | 0.2         |
| e      | 0.3         |
| i      | 0.1         |
| 0      | 0.2         |
| u      | 0.1         |
| !      | 0.1         |

image subtraction image averaging, smoothing and sharpening.

# Department of Computer Science & Engineering Begum Rokeya University, Rangpur

Year Session: 2009-2010 4<sup>th</sup> year 2<sup>nd</sup> Semester Semester Final Examination-2013 Course Code: CSE 4208 Course Title: VLSI Full Marks: 50 Time: 3.0Hours [N.B. Answer any Five (5) Questions, Number of each question is indicated to the right] 4 Describe VLSI design cycle. 1. (a) 3 What do you mean by stick diagram? Why is it necessary? (b) 3 What is Selected Signal Assignment Statement? Write a syntax in VHDL. (c) 2 Explain the difference between CMOS and bipolar technology. 2. (a) 4 Define lambda based design rules used for layout. (b) Discuss in detail the scaling factors for device parameters and show the effects of 4 (c) scaling for constant voltage model. Explain in detail with neat diagram the steps involved in the fabrication of 10 3. MOS transistor process. 4 Explain how channel formed in MOSFET? 4. (a) 6 Explain MOSFET current-voltage characteristics. (b) Derive the expression for drain current of MOS device in different 10 5. operation regions. 5 Implement a XOR gate using CMOS logic. 6. (a) 5 Implement NAND gate using pseudo n-MOS logic (b) What do you mean by MOS capacitor? Explain how it creates in MOS 1+3=47. (a) transistor? 1+5=6Define threshold voltage. Write down its mathematical expression and explain its different terms.

# Department of Computer Science and Engineering Begum Rokeya University, Rangpur. 4th Year 2nd Semester Final Examination'2013 (Session: 2009-10)

Course Title: Physics Course Code: PHY1125 Time: 3.00 Hours

Full Marks: 50

### Answer Any Five from the Given Questions

(Note: Numbers in the right margin indicate marks for each question.)

| and the same of | -   |  |       |
|-----------------|-----|--|-------|
| 1.              | (a) | Explain photoelectric effect. Give an account of Einstein's explanation of photoelectric effect on the basis of quantum theory.  | 1+5=6 |
|                 | (b) | Define work function   | 1.5   |
|                 | (c) | The photoelectric threshold for a metal is 3000 A°. Find the kinetic energy of an electron ejected from it by radiation of wavelength 1200 A°.   | 2.5   |
| 2.              | (a) | What do you understand by mass defect and binding energy of the nucleus?   | 2     |
|                 | (b) | State and explain radioactive decay law.   | 5     |
|                 | (c) | Calculate the binding energy in MeV when one neutron and one proton combine deuteron.  | 3     |
| 3.              | (a) | Distinguish between crystalline and non-crystalline materials.   | 3     |
|                 | (b) | What are Miller indices?   | 2     |
|                 | (c) | Define inter-planner spacing? Show that, the inter-planer spacing of two adjacent plane of cubic crystal is $d_{hkl} = \frac{a}{\sqrt{h^2 + k^2 + l^2}}$ , where the symbols have their usual meaning. | 5     |
| 4.              | (a) | Briefly discuss the various defects in crystal.  | 5     |
|                 | (b) | Find the electric field at a point on the axis of a charge circular ring.  | 5     |
| 5.              | (a) | Define entropy. Mention the physical significance of entropy.  | 3     |
|                 | (b) | Show that entropy remains constant in reversible process but increases in irreversible process.  | 5     |
|                 | (c) | Find the efficiency of a Carnot engine working between 127°C and 27°C.   | 2     |
| 6.              | (a) | Define Lissajous figure.   | 2     |
|                 | (b) | Show that for a body executing simple harmonic motion, mechanical energy remains   | 5     |
|                 |     | conserved.   |       |
|                 | (c) | A particle executes simple harmonic motion given by the equation $y = 10 \sin \frac{2\pi}{100}$ (36000 $t - 20$ ), in C.G.S unit calculate (i) the amplitude (ii) frequency (iii) time period.         | 3     |
| 7.              | (a) | What are the conditions of interference of light?  | 2     |
|                 | (b) | Discuss interference of light analytically and obtain the condition of maximum and minimum intensities.  | 5     |
|                 | (c) | Distinguish between interference and diffraction of light.   | 3     |
|                 | ( ) |  |       |

## Department of Compute Science and Engineering Begum Rokeya University, Rangpur.

4th Year 2nd Semester Final Examination, 2013 (Session: 2009-10)

Full Marks: 50

Course Title: Chemistry

Course Code: CHM 1224

Time: 3 Hours

Answer any FIVE of the Following Questions (Note: Numbers in the right margin indicate marks for each question.) 4 Write the postulates of Bohr theory of hydrogen atom. 1. (a) If the principle quantum number of an electron in an atom is 4, what are the possible 4 (b) values of other quantum numbers? 2 What is Heisenberg's uncertainty principle? (c) Define system and surrounding. Disucss the different types of thermodynamics system. 2+3 2. (a) 2 Wha is entropy of activation? (b) 3 What is real gas and real solution? (c) What are coordination compounds? Discuss the nomenclature of complex compunds by 5 3. (a) IUPAC system. Write down the names of the following complex species according to IUPAC system 3 (b) nomenclature: (i) [Ni(CO)\_4] (ii) [Co (NH\_3)\_2 Cl\_3 (iii) [Fe(H\_2O)\_6 Cl\_3] Define the following terms with examples- i) Ligand ii) Coordination number. 2 (c) 2 What is electrophile and nucleophile? 4. (a) 4 Write down the mechanism of Fridel-Craft alkylation reaction. (b) Define the following terms: i) Natural products ii) Amiono Acid iii) Nucleic acid and iv) 4 (c) Protein 3 Calculate the emf of the given cell: 5 (a)  $Ag_{(s)|}Ag^{+}$  (a=0.1) ||  $Zn^{2+}$  (a = 0.1) | Zn; Given that  $E^{0}$   $Ag/Ag^{+}$ =0.799V;  $E^{0}Z_{n}^{2+}/Z_{n}$ =0.763V What is solubility product? Metal corrosion is an electrochemical process- explain. 1 + 3(b) 3 Distinguish between consecutive and parallel reaction. (c) 3 Discuss about the position of inert gases in periodic table. 6 (a) Define orbit and orbitals. What is the difference between an orbit and oribital? 1+3 (b) 3 What is complex ion and aufbau principle? (c) 2.5\*4 7 Write short notes on any Four of the followings: a) Quantum number b) Thermodynamics quantities c) Application of spectroscopy d) Coordination complexs e) Nernst Equation f) Environmental aspects of metal

### Department of Computer Science and Engineering Begum Rokeya University, Rangpur.

4th Year 2nd Semester Final Examination'2013 (Session: 2009-10)

Course Title: E-Commerce and Web Engineering

(i) HTML (ii) XML (iii) SMTP (iv) XSL

| Course | e Title    | e: E-Commerce and Web Engineering Full Ma  | larks: 50 |
|--------|------------|--|-----------|
| Course | e Codi     | e: CSE4202  Answer Any Five from the Given Questions   |           |
|        |            | (Note: Numbers in the right margin indicate marks for each question.)  |           |
| 1.     | (a)        | Categorize web application based on their development history and degree of complexity. Hence, describe briefly each one with proper example.  | 6         |
|        | (b)        | Describe the product related characteristics of web application.   | 4         |
| 2.     | (b)<br>(a) | What are the challenges that make Requirement Engineering special in Web Engineering? Mention the sources of information from where requirements can be gathered.  | 2+1=3     |
|        | (b)        | Among Requirement Engineering specifics in Web Engineering discuss (i) Multidisciplinary (ii) Unpredictable Operational Environment (iii) Volatility of Requirements and Constraints.  | 3         |
|        | (c)        | Discuss the types of requirements particularly relevant in web development project.  | 4         |
| 3.     | (a)        | What are the objectives of Content Modeling? Draw a state machine diagram for the states of a paper in a paper reviewing system.   | 2+3=5     |
|        | (b)        | What do you mean by static adaptation and dynamic adaptation in customization modeling? What things are customized in customization modeling?  | 2+1=3     |
|        | (c)        | Describe the functionality of hypertext links used in WebML method.  | 2         |
| 4.     | (a)        | What do you mean by architecture of web application? Define the role of design pattern and frameworks in web application.  | 1+2=3     |
|        | (b)        | What do you mean by web infrastructure architecture and web application architecture? Discuss with proper example.   | 3         |
|        | (c)        | Describe the Components of generic web application architecture.   | 4         |
| 5.     |            | The state of the s | 3         |
|        | (b)        | 1.55 and between client side and server side scripting? Give example.  | 4         |
|        | (c)        | the region handling procedures of an HTTP cookie? Mention the six components of a  | 2+1=3     |
| 6.     | . (a)      | 1:55 marges between a standalone application and web-service?  | 3         |
|        | (b)        | - and testing and testing a web-service.   | 4         |
|        | (c)        | What is the role of RTSP in client/server communication on the web?  | 3         |
| 7.     |            | the following terms:   | 4×2.5=10  |