

2-22

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

Time: 3 hours

Full Marks: 50

**N.B.**

- a) There are **SEVEN** questions in this course. Answer any **FIVE** questions.
- b) The figures in the margin indicate full marks.
- c) The questions are equal marks.

1.
  - a) What do you mean by simulation? When simulation is the appropriate tool? 4
  - b) What do you mean by system and system environment? 2
  - c) Name several entities, attributes, activities, events and state variables for following systems: 4
    - i) A cafeteria
    - ii) A fast food restaurant
    - iii) A hospital emergency room
    - iv) A grocery store
2.
  - a) Which points should be considered with importance while designing random number generation subroutines? 3
  - b) What is meant by pseudo random number? Why are they called pseudo? 2
  - c) Use the linear congruential method to generate at least six pseudo random numbers with  $X_0 = 15$ ,  $a = 7$ ,  $c = 17$  and  $m = 100$ . 5
3.
  - a) Develop the poker test for Four-digit numbers. 5
  - b) Consider the following sequence of 120 digits: 5
    - 1 3 7 4 8 6 2 5 1 6 4 4 3 3 4 2 1 5 8 7
    - 0 7 6 2 6 0 5 7 8 0 1 1 2 6 7 6 3 7 5 9
    - 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 5Test whether these digits can be assumed to be independent based on the frequency with which gaps occur. Use  $\alpha = 0.05$ .
4.
  - a) What are the goals of the validation process? 2
  - b) What do you mean by calibration and validation of models? 3
  - c) What types of common-sense suggestions can be given for use in the verification process? 5
5.
  - a) Explain the approach of forward pass while finding the critical path of an activity network. 6
  - b) What is fractal object? What are its characteristics? 4
6.
  - a) Describe parametric continuity conditions. 3
  - b) Determine the Hermite Interpolation blending function for control points. Plot each function and label the maximum and minimum values. 5
  - c) Define the following terms with example 2
    - i) Interpolation spline
    - ii) Approximation spline
7.
  - a) Determine the Bezier blending function for five control points. Plot each function and label the maximum and minimum values. 5
  - b) Obtain an expression for the fractal dimension of a self-similar object. 5

4.2

Time: 3hrs

3



Department of Computer Science & Engineering  
Begum Rokeya University, Rangpur

Semester Final Examination-2013

4<sup>th</sup> year 2<sup>nd</sup> Semester

Year Session: 2009-2010

Course Title: VLSI

Course Code: CSE 4208

Time: 3.0Hours

Full Marks: 50

[N.B. Answer any Five (5) Questions, Number of each question is indicated to the right]

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|--------|---|-------|
| 1. (a) | Describe VLSI design cycle.   | 4     |
| (b)    | What do you mean by stick diagram? Why is it necessary?   | 3     |
| (c)    | What is Selected Signal Assignment Statement? Write a syntax in VHDL.   | 3     |
| 2. (a) | Explain the difference between CMOS and bipolar technology.   | 2     |
| (b)    | Define lambda based design rules used for layout.   | 4     |
| (c)    | Discuss in detail the scaling factors for device parameters and show the effects of scaling for constant voltage model. | 4     |
| 3.     | Explain in detail with neat diagram the steps involved in the fabrication of MOS transistor process.                    | 10    |
| 4. (a) | Explain how channel formed in MOSFET?   | 4     |
| (b)    | Explain MOSFET current- voltage characteristics.  | 6     |
| 5.     | Derive the expression for drain current of MOS device in different operation regions.                                   | 10    |
| 6. (a) | Implement a XOR gate using CMOS logic.  | 5     |
| (b)    | Implement NAND gate using pseudo n-MOS logic  | 5     |
| 7. (a) | What do you mean by MOS capacitor? Explain how it creates in MOS transistor?  | 1+3=4 |
| (b)    | Define threshold voltage. Write down its mathematical expression and explain its different terms.                       | 1+5=6 |

Department of Computer Science and Engineering  
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4<sup>th</sup> Year 2<sup>nd</sup> 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.)

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|--|-------|
| 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 $3000 \text{ \AA}$ . Find the kinetic energy of an electron ejected from it by radiation of wavelength $1200 \text{ \AA}$ .                                   | 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 to form a deuteron.  | 3     |
| 3. (a) Distinguish between crystalline and non-crystalline materials.  | 3     |
| (b) What are Miller indices?   | 2     |
| (c) Define inter-planar spacing? Show that, the inter-planar spacing of two adjacent planes of a 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 charged circular ring.   | 5     |
| 5. (a) Define entropy. Mention the physical significance of entropy.   | 3     |
| (b) Show that entropy remains constant in a reversible process but increases in an irreversible process.   | 5     |
| (c) Find the efficiency of a Carnot engine working between $127^\circ\text{C}$ and $27^\circ\text{C}$ .  | 2     |
| 6. (a) Define Lissajous figure.  | 2     |
| (b) Show that for a body executing simple harmonic motion, mechanical energy remains conserved.  | 5     |
| (c) A particle executes simple harmonic motion given by the equation $y = 10 \sin \frac{2\pi}{100} (36000t - 20)$ , 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     |



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

Course Title: Chemistry  
Course Code: CHM 1224  
Time: 3 Hours

Full Marks: 50

**Answer any FIVE of the Following Questions**

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

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

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

4-2

Course Title: E-Commerce and Web Engineering  
Course Code: CSE4202

Full Marks: 50

Answer Any Five from the Given Questions

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

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|--------|---|----------|
| 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. (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. (a) | What are stateful and stateless communications? How do the server side web sessions and client side web session maintain state?   | 3        |
| (b)    | What are the differences between client side and server side scripting? Give example.   | 4        |
| (c)    | What are the session handling procedures of an HTTP cookie? Mention the six components of a cookie used in web browser?   | 2+1=3    |
| 6. (a) | What are the differences between a standalone application and web-service?  | 3        |
| (b)    | Describe the process of creating and testing a web-service.   | 4        |
| (c)    | What is the role of RTSP in client/server communication on the web?   | 3        |
| 7. (a) | Write short notes on the following terms:<br>(i) HTML (ii) XML (iii) SMTP (iv) XSL  | 4×2.5=10 |