

Department of Computer Science & Engineering

Begum Rokeya University, Rangpur

1st Year 1st Semester Final Examination – 2011 (Session: 2010-2011)

Course Code: CSE 1101 Course Title: Computer Fundamentals

Full Marks: 50

Time: 03:00 hrs

(Answer any Five. Figures in the right margin indicate full marks.)

1. (a) What is a computer? Giving suitable examples, mention the importance of computers with respect to repetitiveness and complexity factors. 1+2=3
 (b) What do you mean by data, information and code? Compare BCD and straight binary code. 1+2=3
 (c) Perform the following operations in 2's complement system and give the decimal values of the result(use 8 bits to represent each number). 2+2=4
 i) (-32)+(-32) ii) 64-128

2. (a) What is Boolean algebra? Mention the importance of Boolean algebra in the design and analysis of digital circuits. 1+2=3
 (b) Why is the NAND gate called universal gate? Realize the logic function $Z = \overline{x}y + \overline{y}z + \overline{z}x$ using only NAND gates. 2+3=5
 (c) Differentiate PC and PC clones. 2

3. (a) Show the internal organization of a PC system and discuss adapters. 2+1=3
 (b) What is system bus? Why is address bus unidirectional? 1+1=2
 (c) What do you mean by fetch-execute cycle? Brief describe the cycle with the help of a suitable example. 1+4=5

4. (a) What is serial port? What type of devices is usually connected to serial port? Why? 1+1+1=3
 (b) What do you mean by resolution of a display unit? Find out the video memory size of a display unit having a resolution of 680X480 that can display 32-bit color images. 1+3=4
 (c) Describe the working principle of a laser printer. 3

5. (a) Explain why larger cache memory implies improved system performance. 2
 (b) Show the organization of a single platter on a hard disk. Why does higher RPM value refer to faster hard disk? 2-1=3
 (c) Describe how a "0" bit is read from a CD-ROM. Comment about a CD-ROM drive that is specified as 48x. 3+2=5

6. (a) What do you mean by access time and access mode of a memory device? 1+1=2
 (b) Why is DRAM circuit complexity greater than that of SRAM? 2
 (c) Compare the different kinds of scanners. 3
 (d) What is NIC card? Why is it required? 1+2=3

7. (a) Describe different network topologies with proper diagram. 5
 (b) Differentiate between intranet and extranet. 2
 (c) Write a short note on e-mail. 3

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1st Year 1st Semester Final Examination – 2011 (Session: 2010-2011)

Course Code: CSE 1103

Course Title: Electrical Circuit Analysis

Full Marks: 50

Time: 03:00 hrs

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

1. (a) When a circuit is called series circuit or a parallel circuit? What is close loop? 2+1=3

- (b) State and explain the KVL and KCL. 2+2=4

- (c) A lead acid battery fitted in a truck develops 24V and has an internal resistance of 0.01 ohm. It is used to supply current to head lights etc. If the total load is equal to 100W, find 3

$$\text{i} = \frac{P}{V} = \frac{100}{24} = 4.17 \text{ A}$$

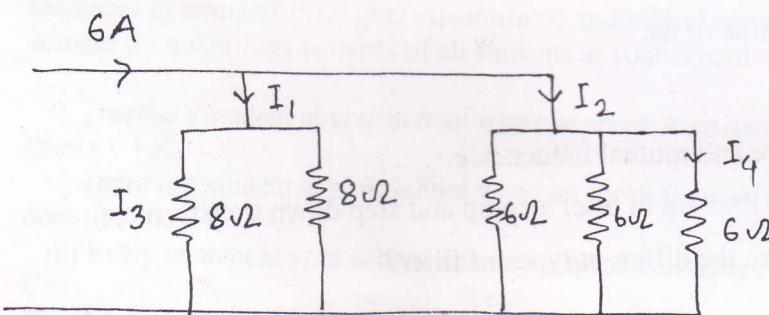
$$R_{\text{int}} = 4.17 \times 0.01 = 0.0417 \text{ V}$$

$$V_{\text{ext}} = 24 - 0.0417 = 23.958 \text{ V}$$

2. (a) State and explain current divider rule. 3

- (b) Prove that the total resistance of parallel resistors is always less than the value of the smallest resistor. 3

- (c) Using the current divider rule, find the unknown current I_1, I_2, I_3, I_4 for the below network. 4



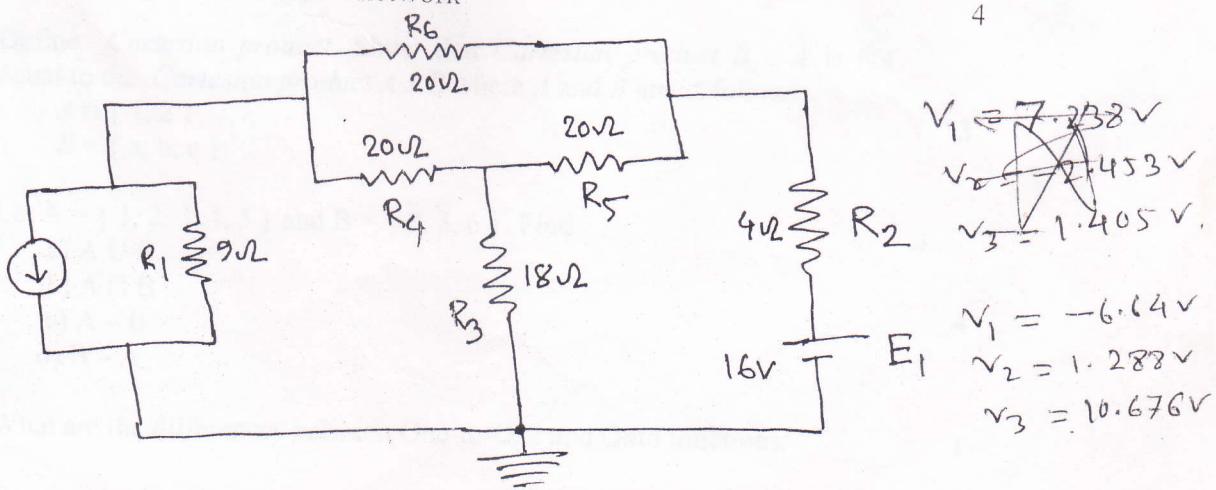
$$I_1 = 2 \text{ A}, I_2 = 4 \text{ A}$$

$$I_3 = 1 \text{ A}, I_4 = 1.333 \text{ A}$$

3. (a) Define active element and passive element. What do you mean by linear bilateral network? 2+1=3

- (b) Write down the different steps of branch current analysis. 3

- (c) Solve the nodal voltages of the below network. 4



$$v_1 = 7.238 \text{ V}$$

~~$$v_2 = 2.453 \text{ V}$$~~

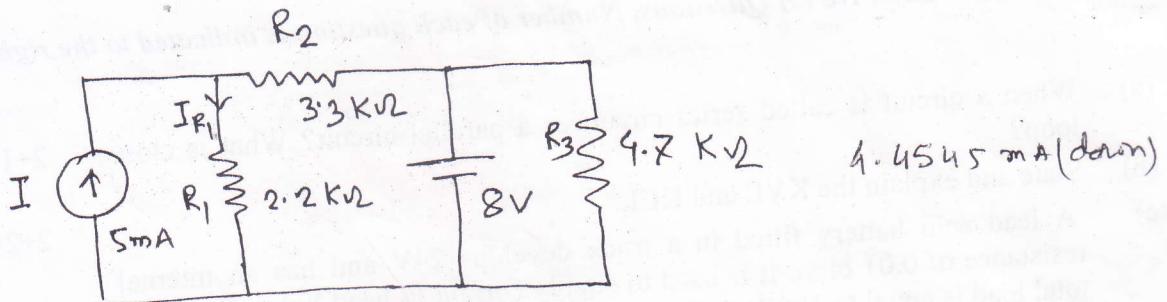
~~$$v_3 = 1.405 \text{ V}$$~~

$$v_1 = -6.64 \text{ V}$$

$$v_2 = 1.288 \text{ V}$$

$$v_3 = 10.676 \text{ V}$$

4. (a) Write down the different network theorems. 2
 (b) State and explain Norton's theorem? 1+3=4
 (c) Using superposition theorem find the current through R_1 for the below network. 4



5. (a) Write down the difference between inductor and capacitor? 2
 (b) Deduce an expression for the capacitor charging in dc LCR circuit. 8

6. (a) Explain the phasor diagram. 2
 (b) Prove that the current lags the applied e.m.f. by an angle ϕ in ac LR circuit. 5
 (c) Calculate the r.m.s value of ac. 3

7. (a) Define self inductance and mutual inductance. 2
 (b) What is transformer? Explain in brief step up and step down transformers. 1+4=5
 (c) Define filter? What are the different types of filter? 1+2=3

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Course Code: CSE 1105 Course Title: Discrete Mathematics

Total Time: 03 hours Total Credit: 03 Total Marks: 50

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

- 1.** a) What is implication and contrapositive of an implication? Give examples of each. 2
- b) Giving proper explanation, write down the truth values of the following propositions. 4
- (i) If 2016 is a leap-year, then 2012 is a leap-year.
 - (ii) If 2012 is a leap-year, then 2014 is a leap-year.
 - (iii) You will learn computer programming iff you are a student of Computer Science & Engineering.
- If the sun rises in the east and sets in the west, then the moon will disappear forever.
- c) What is tautology? By using logical equivalences determine whether $(\neg p \wedge (p \rightarrow q)) \rightarrow \neg p$ is a tautology. 1+3
-
- 2.** a) What is logical equivalence? Determine whether $(p \rightarrow q) \rightarrow (r \rightarrow s)$ and $(p \rightarrow r) \rightarrow (q \rightarrow s)$ are not logically equivalent. 3
- b) Let $P(x)$ be the statement "x can speak Russian" and let $Q(x)$ be the statement "x knows the computer language C++". Express each of these sentences in terms of $P(x)$, $Q(x)$, quantifiers, and logical connectives. The domain for quantifiers consists of all students at your school.
- i) There is a student at your school who can speak Russian and who knows C++.
 - ii) There is a student at your school who can speak Russian but who does not know C++.
 - iii) Every student at your school either can speak Russian or knows C++.
- c) For the following set of premises, what relevant conclusion(s) can be drawn? Also explain the rules of inference used to obtain the conclusion(s). 3
- Whenever I play football, I get injured. I played football yesterday. Whenever I'm injured, I prefer watching movies or reading books. Now, I don't feel like reading books.* 2+2
-
- 3.** a) Define *Cartesian product*. Show that *Cartesian product* $B \times A$ is not equal to the *Cartesian product* $A \times B$ where A and B are as follows: 3
- $$A = \{1, 2\}$$
- $$B = \{a, b, c\}$$
- b) Let $A = \{1, 2, 3, 4, 5\}$ and $B = \{0, 3, 6\}$. Find 4
- a) $A \cup B$
 - b) $A \cap B$
 - c) $A - B$
 - d) $B - A$
- c) What are the differences between One-to-One and Onto functions. 1

- d) Let f and g be the functions from the set of integers to the set of integers defined by $f(x) = 2x + 3$ and $g(x) = 3x + 2$. What is the composition of f and g ? What is the composition of g and f ? 2
4. a) What is *Algorithm*? Write an *Algorithm* to find the *Maximum* element in a Finite Sequence. 3
- b) Write down DIVISION ALGORITHM. Evaluate the following quantities; 3
- i) $13 \bmod 3$
 - ii) $-97 \bmod 7$
 - iii) $-101 \bmod 13$
 - iv) $199 \bmod 19$
- c) What is *pairwise relatively prime*? Determine whether the integers 10, 17 and 21 are *pairwise relatively prime* and whether the integers 10, 19, and 24 are *pairwise relatively prime*. 3
- d) Find the base 8 expansion of $(12345)_{10}$. 1
5. a) What is recursion? Give a recursive definition of the following sequence. 1+3
 $0, 1, 1, 2, 4, 7, 13, 24, 44, 81$
- b) Use mathematical induction to show that 4
 $1 + 2 + 2^2 + \dots + 2^n = 2^{n+1} - 1$ for all nonnegative integers n .
- c) State the sum rule and product rule for counting. 2
6. a) What is PRODUCT RULE? 1
- b) In a version of the computer language BASIC, the name of a variable is a string of one or two alphanumeric characters, where uppercase and lowercase letters are not distinguished. (An *alphanumeric* character is either one of the 26 English letters or one of the 10 digits.) Moreover, a variable name must begin with a letter and must be different from the five strings of two characters that are reserved for programming use. How many different variable names are there in this version of BASIC? 6
- c) What is Dirichlet drawer principle? How many students must be in a class to guarantee that at least two students receive the same score on the final exam, if the exam is graded on scale from 0 to 100 points? 3
7. Write short notes for the followings: 2.5
a. Graph X
b. Tree 4
c. Proofs =
d. Rule of Inference 10

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1st Year 1st Semester Final Examination -- 2011 (Session: 2010-2011)

Course Code: CSE 1106 Course Title: Communicative English

Full Marks: 50

Time: 03:00 hrs

Part A(Reading)

2x5=10

1. Read the passage and answer the following questions:

After years in wilderness, the team 'Artificial Intelligence(AI)' seems poised to make a come back. Most researchers agree that AI peaked around 1985. A public reared on science-fiction movies and excited by the growing power of computers had high expectations. For years, AI researchers had implied that a break through was just around the corner. Marvin Minsky said in 1967 that within a generation the problem of creating 'Artificial Intelligence' would be substantially solved. Prototype of medical diagnosis program and speech recognition software appeared to be making progress. It proved to be a false dawn. Thinking computers and household robots failed to materialize, and backlash ensued. At the beginning of 1980s people were optimistic but at the end of 1980 people started to understand that there were hard problems. But it re-entered public consciousness with the release of AI, a movie about a robot boy. This has ignited public debate about AI, but the term is also being used once more within the computer industry. Researchers, executives and marketing people are now using the expression without irony or inverted commas. And it is not always hype. The term is being applied, with some justification, to products that depend on technology that was originally developed by AI researchers. Admittedly, the rehabilitation of the term has a long way to go, and some firms still prefer to avoid using it. But the fact that others are starting to use it again suggests that AI has moved on from being seen as an overambitious and underachieving field of research.

- (a) What is AI ?
- (b) Why did people were so optimistic about AI?
- (c) Which sectors seemed to have the influence of AI?
- (d) How did the interest in AI get back again?
- (e) What could be the best title for the passage?

Part B(Grammar)

2. Fill in the blanks using the correct form of verbs in brackets.

1x5=5

'Good day, ladies and gentleman. I ---- (ask) today to talk to you about the urban landscape. There ---- (be) two major areas that I ----(focus) on in my talk. I ---- (research) on this area for a long time and ---- (find) some issues on it.'

3. Write WH questions:

1x5=5

- (a) I will tell you what he has told.
- (b) World Science is dominated by a number of languages.
- (c) The magazine was inaugurated in 1980.
- (d) She shouted with me very loudly that day
- (e) They have been longing for such a dream for twenty years.

4. Use articles where necessary 0.5x5=2
~~A~~ light is ~~the~~ important for organisms for two different reasons. Firstly, it is used as ~~a~~ cue for ~~the~~ timing of daily and seasonal rhythms in both ~~A~~ plants and animals, and secondly it is used to assist ~~the~~ growth in plants.
5. Change the voice: 0.5x5=2.5
- (a) Have the scientists listed the number of glow-worm?
 - (b) The house was rented under a ~~contrat~~ ^{rental}.
 - (c) They found out his fault and gave a punishment for it.
 - (d) She killed herself.
 - (e) They regarded me as a doctor.
6. Use appropriate prepositions 0.5x5=2.5
For taking a good ~~preposition~~ ^{preparation} at first, talk ~~to~~ ^{to} your teacher. He can give you some advice ~~on~~ ^{about} your strength and weakness. Then, make a list ~~of~~ ^{of} what you already have learnt. The internet can be an invaluable tool, but there is little point ~~in~~ ^{of} searching ~~for~~ information if you don't know what you are searching.
7. Correct the sentences 0.5x5=2.5
- (a) Hellow and welcome in todays 'Buyer Beware' programme.
 - (b) Did you see our diploma course prospectus yet?
 - (c) I'll be giving our contact details in the end.
 - (d) Can I use them free charge?
 - (e) Two third of the grain have lost.

Part C(Writing)

8. Write an essay on either of the following 15
- (a) Internet for young generation.
 - (b) Colors of summer.
9. Read the following text and summarize it. 5

The market for tourism in remote areas is booming as never before. Countries all across the world are actively promoting ~~their~~ ^{the} 'wildness' regions-such as mountains, arctic lands, deserts, small islands and wetlands to high-spending tourists. Tourists are drawn to these regions by their natural landscape beauty and the unique cultures of their indigenous people. And poor governments in these isolated areas have welcomed the new breed of 'adventure tourist' grateful for the hard currency they bring.

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1st Year 1st Semester Final Examination – 2011 (Session: 2010-2011)

Course Code: CSE 1107 **Course Title:** Linear Algebra and Geometry
Full Marks: 50 Time: 03:00 hrs

(Answer any Five. Figures in the right margin indicate full marks.)

- 1.** (a) Find the condition that the general equation of second degree $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ may represent a pair of straight lines and then find its intersecting point. 5
- (b) Show that the distance from the origin to the orthocenter of the triangle formed by the lines $ax^2 + 2hxy + by^2 = 0$ and $\frac{x}{\alpha} + \frac{y}{\beta} = 1$ is $\frac{(a+b)\alpha\beta\sqrt{(\alpha^2 + \beta^2)}}{a\alpha^2 + 2ha\beta + b\beta^2}$. 5
- 2.** (a) Define pole and polar of a circle. Circles are drawn through the point $(c, 0)$ touching the circle $x^2 + y^2 = a^2$. Show that the locus of the pole of the axis of x with respect to these circles is the curve $4a^2(x^2 - c^2) = (a^2 - c^2)\{a^2 - (c - 2x)^2\}y^2$. 1+4=5
- (b) Define radical axis. Show that the radical axis of two circles is perpendicular to the line joining the centers. 1+4=5
- 3.** (a) State and prove invariants law. 5
- (b) Prove that the transformation of rectangular axes which convert $\frac{X^2}{P} + \frac{Y^2}{Q}$ into $ax^2 + by^2 + 2hxy$ will convert $\frac{X^2}{P-\lambda} + \frac{Y^2}{Q-\lambda}$ into $\frac{ax^2 + by^2 + 2hxy - \lambda(ab-h^2)(x^2+y^2)}{1-(a+b)\lambda+\lambda^2(ab-h^2)}$. 5
- 4.** (a) Define linearly dependent and independent. Determine whether the following vectors in R^4 are linearly dependent or independent: (i) $(1, 3, -1, 4), (3, 8, -5, 7), (2, 9, 4, 23)$ (ii) $(1, -2, 4, 1), (2, 1, 0, -3), (3, -6, 1, 4)$; 2+3=5
- (b) Define basis and dimension of a vector space. Suppose $\{v_1, v_2, \dots, v_m\}$ spans a vector space V . Prove that if v_i is a linear combination of vectors $\{v_1, v_2, \dots, v_{i-1}\}$, then $\{v_1, v_2, \dots, v_{i-1}, v_{i+1}, \dots, v_m\}$ spans V . 2+3=5
- 5.** (a) Define kernel and image of a linear mapping. Let $F: V \rightarrow U$ be a linear mapping. Then show that kernel of F is a subspace of V and the image of F is a subspace of U . 2+3=5
- (b) Let $f: R^3 \rightarrow R^3$ be the linear mapping defined by $f(x, y, z) = (x + 2y - z, y + z, x + y - 2z)$. Find a basis and the dimension of the kernel of f . 5

6. (a) Solve:

$$x+2y-3z-2t=2$$

$$2x+5y-8z+6t=5$$

$$3x+4y-5z+2t=4$$

5

(b)

$$\text{Let } A = \begin{bmatrix} 2 & -2 & 2 & 1 \\ -3 & 6 & 0 & 1 \\ 1 & -7 & 10 & 2 \end{bmatrix}$$

Reduce it echelon form canonical form.

5

7.

Reduce the equation $x^2 + 12xy - 4y^2 - 6x + 4x + 4y + 9 = 0$ to be standard form. Find also the equations of lotus rectum, directrix and axis.

10