**Department of Computer Science and Engineering**
**Begum Rokeya University, Rangpur.**
1ˢᵗ Year 1ˢᵗ Semester Final Examination, 2014. (Session: 2013-14)

Course Title: Computer Fundamentals
Course Code: CSE1101                                                                      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) | What are the technical specifications you should consider when buying a Personal Computer (PC)? |
| | (b) | How did the replacement of vacuum tube with transistor play role in development of computer? |
| | (c) | What do you understand by 1's and 2's complement? Evaluate the following: |

3

2

5

      i)  11110000 – 10001010 ii) 11000-10011 and prove them using 2's complement.

| | | |
|---|---|---|
| 2. | (a) | With circuit diagram describe the three primary logic gates. |
| | (b) | What do you understand by universality of logic gate? |
| | (c) | Simplify the following expression using i) Boolean-Algebra and ii) K-Maps: |

3

1

6

$$\bar{A}BC + A\bar{B}C + ABC + \bar{A}C$$

| | | |
|---|---|---|
| 3. | (a) | Why latch is called the basic memory circuit? Draw a clock signal and show its positive and negative edge transition. |
| | (b) | Draw a simplified block organization of a PC showing the system bus, adapter, main memory, microprocessor and other items. |
| | (c) | Give the main characteristics of address bus, data bus and control bus of the CPU of a microcomputer. |

1+3

3

3

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|---|---|---|
| 4. | (a) | Draw the functions of microprocessor and explain briefly its components. |
| | (b) | Describe the steps performed in instruction cycle during the instruction execution by CPU. |
| | (c) | Calculate the capacity of a hard disk having 1632 cylinders, 12 heads, 54 sectors/track. (Hard disk generally store 512 bytes of data in a sector). |

4

3

3

| | | |
|---|---|---|
| 5. | (a) | What is a computer program? Discuss scope and usability of files included by large program. |
| | (b) | Make a comparison between compiler and interpreter. |
| | (c) | Draw a flow chart to compute and display the area of a circle. |
| | (d) | Write down the differences between system software and application software. |

3

3

2

2

| | | |
|---|---|---|
| 6. | (a) | Describe the syntax and semantics of a typical C program with a sample program. |
| | (b) | Discuss the primary data types in C mentioning their range on 16-bit machine. |
| | (c) | What does void main(void) mean? |
| | (d) | Write program in C to compute display the value of x where, x=a / (b – c). |

3

3

1

3

| | | |
|---|---|---|
| 7. | (a) | Most standard keyboard includes five major groups of keys. List and describe their functionalities. |
| | (b) | What do you mean by resolution, refresh-rate and dot-pitch of a monitor? |
| | (c) | What is impact and non-impact printer? Give the difference between inkjet and laser printer. |

3

3

4

Semester Final Examination-2014     1$^{st}$ year 1$^{st}$ Semester       Session: 20013-2014

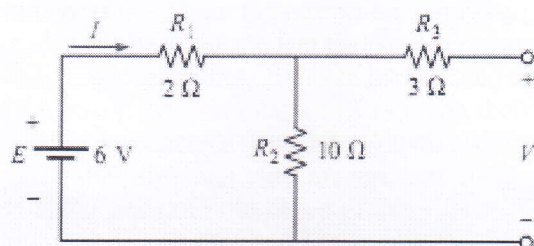Course Title: Electrical Circuit Analysis       Course Code: EEE 1121
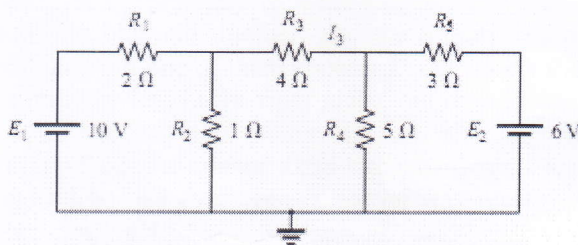
Time: 3.0 Hours                        Full Marks: 50

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

| | | |
|---|---|---|
| 1. (a) | Define electrical circuit element with their symbol. | 3 |
| (b) | State and explain KVL and KCL with proper circuit diagram. | 1+3=4 |
| (c) | Calculate the voltage drops across $R_1$ ,$R_2$ and $R_3$, those are connected in series with a source E. | 3 |
| 2. (a) | Write the properties of series and parallel circuits. | 3 |
| (b) | Explain why resultant resistance increases when two or more resistors are connected in series and resultant resistance decreases when two or more resistors are connected in parallel. | 4 |
| (c) | Calculate V and I in the given circuit. | 3 |



| | | |
|---|---|---|
| 3. (a) | Define linear bilateral element with example. Define mesh and node. | 3 |
| (b) | Explain why current sources of different current ratings are not connected in series. | 2 |
| (c) | State and explain mesh analysis. Using mesh analysis determines the current $I_3$ for the given network. | 3+2=5 |



| | | |
|---|---|---|
| 4. (a) | Write the different important fundamental theorems of network analysis. | 2 |
| (b) | State and explain Norton's theorem. | 4 |
| (c) | Find the Norton's equivalent circuit for the below network in the shaded area of the network. | 4 |
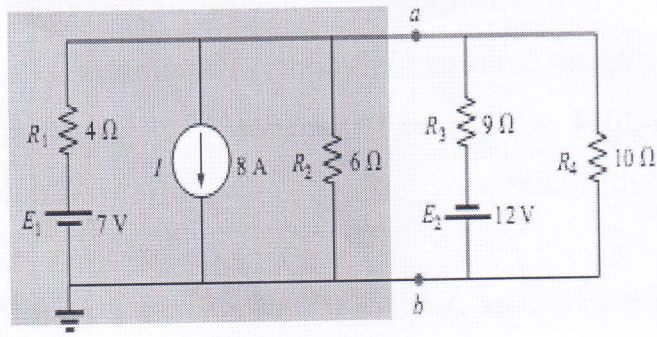
5. (a)    What are the different alternating waveforms?     2

   (b)    Write the general form of sinusoidal ac voltage and ac current and explain its different terms.     1+1=2

   (c)    Calculate the average value and effective value of ac voltage and ac current.     6

6. (a)    Define resistance, reactance and impedance.     3

   (b)    What is resonant circuit? Calculate the resonance frequency of series resonant circuit.     1+3=4

   (c)    The current through a 0.2 H coil is provided. Find the sinusoidal expression for the voltage across the coil and sketch the v and I curves.     3

       (i)    $i = 15 \sin 377t$

       (ii)    $I = 8 \sin (377t\text{-}70)$

7. (a)    Define Q factor and selectivity. Write its physical significance.     3

   (b)    What are different types of filter?     3

   (c)    Explain the frequency response of R-C high pass filter with proper diagram.     4

Course Title: Professional English

Course Code: ENG1123

Full Marks: 50

Time: 3 Hours

### Group – A
### Read the following text carefully and then answer the questions from 1 to 3:

The scores were level and there was one wicket to fall. The last man in was the blacksmith, leaning heavily upon the shoulder of the baker, who was going to run for him, and limping as if in great pain. He took guard and looked round savagely. He was clearly still in a great rage.

The first ball he received he lashed at wildly and hit straight up in the air to an enormous height. It went up and up and up, until it became difficult to focus it properly against the deep, cloudless blue of the sky, and it carried with it the hopes and fears of an English village. Up and up it went and then at the top it seemed to hang motionless in the air, poised like a hawk, fighting, as it were, a heroic but forlorn battle against the chief invention of Sir Isaac Newton, and the nit began its slow descent.

In the meanwhile things were happening below on the terrestrial sphere… In the first place, the blacksmith forgot his sprained ankle and set out at a capital rate for the other end, roaring in a great voice as he went: 'Come on, Joe!'. The baker, who was running on behalf of the invalid, also set out, and he also roared: 'Come on, Joe!' and side by side, like a pair of high-stepping hackneys, the pair cantered along. From the other end Joe set out on his mission, and he roared: 'Come on, Bill!'. So all three came on. And everything would have been all right, so far as the running was concerned, had it not been for the fact that Joe, very naturally, ran with his head thrown back and his eyes goggling at the hawk-like cricket ball. And this in itself would not have mattered if it had not been for the fact that the blacksmith and the baker, also very naturally, ran with their heads turned not only upwards, but also backwards as well so that they too gazed at the ball with an alarming sort of squint and truly terrific wink in their necks. Half-way down the pitch the three met with magnificent clang, reminiscent of early, happy days in the tournament ring at Ashby-de-la-Zouche, and the hopes of the village fell with the resounding fall of their three champions.

But what of the fielding side? Things were not so well with them. If there was doubt and confusion among the warriors of Fordenden, there was also uncertainty and disorganization among the ranks of the invaders. Their main trouble was the excessive concentration of their forces in the neighborhood of the wicket. Napoleon laid it down that it was impossible to have too many men on the battlefield, and he used to do everything in his power to call up every available man for a battle. Mr. Hodge, after a sweet glance at the ascending ball and a swift glance at the disposition of his troops, disagreed profoundly with the emperor's dictum. He had too many men, far too many. And all except the youth in the blue silk jumper, and the mighty Boone, were moving towards strategically positions underneath the ball, and not one of them appeared to be aware that any of the others existed. Boone had not moved because he was more or less in the right place, but then Boone was not likely to bring off the catch, especially after the episode of the last ball. Major Hawker, shouting 'Mine, mine!' in a magnificently self-confident voice, was coming up from the bowler's end like a battle-cruiser. Mr. Harcourt had obviously lost sight of the ball altogether, if indeed he had ever seen it, for he was running round and round Boone and giggling foolishly.

1. **Answer the following questions by using only one sentences:**     (5x1=5)
   (a) Why couldn't the blacksmith run very well?
   (b) Why did the three cricketers run into each other?
   (c) Why did Mr. Hodge disagree with Napoleon's views?
   (d) What made all the men run towards a certain spot?
   (e) Suggest a suitable short title for the text.

2. **Give the meaning of these words taken from the text and then use them in other sentences to**     (5x1= 5)
   **bring out their meaning clearly (any five)**
   (a) limping; (b) lashed; (c) invention; (d) invalid; (e)goggling; (f) warriors; (g)excessive; (h)available; (i) ascending; (j) giggling.

3.  Give the meaning of these expressions taken from the text and then make sentences by using     (5x1=5)
    them. (any five)
    (a) in a great rage; (b) seemed to hang motionless; (c) poised like a hawk; (d) on behalf of; (e)side by side; (f) laid
    it down; (g) to do everything in his power; (h) to bring off the catch.

<center>Group- B</center>

4.  **Fill in the blanks with right form of verbs: (any five)**                                     (5x1=5)
    (a)  The film_____by then. (finish)
    (b)  The sun ____ in the east. (rise)
    (c)  We usually grow vegetables in our garden, but this year we _____any. (grow)
    (d)  What time ____? (arrive)
    (e)  I read a newspaper yesterday, but I _____today. (read)
    (f)  When I arrived, Bina search for me. She was annoyed with me because I was late and she
         ___for a long. (wait)

5.  Give the meaning of the words in italics in these sentences and then use these words in further     (5x1=5)
    examples. (any five)
    (a)  Sitting listening to the wireless, he did not know that a *burglar* was in his bedroom, stealing his wife's
         jewels.
    (b)  The painter decided to *exhibit* his work in a gallery near the Centre of the town.
    (c)  Without a moment's *hesitation* he dashed into the roadway and rescued the child from in front of the car.
    (d)  He shouted so much that he became *hoarse* and now he has to stuck pastilles all day logn.
    (e)  Our neighbour's dog was *a nuisance*, barking from early in the morning till late at night.
    (f)  I am afraid he *lost his head* when he saw the car coming straight at him, otherwise he could have avoided the
         accident.

6.  **Transformation of sentences: (any five)**                                                     (5x1=5)
    (a)  Who is calling me? (Passive)
    (b)  He was made to go outside of the class by the teacher. (Active)
    (c)  He ran fast but could not get the train. (Complex)
    (d)  Work hard or your will not prosper in life. (Simple)
    (e)  I read more in order to make a good result. (Complex)
    (f)  If you work hard, you will shine in life. (Compound)
    (g)  If I were a king! (Assertive)

7.  **Change the following words according to the direction and then make sentences by using the**     (5x1=5)
    **changed words. (any five)**
    (a) center (adjective); (b) rapid (adjective); (c) trouble (adjective); (d) mourn (adjective); (e)bury (noun); (f)
    danger(noun); (g) behave (noun); (h) suggest (noun).

8.  (a)  Write a letter to a friend who has invited you to a birthday party. Write an answer in which you     (5)
         explain why you are not yet sure whether you will be free to go, but you wish him a very happy
         birthday, etc.
    Or,
    (b)  Write a letter to a friend, telling him/her about the unluckiest day of your life.

9.  (a)  Someone has written to the newspaper to say that animals are perfectly happy in zoos. Write an     (10)
         article for the newspaper, disagreeing with this view. Write about 200 words.
    Or,
    (b)  Write a letter to the he headmaster of a school near your house, complaining that the pupils
         climb over the fence to fetch their football and spoil your plants. Ask for something to be done
         about it.

Course Title: Linear Algebra and Geometry
Course Code: MAT1124                                                                 Full Marks: 50

**Answer Any Five from the Given Questions**

(Note: Questions are of equal values)

1.  (a)  What is the transformation of coordinates? Find the change in the coordinates of a point when the origin is shifted to another point $O'(\alpha, \beta)$ where the direction of axis remains same.

    (b)  Determine the angle through which the axes must be rotated to remove the xy term in the equation $7x^2-6\sqrt{3}xy + 13y^2 = 16$.

2.  (a)  Derive the angle between the pair of straight line represented by $ax^2 + 2hxy + by^2 = 0$; Hence write down the conditions of parallelism and perpendicularity between two lines.

    (b)  Find the area of the triangle formed by the lines $ax^2 + 2hxy + by^2 = 0$ and lx+my+n=0.

3.  (a)  Show that the lines joining the origin to the point of intersection of 3x-2y=1 and $x^2 + y^2 + 19x + 4y - 3 = 0$ are at right angles.

    (b)  Reduce the equation $32x^2 + 52xy - 7y^2 - 64x - 52y - 148 = 0$ to standard form.

4.  (a)  Find the locus of the middle point of chords of the circle $x^2 + y^2 = a^2$ which subtends a right angle at the origin.

    (b)  Define limiting points. Find the coordinates of limiting points of of the co-axial system determined by the circles $x^2 + y^2 - 2x + 18y + 11 = 0$

5.  (a)  What is meant by symmetric and skew symmetric matrices? Show that every square matrix can be expressed as the sum of symmetric and skew symmetric matrices.

    (b)  Given A= $\begin{bmatrix} 1 & -2 & 3 \\ 4 & 5 & -6 \end{bmatrix}$ and B = $\begin{bmatrix} 3 & 0 & 2 \\ -7 & 1 & 8 \end{bmatrix}$ find A+B and 2A-3B

6.  (a)  What is the rank of a matrix? Fins the rank of the matrix A where,

    $$A = \begin{bmatrix} 1 & 2 & -3 \\ 2 & 1 & 0 \\ -2 & -1 & 3 \\ -1 & 4 & -2 \end{bmatrix}$$

    (b)  What do you mean by system of linear equations? Solve the following system by matrix method:

    $$2x_1 - 3x_2 + 4x_3 = 5$$
    $$3x_1 + 5x_2 - 6x_3 = 7$$
    $$-4x_1 + 2x_2 + 5x_3 = 9$$

7.  (a)  Define vector space and subspace. If u= (1, 1, 0); v = (1, 3, 2) and w =(4, 9, 5) show that u,v,w are linearly dependent vector.

    (b)  If u and w are two subspaces of a vector space v and u+w has finite dimension then show that dim(u + w) dim u + dim w- dim (u ∩ w.)

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

| | | |
|---|---|---:|
| 1. (a) | What is photoelectric effect? Explain how does photo electron produce? | 1+2=3 |
| (b) | Establish Einstein's mass-energy relation. | 3 |
| (c) | What is Compton effect? Deduce the Compton wavelength. | 1+3=4 |
| 2. (a) | Define binding energy of a nucleus. | 1 |
| (b) | Find out the expression for binding energy per nucleon according to liquid drop model. | 6 |
| (c) | Define nuclear fission and fusion using the binding energy versus mass number graph. | 3 |
| 3. (a) | Define Gaussian surface. When do we apply Gauss's law? | 1+2=3 |
| (b) | Deduce Coulomb's law from Gauss's law fro electrostatic. | 3 |
| (c) | Show that the potential difference is proportional to the charge for a parallel plate capacitor. | 4 |
| 4. (a) | Write down the postulates of kinetic theory of gasses. | 2 |
| (b) | Show that the RMS velocity is the square root of the mean of the squares of the individual velocities. | 5 |
| (c) | Establish the Mayer's relation. | 3 |
| 5. (a) | Define simple harmonic oscillator and discuss its characteristics. | 1+2=3 |
| (b) | Show that the current density per unit area of the cross-section and the total energy per unit volume remain constant for a plane progressive wave. | 4 |
| (c) | Establish the relation for particle velocity and wave velocity. | 3 |
| 6. (a) | State second law of thermodynamics. | 1 |
| (b) | Define entropy. What is the physical significance of entropy? Show that the change of entropy between any two states is path independent. | 1+1+3=5 |
| (c) | A Carnot's engine whose temperature of the source is 400K takes 200 calories of heat at this temperature and rejects 150 calories of heats to the sink. What is the temperature of the sink? Also calculate the efficiency of the engine. | 4 |
| 7. (a) | What is the principle of superposition? State the condition under which two sources of light can produce interference. | 1+2=3 |
| (b) | Define wave front. Explain the behavior of light passing through Young's double slit experiment. | 1+2=3 |
| (c) | What is diffraction? Describe briefly Fresnel and Fraunhoffer diffraction. | 1+3=4 |