2015 -16

Begum Rokeya University, Rangpur
Department of Computer Science and Engineering
B.Sc. 1st Year 1st Semester Examination-2016

Course Code: CSE1101 **Course Title :** Computer Fundamentals
Time: 3 Hours Full Marks: 50

*Note: i) Answer any **FIVE** questions from the following questions ii) Numbers in the right margin indicate marks for each question.*

1.	(a)	What is the difference between data and information?	2
	(b)	Convert $(31654)_7$ to base five.	2
	(c)	Roughly, how many bits do you need to write the number n in binary	1
	(d)	Suppose there are about 100,000 people associated with Stanford. How much space is required to store a 100 KB jpg of each person, in GB	2
	(e)	Suppose you are going to buy a personal computer for gaming purpose. What are the things you would consider before buying your gaming computer? Explain your answer.	3
2.	(a)	What is a number system? Briefly explain 2's complement number representation of signed number. Why this representation is used to represent signed number? Find the 2's complement of the following 8-bit number 00101001.	5
	(b)	How do *computer's system clock* and *cache memory* affect the processing speed of a computer?	4
	(b)	What does an "A/D converter" do?	1
3.	(a)	Describe the layout of a standard keyboard.	3
	(b)	What are the basic components of OCR devices? Explain each component briefly.	3
	(c)	How are OMR devices used for recognizing the characters in the documents to be scanned?	2
	(d)	How does light pen help in inputting data into a computer system?	2
4.	(a)	Distinguish between Graphical User Interface (GUI) and Command-line Interface (CLI) of an operating system (OS). Write your experiences of using CLI of an OS.	4
	(b)	If you want to buy a monitor, you have to choose monitor depending on some important specifications. What are those? Define each.	3
	(c)	What is operating system? Why operating systems are used?	3
5.	(a)	What is a flowchart? Draw a flowchart to find the number of 1s in the binary representation of an integer number.	3
	(b)	Package software makes our work comfortable. Do you agree or not? Critically discuss with example.	3
	(c)	Write some real world scenarios where DBMSs are used.	2
	(d)	What is computer virus? How are virus passed in a computer?	2
6.	(a)	Write short notes on: i)Volatile and non-volatile memory ii) OSI Network Layers	3
	(b)	What is the difference between compiling and running of a program? Do these processes generate the same output?	2
	(b)	What is URL? Show the syntax of URL with example.	1
	(c)	What is Internet? What are the services provided by the Internet? Explain Each of them briefly.	3
	(d)	What are the basic components of a computer system?	1
7.	(a)	What is a computer program? What are the popular programming languages?	1+2
	(b)	A factorial function is define as $f(n) = 1 \times 2 \times 3 \times \ldots\ldots \times n$, which is the number of possible ways to arrange different n objects. Write a C function named calculateFactorial(n) which returns f(n) % 10000007. (For full marks, avoid memory overflow during computation)	3
	(c)	What is the difference between machine language and high level language?	2
	(d)	Suppose we have a 400 mbps LAN. How many megabytes per second can it carry, ignoring all overhead:	2

Begum Rokeya University, Rangpur

Department of Computer Science and Engineering

B.Sc. (Engg.) 1st year 1st Semester Final Examination, 2016. (Session: 2015-16)

Course Code: **EEE 1127** Time: **3.00 Hours**

Course Title: **Electrical Circuit Analysis** Total Marks: **50**

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*[*N B: ***Answer any five (5) questions and figures in the right margin indicate full marks]***

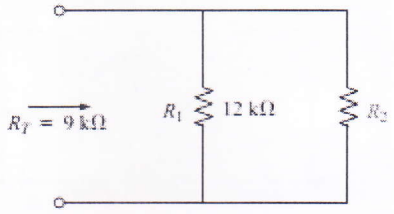
1. (a) Describe different types of resistors. 3

   (b) State and explain KVL and KCL with proper circuit diagram. 2+3=5

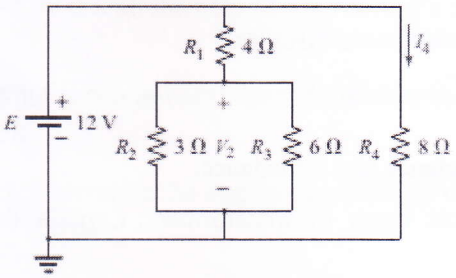
   (c) Explain the characteristics of open circuit and short circuit. 2

2. (a) Write the properties of series and parallel circuits. 3

   (b) Determine the value of R_2 in given circuit to establish a total resistance of 9kΩ 3



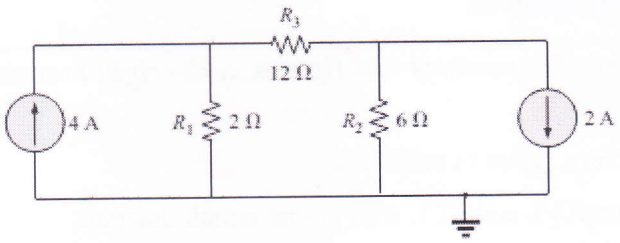
   (c) Calculate current I_4 and voltage V_2 in the given circuit. 4



3. (a) Define linear bilateral element with example. 1

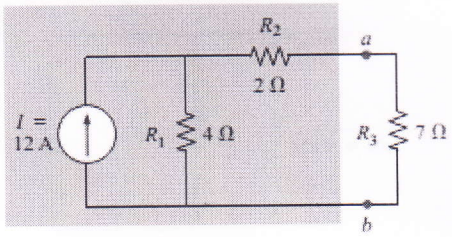
   (b) What do you mean by current source and voltage source? Explain how one can interchange them? 2+2=4

(c) State and explain nodal analysis. Using nodal analysis determines the nodal voltages for the given network. 3+2=5



4. (a) State and explain Thevenin's theorem. 4

(b) Find the Thevenin's equivalent circuit for the below network in the shaded area of the network. 4



(c) Distinguish between Thevenin's and Norton's theorem. 2

5. (a) What do you mean by ac? What are the different alternating waveforms? 1+2=3

(b) Explain linear and non-linear circuits. 2

(c) Explain the effects of ac passing through resistor, capacitor and inductor. 5

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

(b) What are the different types of transformer? Explain the working principle of transformer. 2+2=4

(c) State and prove maximum power transfer theorem. 3

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

(b) Explain R-L Transients storage cycle. 3

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

Begum Rokeya University, Rangpur.

Department of Computer Science and Engineering

B.Sc. (Engg.) 1st Year 1st Semester Final Examination-2016 (Session: 2015-16)

Course Title: Algebra, Trigonometry and Vector; Course Code: MAT 1123

Time: **3.00 hours** Total Marks: **50**

Answer any five from the given questions.

[Note: Answer the question sequentially. All questions carry equal marks.]

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1. **a)** State and prove De Morgan's Law.

   b) Define equivalence relation with example.

2. **a)** Solve: $x + y + z = 9$
   $2x + 5y + 7z = 52$
   $2x + y - z = 0$
   by Cramer's rule.

   b) Write the properties of determinants.

3. **a)** Prove that every equation of degree n has exactly n roots.

   b) If a, b, c are the roots of the equation $x^3 + px^2 + qx + r = 0$ find the values of $(a + b)(c + a)(a + b)$ in p, q and r.

4. **a)** State and prove Gauss's Divergence theorem.

   b) Suppose $F = -3x^2i + 5xyj$, evaluate $\int_C F\,dr$ where C is the curve in the xy-plane, $y = 2x^2$ from (0, 0) to (1, 2).

5. **a)** State De Moiure's theorem and prove the theorem when n is positive integer.

   b) Solve the equation $x^7 + x^4 + x^3 + 1 = 0$ with the help of De Moiure's theorem.

6. **a)** What is the resultant of a vector? Find a unit vector u parallel to the resultant R of vector $r_1 = 2i + 4j - 5k$ and $r_2 = -i - 2j + 3k$.

   b) Define vector dot and cross product. Determine the angles of a triangle whose two sides are given by $A = 3i - 4j + k$ and $B = 4i - j + 3k$.

7. **a)** Show that, $\bar{r} = (6xy + z^3)\hat{\imath} + (3x^2 - z)\hat{\jmath} + (3xz^2 - y)\hat{k}$ is not solenoidal.

   b) Evaluate $\oint(x^2 - 2xy)dx + (x^2y + 3)dy$ around the boundary of the region defined by $y^2 = 8x$ and x = z using Green's theorem.

Begum Rokeya University, Rangpur

Department of Computer Science and Engineering

B.Sc.(Engg.) 1st year 1st Semester Final Examination, 2016. (Session: 2015-16)

Course Code: **ENG 1123** Time: **3.00 Hours**

Course Title: **Technical English** Total Marks: **50**

*[N B: **Answer all of the following questions and figures in the right margin indicate full marks]***

1. **Read the following text and answer the questions below:** **5×2**

The universe as known to science is not in itself either friendly of hostile to man, but it can be made to act as a friend if approached with patient knowledge. Where the universe is concerned, knowledge is the one thing needful. Man alone of living things, has shown himself capable of the knowledge required to give him certain mastery over his environment. The dangers to man in the future come, not from nature, but from man himself. Will he use his power wisely? Philosophy should make us know the ends of life. It can free us from the tyranny of prejudice and distortions due to a narrow view. Love, beauty, knowledge and joy of life: these things retain their luster however wide our purview. And if philosophy can help us feel the value of these things, it can bring light into a world of darkness.

Answer the following questions:

a) How can a universe be a friend to us?

b) Who alone is, to some extent, capable of knowing the universe?

c) Where does the future danger to man come from?

d) What can philosophy do?

e) How can philosophy bring light into world of darkness?

2. **Change the following words according to the direction and then make sentences by using the exchanged words. (any five)** **5×1**

(a) slack (verb); (b) imaginative (noun); (c) star (adjective); (d) believe (noun); (e) addition (adjective); (f) confuse (adjective); (g) necessary (verb).

3. **Make your own sentences with the following phrases: (any five)** **5×1**

(a) work for; (b) find a way; (c) antique dealer; (d) make up one's mind; (e) seize a chance; (f) sought-after; (g) trace back to.

4. **Give synonyms of the following words and then make sentences by using the synonyms given by you. (any five)** **5×1**

(a) information ; (b) permanent; (c) trouble; (d) huge; (e) travel; (f) hope; (g) finish.

5. **Transform the following sentences as directed: (any five)** **5×1**

a) Beware of those who use truth to deceive. (make it simple)

b) She looked down at the ground and a glimmer of silver caught her eye. (make it complex)

c) How many things can you see in the night sky? (make it assertive)

d) They stopped only to rest and eat. (make it compound)

e) Pieces of ice were as sharp as knife. (use superlative degree)

f) It fails to mention that they only asked ten doctors. (make it compound)

6. **Give antonyms of the following words and then make sentences by using the antonyms given by you. (any five)** **5×1**

(a) important; (b) attract; (c) material; (d) problem; (e) night; (f) perpetual; (g) deep.

7. **Fill in the blanks by using appropriate words. Write the complete paragraph in your answer script.** **5**

Silence is unnatural and ___ to man, and all through life he tries to make a ___. He even makes conversation to ___ silence and feels ashamed if he cannot chatter ___, though his ___ is mainly nonsense. The majority of conversion is ___ more than a buzzing noise, but everyone would rather ___ than keep quiet. Few people enter ___ to learn anything; the majority merely wish to make a noise, ___ being sufficient topic. Even so, after taking nothing all evening, people ___ of their conversational ability.

8. Write a paragraph on importance of computer literacy in the present world. **5**

Begum Rokeya University, Rangpur.

Department of Computer Science and Engineering

B.Sc. (Engg.) 1st Year 1st Semester Final Examination-2016 (Session: 2015 -16, 2014 - 2015)

Course Title: Physics; Course Code: PHY 1125

Time: **3.00 hours** Total Marks: **50**

Answer any five from the given questions.

[Note: Numbers on right margin indicate the marks for each question. Answer the question sequentially]

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1. a) State Coulomb's law of electrostatics. What are similarities and dissimilarities between Gravitational force and electric forces? **3**

b) Define electric dipole. Find an expression for electric field strength due to a dipole. **4**

c) An electric dipole consists of two opposite charges of magnitude 2.0×10^{-6} C separated by a distance 0.5 cm. It is placed in an external electric field of 2×10^{5} NC^{-1}. What are the maximum torque does the field exert on the dipole? And what will be the final position of the dipole if the woke done by the external agent is 2×10^{-3} Joules? **3**

2. a) What is capacitance? "The capacitance of a capacitor increases as the capacitor is filled with dielectric." Explain why. **3**

b) Calculate the capacitance of a spherical capacitor of radii a and b. Hence show that the capacitance of an isolated conductor of radii R is $4\pi\varepsilon_0 R$. **3**

c) Applying Gauss' law for dielectric show that induced surface charge in a parallel plate capacitor is always less than the free charge. **4**

3. a) What is the magnetic effect of current? **1**

b) A current carrying conductor of a given length is placed in a magnetic field. Obtain an expression for the force exerted on the wire. **5**

c) State Biot-Savart law. Apply it to find the magnetic field due to a long straight wire carrying a current. **4**

4. a) State the postulates of Bohr atom model. **3**

b) Derive the expression for half life and mean life. Then establish the relationship between them. **4**

c) The half life of radium is 1620 years. In how many years will one gram of pure element (i) lose one centigram and (ii) be reduced to one centigram? **3**

5. a) What is photo-electric effect? What are the characteristics of Einstein photo electric equation? **5**

b) What is a nuclear reactor? What are essential components of a nuclear reactor? Briefly explain their activities. **3**

c) Calculate the binding energy in MeV for helium. The atomic mass of proton, neutron and helium are 1.00814 amu, 1.00898 amu and 4.00387 amu. **2**

6. a) Write a short note on wave theory of light. **2.5**

b) What do you mean by coherent source? **1**

c) Explain how Newton's rings are formed and describe the method for the determination of wavelength of light. **6.5**

7. a) Explain the phenomenon of diffraction of light. **3**

b) Light of wavelength 5500 Å from a narrow slit is incident on a double slit. The overall separation of 5 fringes on a screen 200 cm away is 1 cm. Calculate (i) the slit separation and (ii) the fringe width. **3**

c) What is diffraction grating? Obtain an expression for the resolving power of grating. **4**