

Bangabandhu Sheikh Mujibur Rahman Science and Technology University
Department of Computer Science & Engineering Department
1st Year 1st Semester B.Sc. Engineering Examination-2021

Course No: CSE101
Full Marks: 60

Course Title: Introduction to Computer Systems
Time: 3 hours

N.B.

- i) Answer **SIX** questions, taking any **THREE** from each section.
- ii) All questions are of equal values.
- iii) The figures in the right margin indicate full marks for each question.

SECTION-A (30 Marks)

- | | | |
|-----|--|---|
| Q.1 | (a) Is there any limitation of a computer? Justify your answer. | 2 |
| | (b) Describe the components of a computer system. | 4 |
| | (c) Classify the computers based on capacity and define them briefly. | 4 |
| Q.2 | (a) What is input device? List different categories of input device. | 2 |
| | (b) Explain all categories of keys found on a keyboard with the help of diagram. | 5 |
| | (c) How does bar code reader help in recognizing the characters on the labels? | 3 |
| Q.3 | (a) What do you understand by memory? | 1 |
| | (b) What is a RAM and why it is called so? | 2 |
| | (c) Explain the concept of volatile and non-volatile memory. | 3 |
| | (d) Discuss the different types of ROM. | 4 |
| Q.4 | (a) Distinguish between programmed I/O and direct memory access. | 3 |
| | (b) Mention different categories of scanners and briefly define them. | 4 |
| | (c) Compare thermal, inkjet and laser printer. | 3 |

SECTION-B (30 Marks)

- | | | |
|-----|--|---|
| Q.5 | (a) What is computer code? | 1 |
| | (b) Convert the following:
1) The octal number 7652.01 into its equivalent in decimal number.
2) The decimal number 215 into its equivalent in binary number.
3) The octal number 6251 into its equivalent in hexadecimal number. | 3 |
| | (c) Evaluate
1) The binary product of 100010 and 10010.
2) The binary division of 11011 and 1001. | 4 |
| | (d) Define the following terms: One's complement and Two's complement | 2 |
| Q.6 | (a) What is an operating system? | 1 |
| | (b) Briefly explain the various functions of an operating system. | 3 |
| | (c) What is process state? Explain the various states of a process with the help of a figure. | 3 |
| | (d) What is deadlock? Discuss the methods that can be used to handle this condition. | 3 |
| Q.7 | (a) What is programming language? | 1 |

- | | | |
|-----|--|-----|
| (b) | Differentiate between a compiler and interpreter. | 3 |
| (c) | Write down the advantages and disadvantages of assembly language. | 3 |
| (d) | Explain the features of a good programming language. | 3 |
| Q.8 | (a) What is computer network? | 1 |
| | (b) What is network topology? Discuss different types of network topology. | 6 |
| | (c) What is Internet? What are the advantages and disadvantages of using Internet? | 1+2 |

Bangabandhu Sheikh Mujibur Rahman Science and Technology University
 Department of Computer Science and Engineering
 1st Year 1st Semester B.Sc. Engineering Examination-2021

Course No: EEE105

Time: 3 hours

N.B.

- i) Answer SIX questions, taking any THREE from each section.
- ii) All questions are of equal values.
- iii) The figures in the right margin indicate full marks for each question.

Course Title: Electrical Circuit Analysis
 Full Marks: 60

SECTION-A (30 Marks)

1. a) With an example explain about Kirchoff's laws. 2
- b) Define the following terms: (i) Voltage (ii) Current (iii) Power. 3
- c) Compute the power absorbed or supplied by each component of the circuit of Figure 1(c). 2

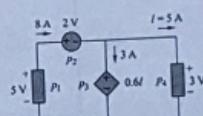
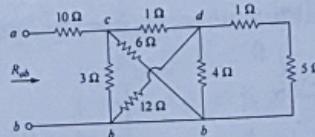


Figure 1(c)

- d) Find the value of Resistance R_{ab} for the following network. 3



2

2. a) Find the currents and voltages in the circuit shown in Figure 2(a). 2

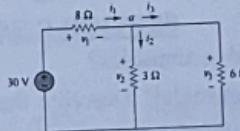


Figure 2(a)

- b) Obtain the expressions for star-delta and delta-star equivalence of resistive network. 6
- c) Given the idea on supernode for circuit analysis. 2

3. a) Find the voltages at the three nonreference nodes in the circuit of Figure 3(a). 3

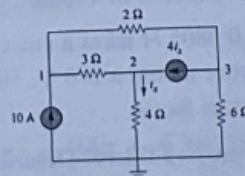


Figure 3(a)

- b) Calculate the mesh currents i_1 and i_2 in the circuit of Figure 3(b). 2

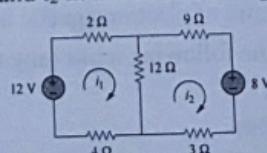


Figure 3(b)

- c) State superposition theorem. Using the superposition theorem, find V_0 in the circuit in Figure 3(c). 5

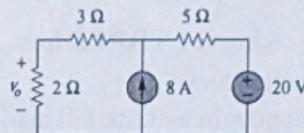


Figure 3(c)

4. a) State thevenin's theorem principle with proper figure. 2
b) Using Thevenin's theorem, find the voltage 'V' in the circuit shown in Figure 4(b). 5

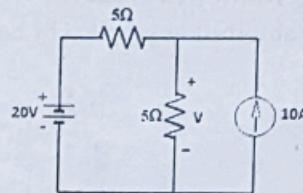


Figure 4(b)

- c) Use VDR to find V_{ab} and V_{bc} for the network (all resistors are given in ohm) of Figure 4(c) 3

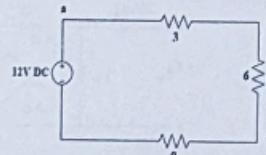


Figure 4(c)

SECTION-B (30 Marks)

5. a) Why we are interested in sinusoids? 1
b) What is period of sinusoidal? Describe the in phase and out of phase phenomenon with the help of two sinusoids. 5
c) Find the amplitude, phase, period, and frequency of the sinusoid $v(t) = 12 \cos(50t + 10^\circ)$ 4
6. a) Define phasor? Graphically represent the phasor diagram. 3
b) Determine the natural response of a source free series RLC circuit. 5
c) A coil of inductance 0.0805 H takes a current of 5 A when connected in series with a 50 μF loss-free capacitor across a 240 V, 50 Hz supply. Calculate (i) resistance of the coil (ii) the overall power factor. 2
7. a) What are the types of passive filters? Describe the working principle of capacitor input filter. 1+3
b) Define: (i) Flux (ii) m.m.f (iii) Reluctance (iv) Magnetic field intensity. 4
c) State the Faraday's laws of electromagnetic induction. 2
8. a) Write short note on the following terms (any two): 4
i) Avometer
ii) Oscilloscope
iii) Signal generator
b) What is the main advantage of active filter over passive filter? What are the disadvantages of passive filters? 3
c) Design a band-pass filter for a graphical equalizer that has gain 2 within the frequency between 100 and 10,000 Hz. Use 0.1 μF capacitors 3

Course No: MAT105
Full Marks: 60

Course Title: Differential and Integral Calculus **Time:** 3 hours

Time: 3 hours

N.B.

- i) Answer **SIX** questions, taking any **THREE** from each section.
ii) All questions are of equal values.
iii) The figures in the right margin indicate full marks for each question.

SECTION-A (30 Marks)

- SECTION-A (30 Marks)**

Q.1 (a) Define one one function and onto function. Draw the graph and find domain and range of the function $f(x)$ where

$$f(x) = \begin{cases} 0 & ; |x| > 1 \\ 1+x & ; -1 \leq x \leq 0 \\ 1-x & ; 0 < x \leq 1 \end{cases}$$

- (b) Define Limit. What do you know about existence of limit of a function. Prove that $\lim_{x \rightarrow 0} \frac{1}{x} \log(1+x) = 0$ 4

- Q.2 (a) Define continuity of a function. Discuss the continuity and differentiability at $x = 0$.

$$x = \frac{\pi}{2} \text{ of the function } f(x) = \begin{cases} 1; x < 0 \\ 1 + \sin x; 0 \leq x < \frac{\pi}{2} \\ 2 + \left(x - \frac{\pi}{2}\right)^2; x \geq \frac{\pi}{2} \end{cases}$$

- (b) State and prove mean value theorem.

- Q3. (a) State Leibnitz Theorem. If $y = \sin^{-1} x$, then show that

$$(1-x^2)y_{n+2} - (2n+1)xy_{n+1} - n^2 y_n = 0.$$

- (b) Find the maxima and minima of $5x^6 - 18x^5 + 15x^4 - 10$.

- Q.4 (a) Find $\frac{dy}{dx}$ of the following function:

$$(i) y = \tan^{-1} \frac{\sqrt{1+x^2}-1}{x}$$

$$(ii) (\cos x)^y + (\sin y)^x = 0$$

- (b) Show that $f(x) = x^3 - 6x^2 + 24x + 4$ has neither maximum nor minimum. 3

- (c) Show that if a function is derivable at a point then it must be continuous at that point. 3

SECTION-B (30 Marks)

- Q.5 (a) Evaluate the followings (any two): 6
(i) $\int e^x \frac{1-\sin x}{1-\cos x} dx$ (ii) $\int \frac{e^{-x}}{e^x+2e^{-x}+3} dx$ (iii) $\int \frac{dx}{(2x+3)\sqrt{(x^2+3x+2)}}$
- (b) Define definite integral. Prove that $\int_0^{na} f(x)dx = n \int_0^a f(x)dx$ if $f(a+x) = f(x)$. 4
- Q.6 (a) State Walli's reduction formula. If $I_n = \int_0^{\pi/4} \tan^n \theta d\theta$, then show that $I_n = \frac{1}{n-1} - I_{n-2}$. Hence find the value of $\int_0^{\pi/4} \tan^6 \theta d\theta$. 6
(b) Evaluate $\int_0^{\pi/2} \ln(\sin x) dx$. 4
- Q.7 (a) Evaluate: (i) $\beta\left(\frac{1}{2}, \frac{1}{2}\right)$ (ii) $\Gamma\left(\frac{1}{2}\right)$ 3
(b) Show that $\int_0^{\infty} e^{-x^2} dx = \frac{1}{2} \sqrt{\pi}$. 3
(c) Find the area of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$. 4
- Q.8 (a) Find the whole perimeter of the curve $x^{2/3} + y^{2/3} = a^{2/3}$ 5
(b) Find the area of the cardioid $r = a(1 + \cos \theta)$ 5

Bangabandhu Sheikh Mujibur Rahman Science and Technology University
 Department of Computer Science & Engineering Department
 1st Year 1st Semester B.Sc. Engineering Examination-2021

Course No: CSE103
 Full Marks: 60

Course Title: Structured Programming Language
 Time: 3 hours

N.B.

- i) Answer SIX questions, taking any THREE from each section.
- ii) All questions are of equal values.
- iii) The figures in the right margin indicate full marks for each question.

SECTION-A (30 Marks)

- Q.1 (a) Why is C called as a structured programming language? 3
- (b) Define variable. Mention the rules for variable naming in C programming. 1+3
- (c) Write a C program to input the values of days and convert it into years, weeks and days. Print the years, weeks and days. 3
- Q.2 (a) What are the outputs of the following programs? 2+2
- i.
- ```
void main(){
 int x=10;
 printf("%d ", 5 + x++);
 printf("%d", 5 + --x);
}
```
- ii.
- ```
void main() {
    int a =5, b=10, c=20;
    printf("%d ", a > b || b < c && a!=c);
}
```
- (b) A year is input through the keyboard. Write a program in C to determine whether the given year is leap year or not. Use nested if...else statement. 4
- (c) What will be the output when the following program is executed? 2
- ```
void main() {
 char ch='b';
 switch(ch){
 case 'a':
 printf("A");
 case 'b':
 printf("B");
 case 'c':
 printf("C");
 }
}
```
- Q.3 (a) Compare between while and do-while loop. 3
- (b) Write down the function of break and continue statements. 3
- (c) Write a C program to check whether a given number is a perfect number or not. A perfect number is a positive integer that is equal to the sum of its positive divisors excluding the number itself. For instance, 6 has divisors 1, 2 and 3, and  $1 + 2 + 3 = 6$ , so 6 is a perfect number. 4
- Q.4 (a) Consider an array *arr[5]* and answer the following short questions: 1+1
- i. How can you print the base address of this array?  
 ii. Can this array store integer and floating-point numbers together?
- (b) Insert 100 random integer numbers into an array in the range [0 - 1000]. Write a program to find out how many times a given number (search value) appears in the array. Suppose a search value 35 appears 5 times in the array then your program will output as follows.  
 Sample Input (search value): 35  
 Sample Output: 35 appears 5 times in the array 4

- (c) What is a dynamic array? Give a typical example of creating a dynamic array for calculating the sum of n numbers entered by the user. 1+3

### SECTION-B (30 Marks)

- Q.5 (a) Find errors and fix, if any, in the following code segments to copy one string to another: 2
- ```
char str1[]="Computer Science", str2[20];
str2 = str1;
printf("%s", str2);
```
- (b) Write a program for reversing a string and check if the string is palindrome. 3
- (c) Take a string as input from the user and write a program to do the following tasks: 5
- Count total number of vowels and consonants in the string separately.
 - Remove all characters in the string except the alphabets (i.e. vowels and consonants). Print the updated string.
- Q.6 (a) What is the difference between built-in and user-defined function? *With example* 2
- (b) How do you return an entire array from a user-defined function? Give an example of it. 3
- (c) Write a program in C to find the factorial of a given integer number using recursion. 3
- (d) Distinguish the scope of global and local variables. 2
- Q.7 (a) What are the uses of **typedef** and **enum** in C. Explain them with an example. 3
- (b) Define a structure data type called **student** containing three members: *Name, Marks, and Grade*. Write a program to read a students' names and marks, calculate his/her letter grade based on the scale below, print all the information on the screen. 4
- | Score | Grade |
|-----------|-------|
| 80 to 100 | A |
| 70 to 79 | B |
| 60 to 69 | C |
| 50 to 59 | D |
| 40 to 49 | E |
| Bellow 40 | F |
- (c) What is the output of following program? 3
- ```
void test (int *x, int y) {
 *x = *x + y;
}
void main () {
 int a=10, b=5;
 test (&a, b);
 printf ("%d \n %d", a,b);
}
```
- Q.8 (a) What do you know about keyword and header files in C programming? 2
- (b) Compare the basic modes of opening a file. 3
- (c) Write a program to read the last *n* characters of the file using appropriate file functions and then read the first *n* characters of the file. The value *n* will be taken from the user. 5

Bangabandhu Sheikh Mujibur Rahman Science and Technology University  
Department of Computer Science & Engineering Department  
1<sup>st</sup> Year 1<sup>st</sup> Semester B.Sc. Engineering Examination-2021

Course No: ENG105  
Full Marks: 60

Course Title: Technical English Language  
Time: 3 hours

N.B.

- i) Answer SIX questions, taking any THREE from each section.
- ii) All questions are of equal values.
- iii) The figures in the right margin indicate full marks for each question.

**SECTION-A (30 Marks)**

- Q.1 (a) Nowadays, being a teacher is a difficult yet rewarding job. Not everyone is well suited to teaching. Aside from having a love for working with children, being a teacher is not like any other job. An effective teacher is not only the master of his or her subject area, but also an educator with a strong **emotional** character. Every day, a good teacher is expected to enjoy communicating with students from different social backgrounds, with different learning skills, and with multiple intelligences and emotions. A good teacher sets high expectations of all students and never neglects or despises the underachievers. A good teacher is always available to help students anytime. Also, an efficient teacher is willing to support students who need extra assistance in learning the subject and encourage them to focus on effort, not excellence. An effective teacher begins his/her lesson by giving clear instructions, describing expectations, and activities, and evaluating procedures. This will ensure that students remain on task during the whole session. Being asked open-ended questions require students to provide explanation and elaboration. This is a great opportunity to get them to explain themselves even more, and to help them remain interested and not be bored. **Difficult** as this may sound; however, this can be achieved. What is more, an effective teacher is always an enthusiastic and active, organized and clear, positive and caring person, and often tries to make learning fun. A good teacher does not simply write the assignment on the board, and tell the students: "There's your **assignment**, get to work!". Instead, an effective teacher varies instructional methods, provides work of appropriate difficulty, adds materials and technology, uses games and rich media in the learning process. As a result, students will stay animated and crave learning.

**Read the passage and answer the questions:**

1. If you want to be a good teacher you should \_\_\_\_.
    - i. be good only at teaching your lessons
    - ii. form the habit of working with children
    - iii. enjoy communicating with different students
    - iv. try your best to follow school rules
  2. As a teacher, you should do all the following EXCEPT \_\_\_\_.
    - i. expect everyone to make progress
    - ii. help students who do badly in their lessons
    - iii. help students before or after class
    - iv. do some of the homework for students
  3. A teacher can ask some open-ended questions in order to \_\_\_\_.
    - i. keep students busy
    - ii. to get students to explain themselves even more
    - iii. help students achieve more
    - iv. force students to learn more knowledge
  4. Which of the following shows that a teacher is active, clear and positive?
    - i. Writing homework on the blackboard.
    - ii. Asking students to work hard.
    - iii. Reminding students to finish homework in time.
    - iv. Making learning interesting by using rich media like games and technology.
- (b) Give a suitable title to the passage. 2
- (c) Change the following words as directed by adding affixes and make your own sentences with the changed words (any FOUR). 4
- Emotional (noun), effective (adverb), assignment (verb), difficult (noun), teaching (verb)

Q.2 Choose the correct options from parenthesis to fill the gaps in the following passage:

10

Two-thirds of the world's one-horned rhinoceros ..... (live / are living / has lived) in the Kaziranga National Park. It ..... (located / has located / is located) in the Golaghat and Nagaon districts of Assam . A World Heritage Site, Kaziranga also ..... (is / has / have) the highest density of tigers among protected areas in the world. It ..... (declared / was declared / had declared) a Tiger Reserve in 2006. The park is a biodiversity 'hotspot'. ..... (Except / Apart from / beside) the rhinos and the big cats, the forest.....( has/ have/are) large breeding populations of elephants, water buffalo and swamp deer. Nine of the 14 primate species found in India are present in the park. Prominent among them ..... (is / are / have) the Assamese Macaque, Capped, Golden Langur and the Hoolock Gibbon, the only ape found in India. Kaziranga's rivers are home to the endangered Ganges Dolphin. It is also ..... (recognizing / recognized) as an Important Bird Area.

Q.3 (a) Complete the following sentences:

- If you had gone, you.....
- As soon as she received the latter, she .....
- He heard a sound of the door bell while he .....
- Although he was suffering from COVID-19, he .....
- I wish I .....

(b) Use the right form of verbs in the following sentences.

- My sisters or my brother in law ----- (come) today.
- Neither the plates nor the serving bowls ----- (be) standard in the wedding party.
- Fifty miles ----- (be) too far to walk.
- My sunglasses ----- (be) lost yesterday.
- It ----- (consider) as one of the major problems in my locality.

Q.4 (a) Fill in the blanks with appropriate preposition (write complete sentence):

- Shafiq was deprived ----- his freedom.
- They are indifferent ----- politics.
- Who presided ----- the last meeting?
- You asked me ----- luncheon.
- Sanika heard music all ----- him

(b) Transform the following sentences according to direction:

- I never drink tea.(Interrogative)
- No one can depend on an unreliable man.(Interrogative)
- I wish I had the wings of a bird.(Exclamatory)
- Village women who are sitting on the walkways may enjoy gossiping.(Simple)
- In spite of having vast riches, the man wants more.(Complex)

#### SECTION-B (30 Marks)

Q.5 (a) Develop a paragraph from one of the topic sentences below:

- Studying in a university has several benefits.

5

(b) Suppose, the cultural week of your university has recently been held. Now, write a report about it for a press.

Q.6 (a) Suppose you missed the class test (10 marks) of Functional English. Now write an application to the course teacher showing reasons to inform him/her about the matter and request him/her to arrange a make-up class test for you.

5

(b) Complete the following story.

It was a sunny morning. He was waiting for the university bus and ...

5

#### Part-time Job Opportunity for Students

10

Swapna, a renowned super shop is looking for some salespersons for the outlet of Gopalganj.

Requirements:

Need to work for 3 hours (schedule is adjustable)

Need to have a good communication skill

Need to be smart

Both male and female students can apply

Handsome salary will be given (negotiable)

Interested students must send their CV with a cover letter to Human Resource Officer, Swapna, Post office More, Gopalganj on or before 15 October, 2022.

Q.8 Job source: *The Dainik Gopalganj*. Date: 15 September, 2022

10

i) Excessive use of social media

ii) Co-education

iii) Family life vs hostel life