Bangabandhu Sheikh Mujibur Rahman Science and Technology University
Department of Computer Science & Engineering Department
1st Year 1st Semester B.Sc. Engineering Examination-2020

Course No: CSE103 **Course Title: Structured Programming Language**
Full Marks: 60 **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) What is indentation in programming, and why is it needed? 3

(b) How do comments improve a C program? 2

(c) If a three-digit integer number is input through the keyboard, write a C program to reverse the number and to calculate the sum of its digits. 3

(d) Distinguish between the initialization and assignment of variables. 2

Q.2 (a) What are the outputs of the following programs? 3

i.
```
void main() {
   int x=10;
   printf("%d\n", 5 + x++);
   printf("%d\n", 5 + ++x);
}
```

ii.
```
void main() {
   int a = 5;
   if(a<0);
     printf("Negetive\n");
   if(a>0);
     printf("Positive");
}
```

(b) Write a C program that takes a temperature in centigrade as input and shows a suitable message according to the temperature stated below using only simple if statements. Rewrite the program using if…else if…else statements. 5
Temperature < 0 then It's Freezing
Temperature 0-10 then It's Very Cold
Temperature 11-20 then It's Cold
Temperature 21-30 then It's Warm
Temperature 31-40 then It's Hot
Temperature > 40 then It's Very Hot
Sample Input: 25
Sample Output: It's Warm

(c) Write the general form of the switch statement. 2

Q.3 (a) What is the problem with the following code segment to find the sum of numbers from 1 to 9? Resolve the issue and rewrite the code segment. 3
```
int sum=0, count =1;
while (10 ){
      sum = sum + 1;
      count++;
}
```

(b) Draw the control flow diagram of *while* loop. How does *while* loop differ from *do .. while* loop? 2+1

(c) What is printed when the following code segment is executed? 3
```
for (m = 0; m <3; ++m)
printf("%d\n", (m%2) ? m: m+2);
```

(d) Determine the following expression is true/false: 1
$5 + 3 > 8$ && $10 \neq 2 + 3$ || $9 - 4 < 5$

Q.4 (a) Consider an array *arr[3]={-1, 5, 9}* and answer the following short questions. 1+1+2
i. Can we change the size of the array at run time?
ii. What will be the output if we execute this statement: *printf("%d", arr[3]);*
iii. How can you reverse the array elements using C statements?

(b) Input an array of integer numbers from the keyboard. Write a C program to print and count all the odd numbers in the array and calculate their sum. 4

(c) Discuss how initial values can be assigned to a two dimensional array. 2

SECTION B (30 Marks)

Q.5 (a) Find the error and correct the following code segment along with giving the program output: 3
```
void main(){
   char s1[20]="C", s2[20]= "PROGRAMMING", s3[20];
   s3=s1;
```

```
    s2= s2+s3;
    printf("%s\n",s2);
    printf("%s",s3);
}
```

2

(b) Find the output of the following code segment with explanation:

```
void main(){
switch(printf("Hi-")){
  case 1: printf("A");
          break;
  case 2: printf("B");
          break;
  case 3: printf("C");
          break;
  default: printf("default");
  }
}
```

5

(c) Shown below is a Floyd's triangle.

1
2 3
4 5 6
7 8 9 10
11 15
.
.
79 91

Write a program to print this triangle.

Q.6 (a) Describe the two ways of passing parameters to functions. When do you prefer to use each of them? 3

(b) What is the difference between global and local variables? 2

(c) What do you mean by recursion? 1

(d) Write a program in C to calculate the value of ${}^{n}C_{r}$ using a user-defined function *factorial( )* where the input n and r will be given through keyboard. Implement the *factorial( )* function using recursion. 4

Q.7 (a) What is the difference between structure and union in terms of object size? 2

(b) Define a structure data type called ***student*** containing three members: *Name, Marks,* and *Grade*. Write a program to read five students' names and marks, calculate their letter grade based on the scale below, print all the information on the screen. Use an array of structure for this program. 5

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) Find the error, if any, in each of the following statements. 3

i. int *y = 10;
ii. int **p1, *p2;
    p2=&p1;
iii. int m,**x;
    **x = &m;

Q.8 (a) What is the significance of EOF? 1

(b) When do we use the following functions? 2
i. fseek( ) ii. ftell( )

(c) How does an append mode differ from a write mode of a data file? 2

(d) Write a program that reads integers from two files file1.txt and file2.txt; merge those integers, sort them and store the sorted list of numbers to a third file output.txt. 5

Bangabandhu Sheikh Mujibur Rahman Science & Technology University
Department of Computer Science & Engineering
1st Year 1st Semester B.Sc. (Engg.) Final Examination-2020

Course No.: EEE105 **Course Title: Electrical Circuit Analysis**

Full Marks: 60 **Time:** 3 hours

N.B.:
i) Answer **SIX** questions, taking any **THREE** from each section.
ii) All questions are of equal values.

SECTION-A

1. a) What do you mean by branches and loops? 2
   b) In the given circuit (**Fig. 1.1**), assuming point A to be at zero potential, use Kirchhoff's rules to determine the potential at point B. 4

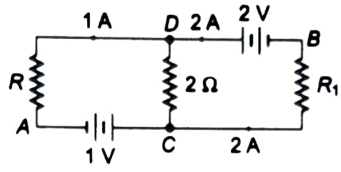

Fig. 1.1: A circuit.

   c) Using Kirchhoff's rules in the given circuit (**Fig. 1.2**),determine: 4
   (i) Voltage drops across the unknown resistor R and
   (ii) Current I_2 in the arm EF.

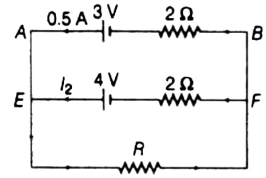

Fig. 1.2: A circuit.

2. a) What are the main characteristics of series and parallel and series circuits? 2
   b) Calculate the equivalent resistance R_{ab} of the circuit in **Fig. 2.1**. 4

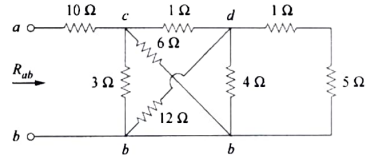

Fig. 2.1: A circuit.

   c) Find out Geq of the circuit in **Fig. 2.2**. 4

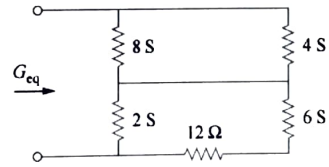

Fig. 2.2: A circuit.

3. a) Why we are interested to apply the wye-delta transformation in network analysis. 2
   b) Convert the Δ network of circuit in Fig. 3.1 to an equivalent Y network. 3

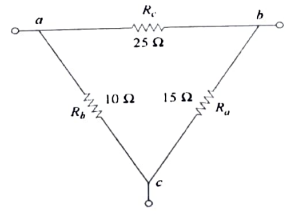

Fig. 3.1: A circuit.

   c) For the following bridge network in **Fig. 3.2**, find R_{ab} and i. 5

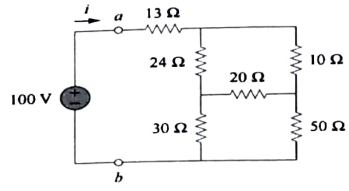

Fig. 3.2: A circuit.

4. a) Define supernode. Find the node voltages of circuit in **Fig. 4.1.** 6

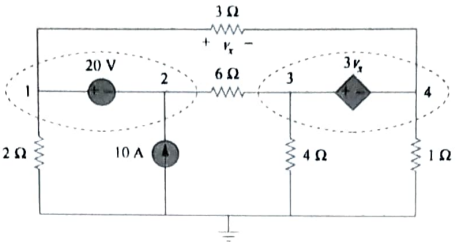

Fig. 4.1: A circuit.

b) Mention the steps to Determine Mesh Currents. For the circuit in **Fig. 4.2**, find the branch currents I_1, I_2, and I_3 using mesh analysis. 4

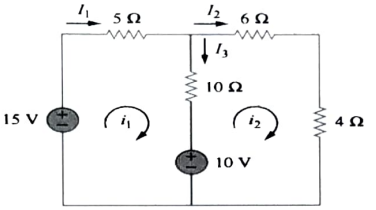

Fig. 4.2: A circuit.

SECTION-B

5. a) Explain periodic function with proper example. 3

b) Find the amplitude, phase, period, and frequency of the sinusoid 4
$v(t) = 12 \cos(50t + 10°)$

c) What do you mean by phasors? Why are the phasors necessary in solving ac circuits? 3

6. a) Differentiate between instantaneous and average power. 2

b) Given that, $v(t) = 120 \cos(377t + 45°)$ V and $i(t) = 10 \cos(377t - 10°)$ A, find the instantaneous power and the average power absorbed by the passive linear network of following figure (**Fig. 6.1**). 3

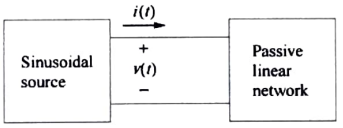

Fig. 6.1

c) For maximum average power transfer, show that the load impedance ZL must be equal to the complex conjugate of the Thevenin impedance Z_{Th}. 5

7. a) Define effective or rms value of ac power signal. Deduce an expression for RMS value and average value of a sinusoidal current. 1+4

b) Determine the rms value of the current waveform in **Fig. 7.1**. If the current is passed through a 2Ω resistor, find the average power absorbed by the resistor. 3

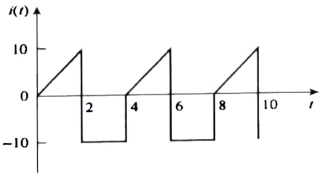

Fig. 7.1

c) Briefly explain the conservative of ac power. 2

8. a) Give the idea on transfer function? Obtain the transfer function V_o/V_s of the RC circuit in **Fig. 8.1**, assuming $v_s = V_m \cos \omega t$. Sketch its frequency response. 6

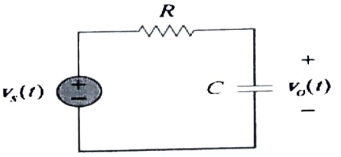

Fig. 8.1: A circuit.

b) Describe the four types of filters with its frequency response curve. 4

Bangabandhu Sheikh Mujibur Rahman Science and Technology University
Department of Computer Science & Engineering
1st Year 1st Semester B.Sc. Engineering Examination-2020

Course No: CSE101 **Course Title: Introduction to Computer Systems**
Full Marks: 60 **Time:** 3 hours

N.B.
i) Answer **SIX** questions, taking any **THREE** from each section.
ii) All questions are of equal values.

Section A

Q.1 (a) What is a computer? Explain that a computer is a programmable device. 3

(b) Is a computer system run without RAM? Give logic about your opinion. 2

(c) What are the striking features of a fifth generation computer? 2

(d) What are the differences between a personal computer and other types of computer? 3

Q.2 (a) What are the usage purposes of system and application software? 4

(b) Why and where device driver software is used? 2

(c) Give the main characteristics of different kinds of bus of a microcomputer. 4

Q.3 (a) What do you understand by BCD, ASCII codes? 2

(b) i. Convert $42BD5_{16}$ to its octal equivalent. 4
ii. Convert 10110101_2 to its decimal equivalent.

(c) Define the following terms: One's complement and Two's complement. Convert the following 1101101 to its equivalent two's complement. 4

Q.4 (a) What is computer virus? What do virus do? What are the circumstances to prevent computer viruses? 4

(b) What are the purposes of the use of a Modem in a network system? 3

(c) Write down working principle of an optical mouse. 3

Section B

Q.5 (a) What is meant by Operating System (OS)? Write the functions of an OS. 4

(b) What are universal gates? Prove that NOR is a universal gate. 3

(c) Define web browsers. List the names of any five web browser. 3

Q.6 (a) How does control unit communicate with ALU and primary memory? Explain with a block diagram. 5

(b) Give the differences between static and dynamic RAMS. 2.5

(c) What is the role of cache memory in a computer system? 2.5

Q.7 (a) Perform the operation $(23.B4)_{16} + (14.45)_8 = (?)_2$. 3

(b) What is the difference between volatile and non-volatile memory? Explain RAM is either volatile or non-volatile memory. 4

(c) What is data communication? What are the basic elements of data communication? 3

Q.8 (a) What is computer network? What are the differences between LAN and WAN? 3

(b) What is network topology? Discuss different types of network topology. 4

(c) What are networking devices? Describe functions of each network devices. 3

Bangabandhu Sheikh Mujibur Rahman Science and Technology University
Department of Computer Science and Engineering
1st Year 1st Semester B.Sc. Engineering Final Examination-2020

Course No: ENG105 Course Title: Technical English Language
Full Marks: 60 Time: 3 hours

All questions are of equal value. Answer any six taking three from each section.

Section - A

1. Read the passage carefully and answer the questions that follow:

Philosophy of Education is a label applied to the study of the purpose, process, nature and ideals of education. It can be considered a branch of both philosophy and education. Education can be defined as the teaching and learning of specific skills, and the imparting of knowledge, judgment and wisdom, and is something broader than the societal institution of education we often speak of.

Many educationalists consider it a weak and woolly field, too far removed from the practical applications of the real world to be useful. But philosophers dating back to Plato and the Ancient Greeks have given the area much thought and emphasis, and there is little doubt that their work has helped shape the practice of education over the millennia.

Plato is the earliest important educational thinker, and education is an essential element in "The Republic" (his most important work on philosophy and political theory, written around 360 B.C.). In it, he advocates some rather extreme methods: removing children from their mothers' care and raising them as wards of the state, and differentiating children suitable to the various castes, the highest receiving the most education, so that they could act as guardians of the city and care for the less able. He believed that education should be holistic, including facts, skills, physical discipline, music and art. Plato believed that talent and intelligence is not distributed genetically and thus is be found in children born to all classes, although his proposed system of selective public education for an educated minority of the population does not really follow a democratic model.

Aristotle considered human nature, habit and reason to be equally important forces to be cultivated in education, the ultimate aim of which should be to produce good and virtuous citizens. He proposed that teachers lead their students systematically, and that repetition be used as a key tool to develop good habits, unlike Socrates' emphasis on questioning his listeners to bring out their own ideas. He emphasized the balancing of the theoretical and practical aspects of subjects taught, among which he explicitly mentions reading, writing, mathematics, music, physical education, literature, history, and a wide range of sciences, as well as play, which he also considered important.

During the Medieval period, the idea of Perennialism was first formulated by St. Thomas Aquinas in his work "De Magistro". Perennialism holds that one should teach those things deemed to be of everlasting importance to all people everywhere, namely principles and reasoning, not just facts (which are apt to change over time), and that one should teach first about people, not machines or techniques. It was originally religious in nature, and it was only much later that a theory of secular perennialism developed.

During the Renaissance, the French skeptic Michel de Montaigne (1533 - 1592) was one of the first to critically look at education. Unusually for his time, Montaigne was willing to question the conventional wisdom of the period, calling into question the whole edifice of the educational system, and the implicit assumption that university-educated philosophers were necessarily wiser than uneducated farm workers, for example.

1. A) Answer the following questions: 5

a) What is the difference between the approaches of Socrates and Aristotle?
b) Why do educationists consider philosophy a 'weak and woolly' field?
c) What do you understand by the term 'Perennialism', in the context of the given comprehension passage?
d) Were Plato's beliefs about education democratic?
e) Why did Aquinas propose a model of education which did not lay much emphasis on facts?

B) Give a suitable title to the passage and write down the theme of it. 5

2. Correct the following passage: 10

I've had a terrible cold a) about several days. I've been b) blow my nose, sneezing, and coughing. c) I'm been eating chicken soup and drinking orange juice for a couple of days. d) I was taking aspirin and e) coffee syrup since the weekend. I've been at home watching TV f) for Monday. I've talked to my mother on the phone every day of the g) week, I've watched every bad movie that came on the TV. I h) wonder I'll well again. I wonder when I can go back to i)work? I'm j) tired of the cough, sneezing, and complaining!

3. A) Complete the following sentences: 5

i. I wonder .....
ii. It is too difficult for a university student....
iii. You cannot express yourself unless.....
iv. We should take care of each other so that.....

v. If I were the VC of a university, I.....

B) Fill in the gaps with appropriate prepositions: 5

i. His enemies said that he was the embodiment ..... evil. (for /to/ of)
ii. The mother felt great relief when the child recovered ..... illness. (of / from / with)
iii. He has many accomplishments .....his credit. (of/ for/ to)
iv. In many countries of the world, people are deprived ..... their rights. (of/ to/ with)
v. He lives ..... his own. (to/ on/ from)

4. A) Make new words by adding prefixes/ suffixes and make sentences with the new words (Any five): 5

Glory, prove, sympathy, regular, legal, respect, try

B) Write five sentences on 'E-learning' using different types of clauses/sentences. 5

Section - B

5. Write a paragraph on any of the following: 10
   a. Parents and Children
   b. City Life
   c. Family Life and Hostel Life

6. Write a composition on any one of the following: 10

   a. Communal Harmony
   b. The Research-Centered University

7. Suppose, a road accident occurred on the Dhaka-Khulna highway. You as a reporter of *The Daily Star* write a report on it. 10

8. Synergy Interface Ltd. is looking for some ASP.NET Software Developers. Write a cover letter with a CV to the Human Resource Officer, Synergy Interface Ltd. Address: Unit-G-A, House-687, Road-10, DOHS, Mirpur Dhaka-1216 according to the following advertisement.

Application Deadline: 30 Nov 2021, Published On: 11 Nov 2021
Vacancy: 2 (TWO)

Job Responsibilities

- Should have good knowledge on .Net Framework (Both on Web Form and MVC) and .Net Core
- Should have experience to work using C#.
- Should have Knowledge on pl/sql and MSSQL Function, Trigger, Stored Procedure.
- Should have capability to handle complex SQL queries.

Employment Status: Full-time
Educational Requirements: Bachelor of Science (BSc) in CSE or EEE
Experience Requirements: At most 2 year(s)
Freshers are also encouraged to apply.

Additional Requirements

- Age 22 to 32 years
- We encourage applicant who can join immediately
- Should be capable to work as individual or in a team
- Excellent communication skill in English (Writing - Reading and Speaking)
- Ability to work under pressure

Job Location: Anywhere in Bangladesh

Salary: Tk. 18000 - 25000 (Monthly)

Compensation & Other Benefits: Mobile bill, Tour allowance, Performance bonus, Weekly 2 holidays

Lunch Facilities: Full Subsidize

- Salary Review: Yearly
- Festival Bonus: 2

Job Source: Bdjobs.com Online Job Posting. 10

Bangabandhu Sheikh Mujibur Rahman Science and Technology University
Department of Computer Science & Engineering
1st Year 1st Semester B.Sc. Engineering Examination-2020

Course No: MAT105 **Course Title: Differential and Integral Calculus**
Full Marks: 60 **Time:** 3 hours

N.B.
i) Answer **SIX** questions, taking any **THREE** from each section.
ii) All questions are of equal values.

Section A

Q.1 (a) Define Domain and Range with examples. Determine the domain and Range and sketch the graph of the following functions: 4

(i) $f(x)=\begin{cases}x^2; & 0<x<1\\ x; & 1\le x<2\end{cases}$ **(ii)** $y=\dfrac{3x}{2-x}$ **(iii)** $y=\sqrt{x-3}$

(b) Show that the following function $f(x)$ is continuous at $x=1$ but $f'(x)$ does not exist at these points. 4

$$f(x)=\begin{cases}2x & ; \quad 0<x<1\\ 1 & ; \quad x=1\\ -2x+4 & ; \quad 1<x\le 2\end{cases}$$

(c) Describe geometrically the derivate of a function $f(x)$. 2

Q.2 (a) 3

$$\text{If } f(x)=\begin{cases}x^2+1 \ when \ x \le 0\\ x \ when \ 0 < x < 1\\ \frac{1}{x} \ when \ x \ge 1\end{cases}$$

Check the differentiability at $x = 0$ *and* $x = 1$

(b) Simple differentiation find $\frac{dy}{dx}$ if 4
i) $y = sin^2(logsecx)$ ii) $y = \sqrt{x}\, e^x secx$

(c) If $y = e^{a\sin^{-1}x}$, then show that $(1-x^2)y_2 - xy_1 = a^2y$. 3

Q.3 (a) State Rolle's Theorem. Verify the Rolle's Theorem for the function $f(x)=x^2-3x+2$ in the interval $(1, 2)$. 4

(b) Determine the Differential coefficient of the following function: 3
(i) $y=(\sin x)^{\ln e^x}$ **(ii)** $y=x^x+x^{\tan^{-1}x}$ **(iii)** $y=(\sin x)^{(\sin x)^{(\sin x)}\cdots\infty}$

(c) Find the equation of tangent and normal of the curve $f(x)=3x^2+5x-9$ at the point $x=1$ 3

Q.4 (a) Define partial derivatives with example. If $u=\log r$ and $r^2=x^2+y^2+z^2$, prove that $r^2(u_{xx}+u_{yy}+u_{zz})=1$. 3

(b) If $V=\sin^{-1}(x^2+y^2)/(x+y)$, then show that $xV_x+yV_y=\tan V$. 3

(c) Find the maximum and minimum of the function $f(x)=2x^3-9x^2+12x-3$. 4

Section B

Q.5 (a) Evaluate $\int \frac{x}{1+cosecx}dx$ 3

(b) Using the fundamental theorem of calculus evaluate $\int_0^2(x^3+3x-1)dx$ 3

(c) Find the reduction formula for $\int sin^n x\, dx$ 4

Q.6 (a) State and prove fundamental theorem of integral calculus. 3

(b) 7

(i) $\int_1^2 \dfrac{dx}{\sqrt{(x-2)(3-x)}}$ **(ii)** $\int_0^1 t^3(1-t^2)^{\frac{5}{2}}dt$ **(iii)** $\int_0^1 x^3e^{2x}dx$

Q.7 (a) Find the reduction formula for $\int \cos^n x dx$ and hence evaluate $\int \sin^6 x dx$ 5

(b) Define Gamma function and Beta function. Also, Show that $\int_0^{\frac{\pi}{2}} \sin^4\theta \cos^6\theta = \frac{3}{512}\pi$ 5

Q.8 (a) Find the length and area of the cardioid $r = a(1 + cos\theta)$. 5

(b) Find the area of the region bounded by asteroid $x^{\frac{2}{3}} + y^{\frac{2}{3}} = a^{\frac{2}{3}}$ 5