

# Patuakhali Science and Technology University

1<sup>st</sup> Semester (Level-1, Semester-I), Final Examination of B.Sc. Engg.(CSE),

Semester: January-June/2021, Session: 2020-21

Course Code: CIT-111 Course Title: Programming Language

[Figures in the right margin indicate full marks, Splitting answer if highly discouraged]

**Time: 03 Hours**

**Total Marks: 70**

**Answer any five of the following questions**

(4050) 4 405  
1050

1. a) Define program and programming language. Write the difference between compiler, assembler and interpreter with example. 3

- b) Write a C code of sum of the digits of a number. (If the input 4050 then output will be 9) 3

- c) i) Find the errors and correct the error. ii) How many times CSE PSTU will print: 1+2

```
1. #include<stdio.h>
2. int main(void)
3. {
4.     while(.)
5.     {
6.         printf("hello");
7.     }
8.     return 0;
9. }
```

```
1. #include<stdio.h>
2. int main()
3. {
4.     int x;
5.     for(x=-1; x<=10; x++)
6.     {
7.         if(x<5)
8.             continue;
9.         else
10.            break;
11.         printf("CSE PSTU");
12.     }
13. }
```

- d) Fill-In the blanks in each of the following statements. 2

a) In counter-controlled iteration, a(n) ----- is used to count the number of times a group of instructions should be repeated.

b) The -----statement, when executed in an iteration statement, causes the next iteration of the loop to be performed immediately.

c) The -----statement, when executed in an iteration statement or a switch, causes an immediate exit from the statement.

d) The ----- is used to test a particular variable or expression for each of the constant integral values it may assume.

- e) Write a C program to count the total number of vowel or consonant in a word. 3

2. a) Define expresión and statement. Distinguish them with example. 3

- b) Write a program for reversing an odd number where user will enter the input from the keyboard. 3

- c) i) Find the error(s) if any and corrected the code ii) Find the output of the following code 2+2

```
1. #include<stdio.h>
2. void main()
3. {
4.     int x = 10;
5.     int y = 15;
6.     printf("%d", (x, y)) ;
```

```
#include<stdio.h>
int main()
```

```
{
    int a = 10, b = 25;
    a = b-- - a--;
    b = --b - --a;
    printf("%d %d\n", a, b); }
```

- (d) i) Find the output of the following code

```
1. #include<stdio.h>
2. int main()
```

- ii) What's wrong with the following while iteration statement (assume z has value 100), which is supposed to calculate the sum of the integers from 100 down to 1? 2+2

24 - 14  
= 39

23 - 14  
= 9

```

3. {
4.     int m = -10, n = 20;
5.     n = (m<0)? 0:1;
6.     printf("%d %d", m, n);
7. }

```

```

while (z >= 0) {
    sum += z;
}

```

2-2

3. a) Classify Data Types with Example:

3

- b) Find the output of the following code:

```

1. #include<stdio.h>
2. int main()
3. {
4.     int m = 100, n = 0;
5.     while(n == 0)
6.     {
7.         if(m < 10) break;
8.         M = m-10;
9.     }
10.    return 0;
11. }

```

- ii) Find the output of the following code

```

1. #include<stdio.h>
2. int main(){
3.     int check = 2;
4.     switch(check){
5.         case 1: // case 1:
6.             printf("Computer");
7.         case 2: // case 2:
8.             printf("Science");
9.         case 3: // case 3:
10.            printf("Engineering");
11.        default:
12.            printf("PSTU");
13.        }
14.    return 0;
15. }

```

2+2  
=4

7.5

- c) Explain the difference among **For loop**    **While loop**    **Do while loop** with an example

4

- d) Calculate grade using switch statement in c. Grade like A+ >=80, A>=70, B>=60, C>=50, D>=40, F<39 ,

3

4. a) Define function. Briefly describe the function call and return procedure using an example of multifunction program.

3

- b) Write a program to print prime numbers between two integers using function.

4

- c) Define recursion. Write down the advantages and disadvantages of recursion? Describe the scope, visibility and lifetime of variables.

3

- d) Write a program to find the sum of N natural numbers using recursion. Use N=5 as your test data and demonstrate the calls and returns in details.

4

5. a) How pointer is initialized? Is there any arithmetic operation permitted on pointers? Describe with example.

3

- b) Write a program to pass pointers to functions.

4

- c) What is call by value and call by reference? Describe with examples. Write down the common mistakes when working with pointers.

3

- d) Write a function using pointers to exchange the values stored in two locations in the memory.

4

6. a) What is a file? Why file is necessary? Explain how the file open and file close functions handled.

3

- b) A file named NUMB contains a series of integer numbers. Write a program to read these numbers and then write all 'odd' numbers to a file to be called ODD and all 'even' numbers to a file to be called EVEN.

4

- c) How does structure differ from union? Describe with memory representation. Show the different ways of assigning values to structure members.

3

- d) Define a structure called **complex** consisting of two floating-point numbers x and y and declare a variable p of type **complex**. Assign initial values 0.0 and 1.1 to the members.

4



Patuakhali Science and Technology University

Department of Computer Science and Information Technology

1<sup>st</sup> Semester (Level-1, Semester-I), Midterm Examination of B.Sc. Engg.(CSE), January-June/2021, Session: 2020-21

Course Code: CIT-111 Course Title: Programming Language

Full Marks: 15 Duration: 1 hour

[Figures in the right margin indicate full marks]

*Answer all the following questions.*

1. Define function. Briefly describe the function call and response with an example. 2
2. Explain what is likely to happen when the following situations are encountered in the program.
  - i. Actual arguments are less than the formal arguments in a function.
  - ii. Data type of one of the actual arguments does not match with the type of the corresponding formal argument.
  - iii. Data type arrangement of function call is mismatched with formal declaration or definition.
  - iv. The type of expression used in return statement does not match with the type of the function.
  - v. Want to return multiple value by reference but function declaration is not return type.
  - vi. Recursive function have no terminating condition.
3. a. The function test is coded as follows:  

```
int test (int number)
{
    int m, n=0;
    while (number>0)
    {
```

```
m=number%10;
if (m%2)
    n=n+1;
number=number/10;
}
return(n);
```

1

What will be the value of ~~and~~ y when the following call statements are executed?

```
int y=test(63);
```

4. Write a function exchange to interchange the values of two variables, say x and y. Illustrate the use of this function, in a calling function. Assume that x and y are defined as global variables. 2
5. Write a program that reads three float numbers from the user then displays their sum, product, difference, quotient and remainder. 3
6. Identify and correct the errors in each of the following statements: 2
- a) printf("The value is %d\n", &number);
  - b) scanf("%d%d", &number1, number2);
  - c) if (c < 7);{  
    puts("C is less than 7");  
}  
d) if (c => 7) {  
    puts("C is greater than or equal to 7");  
}
7. a) Most C programmers take advantage of the rich collection of existing functions called the ..... 2
- b) Avoid "reinventing the wheel" Instead, use existing pieces. This is called.....
- c) Today, most code for general-purpose operating systems and other performance-critical systems is written in .....
- d) C programs typically go through some phases to be executed: -----,-----,-----,----,----- and -----.

# **Patuakhali Science and Technology University**

First Semester (L-1, S-I) Final Examination of B.Sc. (Engg.) in CSE, January-June: 2021, Session: 2020-2021

Course Code: PHY 111, Course Title: Physics-I

Credit Hour: 3.0, Full Marks: 70, Total Time: 3 Hours

[Figures in the right margin indicate full marks. Split answering of any question is not recommended.]

## **Answer any 5 (Five) from the following questions**

1. (a) From the equation of S.H.W find out particle velocity and also find the relationship among particle velocity at any instant, wave velocity and slope of displacement curve. 6  
(b) Prove that in a progressive wave, total energy i.e.; the sum of kinetic and potential energy per unit volume remain constant. 8
  
2. (a) State the characteristics of a standing wave specifying how standing wave differs from progressive wave? 3  
(b) Write a short note on interference of sound waves. 3  
(c) Analyze the incident when two simple harmonic waves interfere with each other considering the special case when interference phenomenon gives rise to standing wave. 8
  
3. (a) State and explain the third law of thermodynamics. Write down its importance and limitations. 4  
(b) What is entropy? Write down the characteristics of entropy. Derive an equation for change in entropy during an isochoric process. 6  
(c) Three real heat engines have the same thermal efficiency and are connected in series. The first engine absorbs 2400 kJ of heat from a thermal reservoir at 1250 K and the third engine ejects its waste of 300 kJ to a sink at 150 K. Determine the work output from each engine. 4
  
- (a) What is Carnot's Cycle? Describe it with four processes. 10  
(b) A Carnot engine converts one fifth of the heat input into work. If the sink temperature is reduced by  $80^{\circ}\text{C}$ , the efficiency gets doubled. Find the source and the sink temperature. Also give the consequences of the Carnot cycle. 4

**Please Turn Over**

- ✓ 5 (a) Write down the fundamental assumptions of the Kinetic Theory of Gases. 3
- (b) What do you understand by 'mean free path'? Show that the mean free path ( $\lambda$ ) is equal to  $\frac{RT}{\sqrt{2\pi d^2 N_A P}}$ , where the symbols have their conventional meanings. 7
- (c) (i) What is the mean free path  $\lambda$  for oxygen molecules at temperature  $T = 300$  K and pressure  $p = 1.0$  atm? Assume that the molecular diameter is  $d = 290$  pm and the gas is ideal. (ii) Assume the average speed of the oxygen molecules is  $v = 450$  m/s. What is the average time  $t$  between successive collisions for any given molecule? At what rate does the molecule collide; that is, what is the frequency  $f$  of its collisions? 4
6. ✓ (a) What is Transmission of Heat? Give its classifications with practical examples. 5
- (b) Briefly describe the Mechanisms of Conduction in metals. Explain the Mathematical idea of Heat Conduction. 5
- (c) What is the rate of heat transfer by radiation, with an unclothed person standing in a dark room whose ambient temperature is  $22.0^\circ\text{C}$ . The person has a normal skin temperature of  $33.0^\circ\text{C}$  and a surface area of  $1.50 \text{ m}^2$ . The emissivity of skin is 0.97 in the infrared, where the radiation takes place. 4

7. (a) What do you understand by degree of freedom? For diatomic and triatomic gases, find out the value of atomicity ( $\gamma$ ) with the help of degree of freedom. 6
- (b) State and explain Stefan-Boltzmann, and Wiedemann-Franz Laws of transmission of heat. 5
- (c) Calculate the total random kinetic energy of one gram of Nitrogen at 300 K. 3

$$\epsilon = 1.6$$

$$\frac{3}{2}RT$$

Patuakhali Science and Technology University  
Department of Physics and Mechanical Engineering

First Semester (L-1, S-I) Class Test of B.Sc. (Engg.) in CSE, January-June: 2021, Session: 2020-2021

Course Code: PHY 111, Course Title: Physics-I

Credit Hour: 3.0, Full Marks: 15, Total Time: 45 Minutes.

Answer any one (01) from the following questions

- |    |  |   |
|----|--|---|
| 1. | (a) What is propagated in wave motion? State the properties a medium should possess to transfer wave through it.   | 2 |
|    | (b) State the properties of longitudinal wave motion.  | 5 |
|    | (c) Derive equation of simple harmonic motion  | 5 |
|    | (d) At a time $t=3s$ , the displacement of a particle having simple harmonic motion is given by,<br>$y = 6 \sin 2\pi \left(0.1 - \frac{x}{45}\right)$ . Calculate the amplitude, time period, wave length and wave velocity. | 3 |
| 2. | (a) State and Explain the Second law of thermodynamics.  | 3 |
|    | (b) Explain Entropy and its characteristics. State third law of thermodynamics with its limitations.   | 4 |
|    | (c) How many processes takes in thermodynamics? Briefly describe.  | 5 |
|    | (d) One mole of an ideal gas is heated at constant pressure from $0^\circ\text{C}$ to $200^\circ\text{C}$ .  | 3 |
|    | (i) Calculate work done.   |   |
|    | (ii) If the gas were expanded isothermally & reversibly at $0^\circ\text{C}$ from 1 atm to some other pressure $P_t$ , what must be the final pressure if the maximum work is equal to the work involved in (i).             |   |

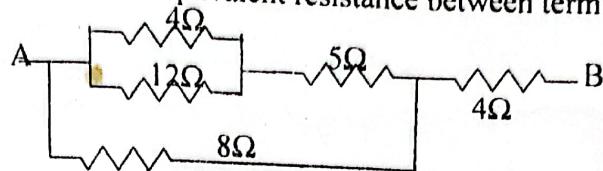
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**Patuakhali Science and Technology University**  
 B.Sc.Engg.(CSE) Level-1 Semester-I Final Examination-2021 (January-June)  
 Course Code: EEE 111 Course Title: Basic Electrical Engineering  
 Credit Hour: 3.0 Full Marks: 70 Duration: 3 Hours.

[Figures in the right margin indicate full marks. Split answering of any question is not recommended.]  
**Answer any 5 of the following questions.**

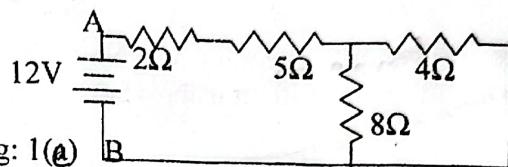
*All values of resistances are in Ohm*

- 1 (a) What is conductivity? Show the effects of temperature on resistance. 2+3  
 (b) Write down the Ohm's law. Find out the equivalent resistance between terminal A and B. 2+04



12

- (c) Find the current through  $8\Omega$  in the circuit. Fig: 1(6)



3

- 2 (a) Show the V-I characteristics of Non-linear Resistor. 04  
 (b) Write down the short notes on i. Bilateral circuit ii. Unilateral circuit iii. Passive Network iv. Non-linear circuit. 06  
 (c) Find the resistance between the terminals A and B for the network 04

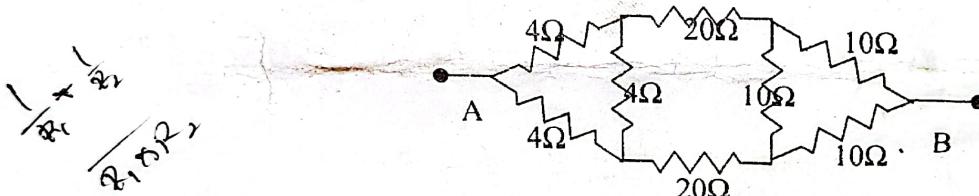
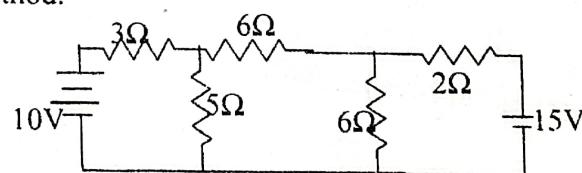


Fig: 2(c)

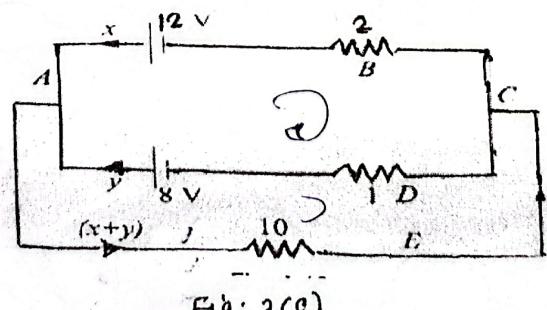
$$\begin{aligned} & 3 \times 24 + 12 \\ & = 26 + 0 = 40 \end{aligned}$$

- 3 (a) Write down the Superposition theorem. 03  
 (b) Show the differences between mesh and loop. Determine the current in each resistance using loop current method. 3+4



4/57

- (c) Determine the values and directions of current in each resistance using Kirchhoff's laws. 04



40

Fig: 3(c)

- 4 (a) Deduce the Matrix equation of Mesh analysis with proper example of electric network. 05  
 (b) Determine the current of different branches for the given circuit using Nodal analysis. 05

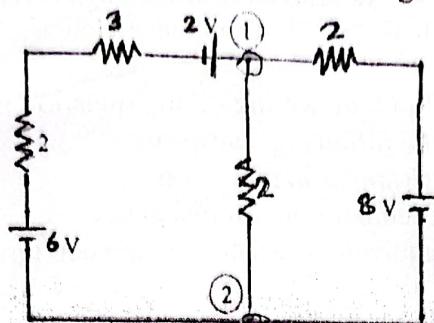


Fig: 4(b)

- (c) Write down Maximum Power Theorem. Proof that  $P_{L_{MAX}} = \frac{E^2}{4R}$  4

- 5 (a) Discuss the Thevenin's Theorem and Norton's theorem. Find the current through  $4\Omega$  resistor for the following circuit using Thevenin's theorem.

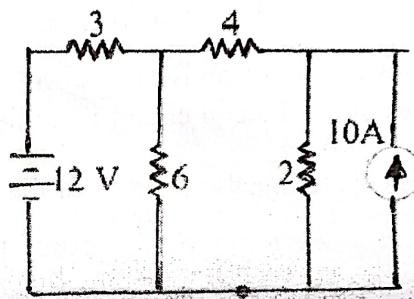


Fig: 5(a)

- (c) How current flow is measured for given terminal through Norton's theorem? 03  
 (d) How Star connections are transformed to Delta connections? 4 5+3  
 6 (a) Write down the short notes on i. instantaneous power ii. RMS value iii. form factor 06  
 (b) Show the variations of voltage, current and power with mathematical equations and graphical representations in a purely capacitive branch. 04  
 (c) What is resonance? Deduce the equation of effective values for Sinusoid wave. 02+2

3

# Patuakhali Science and Technology University

Faculty of Computer Science and Engineering

1<sup>st</sup> Semester (L-1, S-1) Final Examination of B.Sc. Engg.(CSE) Jan- June-2021, Session:2020-21

Course Code: MAT-111

Course title: Mathematics-I

Credit Hour: 3.0

Full marks: 70

Time: 3.0 hours

*Answer any 5 of the following questions*

- 1 a)** Illustrate some important uses of differential calculus for computer science 02
- b)** Define i) Transcendental function and ii) Periodic function. Find the left-hand limit and right-hand limit of the function  $y = f(x) = \frac{1}{1-e^x}$  at  $x = 0$  02+03
- c)** If  $y = e^{m\cos^{-1}x}$  then show that  $(1-x^2)y_{n+2} - (2n+1)xy_{n+1} - (n^2+m^2)y_n = 0$  04
- d)** Prove that the curves  $\frac{x^2}{a} + \frac{y^2}{b} = 1$  and  $\frac{x^2}{a'} + \frac{y^2}{b'} = 1$  will cut orthogonally if  $a-b=a'-b'$  03
- 2 a)** State and prove the Leibnitz's theorem. 02+03
- b)** Find the radii of curvature of two curves  $r^2 = 2ap^2$  and  $\frac{a^2b^2}{p^2} + r^2 = a^2 + b^2$  05
- c)** Find the limit using L'hopital's rules: i)  $\lim_{x \rightarrow +\infty} \frac{x^{-\frac{4}{3}}}{\sin(\frac{1}{x})}$  ii)  $\lim_{x \rightarrow +\infty} \frac{x}{e^x}$  04
- 3 a)** Find nth Maclaurin Polynomials for  $e^x$  03
- b)** State and prove the Taylor's Theorem. 04
- c)** Define Maximum, Minimum and Inflection point. Find the maximum and minimum value of  $4\sin x \cos^2 x$ . 03+04
- 4 a)** Write down some applications of integration Related to CSE 02
- b)** Integrate the following functions: 3×4
- (i)  $\int \frac{dx}{(x+1)\sqrt{1+2x-x^2}}$     (ii)  $\int \frac{dx}{(x^2+1)\sqrt{x^2+4}}$     (iii)  $\int \frac{2\sin x + \cos x + 3}{\sin x + 2\cos x + 4} dx$  =12
- 5 a)** Illustrate the physical meaning of  $\int_2^3 x^3 dx$  02
- b)** Find the value of  $\int_0^{\frac{\pi}{2}} \frac{\sqrt{\sin x}}{\sqrt{\sin x} + \sqrt{\cos x}} dx$  05
- c)** Establish the relation between Gamma and Beta function 04
- d)** Prove that  $\Gamma(\frac{1}{2}) = \sqrt{\pi}$  03
- 6 a)** State the walli's formula and then prove it only for even integers 04
- b)** If  $I_{m,n} = \int \cos^m x \cos nx dx$ , then prove that  $I_{m,n} = \frac{\cos^m x \sin nx}{m+n} + \frac{m}{m+n} I_{m-1,n-1}$ . Also evaluate  $\int_0^{\frac{\pi}{2}} \cos^5 x \cos 4x dx$  using this relation 06
- c)** Find the summation of the following series using definite integral 04
- $$\lim_{n \rightarrow \infty} \left[ \left(1 + \frac{1}{n^2}\right) \left(1 + \frac{2^2}{n^2}\right) \cdots \cdots \cdots \left(1 + \frac{n^2}{n^2}\right) \right]^{\frac{1}{n}}$$

**1<sup>st</sup> Semester Class Test Exam of CSE 2022**

**Course Code: MAT 111, Course Title: Mathematics-1, Full Marks: 15 Time: 30 min**

- 1) (i)  $\int \frac{dx}{(x+1)\sqrt{1+2x-x^2}}$       (ii)  $\int \frac{2\sin x + \cos x + 3}{\sin x + 2\cos x + 4} dx$       8
- 2) Define continuity of a function. Test the continuity and Differentiability of the following function      7

$$y = f(x) = \begin{cases} \sqrt{|x|} & x \geq 0 \\ -\sqrt{|x|} & x < 0 \end{cases}$$

# Patuakhali Science and Technology University

Final Examination of CSE-2021(January-June)

Course Code: CHE 111 Course Title: Chemistry

Credit Hour: 3.0 Full Marks: 70 Duration: 3 Hours

[Figures in the right margin indicate full marks. Split answering of any question is not allowed.]

**Answer any 07(seven) of the following questions.**

1. Define chemistry. Describe the branches of chemistry. What are the types of analysis? 2+4+4
2. What do you mean by reversible and irreversible reaction? Give the characteristics of chemical equilibrium. Explain the relationship between  $K_p$  and  $K_c$ . 3+3+4
3. How can you explain the term pH and pOH? Prove that  $pH + pOH = 14$ . Calculate the  $P^H$  of 0.001M HCl. If the pH of a solution of HCl is 2, what will be the concentration of  $H^+$ ? 2+4+2+2  
*2Vcl<sub>03</sub>*
4. Calculate the pH of an acidic buffer solution. The components of acetic acid and sodium acetate in a buffer solution is 0.1 M. Calculate the pH of buffer solution, where  $pK_a = 4.73$ . How can you prepare 0.1N HCl solution? 5+3+2
5. What is meant by volumetric analysis? Write down the advantage and disadvantage of volumetric analysis. Describe the criteria of primary standard substances. 2+4+4
6. What is cell called in chemistry? "A battery is a device that converts chemical energy into electrical energy"-explain. Why are primary batteries ideal for transistor radios, toys, and emergency flashlights? 2+4+4
7. Define electrode, electrolyte, and electrolysis with examples. What happens when electricity is passed through acidified water? What are electrochemical cells? How does a galvanic cell produce electricity? 3+3+1+3
8. What are electrolytes? Prove that the degree of dissociation for a molar solution of weak electrolytes is equal to the square root of its dissociation constant. At  $25^\circ C$  in a solution of 0.1 N of formic acid, 4.50 % of its dissociates, Calculate its dissociation constant. 2+6+2
9. Enlist the role of a salt bridge. Write down the key differences between galvanic cells and electrolytic cells. Briefly describe the chemistry of primary batteries. 2+4+4

B.Sc Eng.(CSE), Level-1, Semester-I, Class Test Examination-2021 (January-June)

Course Code:CHE 111 Course Title: **Chemistry**

Credit Hour: 3.0 Full Marks: 15 Duration: 30 minutes

1. Define:

- a) Chemistry, b) Matter, c) Mass percent solution, d) Volume percent e) Titration.  $5 \times 1 = 5$

2. Differentiate between:

$$2.5 \times 4 = 10$$

- a) Analysis and chemical analysis
- b) Titrant and Titrand
- c) Solute and Solvent
- d) Gravimetric and Volumetric analysis