Department of Computer Science & Engineering
University of Asia Pacific (UAP)

Final Examination — **Fall 2019** — **1st Year 1st Semester**

Course Code: CSE 101 — **Course Title: Introduction to Computer Science and Programming Methodology** — **Credits: 3.00**

Full Marks: 150 — **Duration: 3 hours**

Instructions:

1. There are Six (6) Questions. Answer all of them. All questions are of equal value. Part marks are shown in the margins.
2. Non-programmable calculators are allowed.

1. a) List 5 negative impacts of computer in human life. **5**

   b) What do you understand by 'Quad Core Processor with 2.8 GHz Clock Speed and 6 MB Cache'? **5**

   c) Write short notes on the following: **10**
   i. CPU ii. ALU iii. Cache iv. BIOS

   d) We all know about a few number systems such as Binary (base 2), Decimal (base 10) etc. Can there be a **Unary (base 1)** number system? Why or why not? **5**

OR

   a) "Faster memory devices have smaller and slower devices have larger storage capacity" – Can you explain why? **5**

   b) According to IEEE 754 Standard, 32-bit Floating Point Numbers are stored in Computer Memory as follows: **10**
   Sign (+ or -): 1 bit, Significand/Mantissa: 23 bits. Exponent: 8 bits

   For example, 1.2345 = + 12345 x 10^-4
   - The sign '+' is stored in the MSB as a 0 (or 1 if the sign is '-'ve)
   - Binary representation of the significand 12345 stored in 23 bits
   - The exponent -4 is converted to 8-bit binary and stored on the remaining 8 bits.

   Question: Find out the Maximum and Minimum value that can be stored as:
   i) Significand ii) Exponent

   c) Explain how a negative number is stored in computer memory and how it is converted back to decimal. **10**

2. a) Draw truth table and logic gate diagram of boolean XOR operation. **10**

   b) Prove that NOR is a universal gate by showing proper logic gate diagrams and Boolean expressions to perform Boolean AND, OR, NOT operations using just NAND gate. **15**

OR

   a) We want to build a 1-bit adder system according to the following truth table **25**

A	B	$Carry_{in}$	Sum	$Carry_{out}$
0	0	0	0	0
0	0	1	1	0
...				

   1. Complete the above truth table with rest of the combinations for A, B and $Carry_{in}$
   2. Formulate the Boolean expressions for Sum and $Carry_{out}$
   3. Draw the logic gate diagrams for the above Boolean expressions

3. a) Draw the symbols used for expressing Start/End, Input/Output, Commands, and Questions in algorithm flowcharts. 5

b) Draw a flowchart to take an integer number as input and print all the positive divisors of that number. 15

c) Explain High-level, Mid-level and Low-level programming languages in your own words. 5

4. a) Show a comparative study among the following network topologies: **Bus, Star, Mesh, Ring** based their setup method, no. of connections required, setup cost, effects of damaging a connection etc. 16

b) Write short notes on the following: 9

1. IP address (public and private)
2. DNS Servers
3. Optical fiber cable

5. a) Mark the errors in the code below. Then, write down the corrected code. 5

```
include <studio.h>

int main
{
   int x;
   scan("%D", x);
   print("%D", x);
   return 0
)
```

b) Find the results of following Boolean expressions considering: 20

A = Last two digits of your student ID

B = 10

1. A && ((A&B) & B)
2. !((A/5) == (B<<1))
3. (((A>>2) | (B<<1)) > (A>>2))
4. (A%2) == ((A^1) < A)
5. (A^B) < ~B

6. a) You are given a C program to print the first 20 multiples of 3 (for example: 3, 6, 9 …). Unfortunately, the code is not giving the expected output. **Briefly describe why and propose a solution with minimum changes in the code.** 10

```
#include <stdio.h>
int main() {
        int i;
        for(i=1; i<=20; i+=3){
                printf(" %d",i);
        }
        return 0;
}
```

b) Find the output of the program below for these inputs (show proper reasoning):

i. 12 13 14 90
ii. -5 100 3 60
iii. 80 80 80 60

```
#include <stdio.h>

int main() {
        int x, y, z, T, val;
        scanf("%d %d %d %d",&x,&y,&z,&T);

        if (x<=y) {
                if (y>z)
                        val = 2*y - x - z;
                else if (y==z)
                        val = y - x;
                else
                        val = z - x;
        }
        else {
                if (y>z)
                        val = x - z;
                else if (y==z)
                        val = x - y;
                else
                        val = x + z - 2*y;
        }

        if (val>T)
                printf("%d is below par score\n",val);
        else if (val==T)
                printf("%d is par score\n",val);
        else
                printf("%d is above par score\n",val);

        return 0;
}
```

University of Asia Pacific
Department of Basic Sciences & Humanities
Final Examination, Fall -2019
Program: B.Sc. Engineering (Computer Science)
1st Year /1st Semester

Course Title: Mathematics-I Course Code: MTH 101 Credit: 3.00
Time: 3.00 Hour Full Marks: 150

There are **Eight** questions. Answer any **Six** including 1, 2,3 and 4. All questions are of equal values, indicated in the right margin.

1. (a) Find the equation of straight line which are passing through the point $(2,6)$ and $(6,-1)$. — 7

   (b) $P(1,-5,7), Q(-3,6,-2)$ are two points. Find Direction cosines of OQ and PQ. — 9

   (c) Find the angle between the lines whose direction ratios are $(2,-1,3)$ and $(-1,3,4)$. — 9

2. (a) Expand $\ln(\sin(x+h))$ in power of h. — 7

   (b) Find $\lim_{x\to 0}\frac{x-\sin^{-1}x}{\sin^3 x}$ — 8

   (c) State Euler's theorem for three variables. Verify Euler's theorem for $u = x^2\ln(y/x)$. — 10

3. (a) Show that $\int_0^{\pi/2}\sin^p\theta\cos^q\theta\,d\theta = \frac{\Gamma\left(\frac{p+1}{2}\right)\Gamma\left(\frac{q+1}{2}\right)}{2\Gamma\left(\frac{p+q+2}{2}\right)}$ — 15

   (b) Find $\int_0^{\infty} e^{-y^3}y^5\,dy$ using gamma function. — 10

10

4. (a) If $\vec{A} = 2\hat{i} - 3\hat{j} - 5\hat{k}, \vec{B} = 2\hat{i} + 3\hat{j} - 9\hat{k}, \vec{C} = -\hat{i} + 4\hat{j} - 5\hat{k}$, then find

$$\left|(\vec{A} \times \vec{B}) \times \vec{C}\right|$$

15

(b) Find the area of the triangle with vertices P (1, 5, -2), Q (0, 0, 0) and R (3, 5, 1).

13

5. (a) State Rolle's theorem. Verify Rolle's theorem for $f(x) = x^2$ in (-1, 1).

12

(b) Check the differentiability of the function $f(x)$ at $x = 0$. Where,

$$f(x) = \begin{cases} 3 + 2x, & -\frac{3}{2} < x \leq 0 \\ 3 - 2x, & 0 < x < \frac{3}{2} \end{cases}$$

OR

10

6. (a) If $y = e^{a \sin^{-1} x}$, then show that $(1 - x^2)y_2 - xy_1 - a^2 y = 0$.

15

(b) If $y = \tan^{-1} x$, prove that $(1+x^2)y_{n+2} + 2(n+1)xy_{n+1} + (n^2+n)y_n = 0$.

25

7. Evaluate the following integrals:

i) $\int x \sin x \, dx$ *ii)* $\int e^x \cos x \, dx$ *iii)* $e^{\tan x} \sec^2 x \, dx$

iv) $\dfrac{a \cot x + b \tan^2 x - c \sin^2 x}{\sin x} dx$ *v)* $\int \dfrac{x^2}{\sqrt{1-x^6}} dx$

OR

10

8. (a) Integrate the following: $\int \dfrac{x^2 dx}{(x+1)(x+2)^2}$

15

(b) Establish a reduction formula for $\int x^n e^{ax} dx$ and find $\int x^2 e^{ax} dx$.

University of Asia Pacific

Department of Basic Sciences and Humanities

Final Examination, Fall 2019

Program: B. Sc. Engineering (Computer Science)

(1st Year 1st Semester)

Course code: HSS 111(b) Course Title: Bangladesh Studies: History Credit: 2.00
Total Time: 2.00 hrs. Full Marks: 100

There are **Six** Questions. Answer **Four** Questions **including Q-5 and Q-6.**

1. a. Who was the first modern person of Bengal and India? – 5
   b Describe his contribution to the society. 20

Or

2. a. Who was the founder of modern Bangla prose style? 5
   a. Describe his contribution to the society. 20

3. a. Describe the background of Lahore Resolution. 15
   b. Discuss the reaction of Bengalis. 10

Or

4. a. Describe the reasons behind the Partition of Bengal in 1905. 15
   b. Discuss the reaction of the Hindus and the Muslims. 10

5. Discuss the Six Point Program. 25

6. Write an article on the Bangladesh War of Liberation. 25

University of Asia Pacific
Department of Basic Sciences and Humanities
Final Examination, Fall 2019
Programme: B.Sc. Engineering (Computer Science)
(1st Year 1st Semester)

Course Title: Bangladesh Studies: Society and Culture **Course Code: HSS 111(a)**
Credit: 2
Time: 2 Hours **Full Marks: 100**

Answer **FOUR** questions **including question 5 and question 6.**
Figures in the right margin indicate marks.

1. a) Define socialization. 5
   b) What are the agencies of socialization? In this context, discuss the roles of family and mass media in socialization process. 20

OR

2. a) Define marriage and family. 5
   b) Discuss different forms and functions of family with examples. 20

3. a) Define social stratification. 5
   b) What are the historical systems of stratification? Discuss with example. 20

OR

4. a) Define social mobility. 5
   b) Explain different types of social mobility with relevant examples. 20

5. a) What are the determinants of social stratification? 5
   b) Make relationship among them with examples. 20

6. a) Define power and authority. 5
   b) Discuss different types of authority with suitable example. 20

University of Asia Pacific
Department of Basic Sciences and Humanities
Final Examination, Fall-2019
Program: B. Sc. in Computer Science and Engineering (1st year/1st semester)

Course Title: Physics | Course No. PHY-101 | Credit: 3.00
Time: 3.00 Hours | Full Mark: 150

[There are Eight questions. Answer any Six including Q-3, Q-4, Q-5 and Q-6. The figures in the right margin indicate marks.]

1. (a) Show that in Young's experiment bright fringes and dark fringes have the same width $\frac{\lambda D}{d}$ where the symbols have their usual meanings. 20

(b) In a Young's double slit experiment, the separation between the sources is 0.18 mm and the fringes are observed on a screen 90 cm away. If with certain monochromatic source of light, the third bright fringe is situated at a distance of 8.1 mm from the central bright fringe, find the wavelength of light. 5

OR

2. Derive the equations for the diameters of bright fringes and dark fringes of a Newton's Rings system for reflected light produced by monochromatic light. 25

3. (a) Define simple harmonic motion. 5

(b) Derive the differential equation of simple harmonic motion. 10

(c) Show that $y = a\sin(\omega t + \alpha)$ is a solution to the differential equation where the symbols have their usual meanings. 10

4. (a) Define Lissajous figures. Write some uses of Lissajous figures. 5

(b) Derive the resultant equation for the superposition of two simple harmonic motions of equal time period acting at right angle to each other and show that the equation represents an ellipse. Find out what will happen if the initial phase angle $\alpha = 0, \pi$. 20

~~$A\cos(\omega t + \alpha)$~~ $A\cos(\theta + \pi) \pm \frac{\lambda}{2}$

Turn Over

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5. Show that the resultant of two simple harmonic motions of the same period and frequency acting in a straight line is also a simple harmonic motion. Find out the result if the two initial phase angles are equal. 25

6. Derive the equation $E = 2\pi^2\rho n^2 a^2$ for the total energy of a travelling wave where the symbols have their usual meanings. 25

7. (a) State and explain First Law of Thermodynamics. 5

   (b) Derive Mayer's relation. 20

OR

8. State and prove Carnot's theorem. 25

University of Asia Pacific
Department of Computer Science and Engineering (CSE)
Final Examination, Fall 2019
Program: B.Sc. in Computer Science and Engineering
Year: 1st, Semester:1st

Course Title: English I: Written and Spoken English Course Code: HSS 101 Credit: 3.00

Time: 3.00 Hours Full Marks: 50

Instructions:

*Marks are indicated in the right margin.

*Answer all the questions

1. Show how the following words have been constructed. (10x1=10)

Embrace, Discharge, Falsifier, Constructor, Apprehension, Misspell, Sportive, Decease, Illegitimate, Encounter

2. Write a story based on the following picture. (10x1=10)

3. Show your brainstorming in an outline and write a paragraph on any one of the following. (3+7=10)

a) Private University VS Public University

b) The Advantages of Email

4. Write a cover letter and prepare your CV in order to apply for the post mentioned in the following circular. (8+12=20)

ABC Properties Limited
House 78, Road 32, Dhanmondi R/A, Dhaka- 1207
Email: hrapl@gmail.com, Phone: 980944353

Vacancy Announcement

Post: Junior Architect
Vacancy: 03

ABC Properties Limited, a renowned construction company, is inviting applications from qualified candidates for the post of junior architect.

Educational Requirements:

- Bachelor in Architecture from any recognized university

Experience Requirements:

- 3 years work experience as a junior architect

Application Procedure:
Please send your detailed CV along with a cover letter, 02 copies of pp size photo and attested copies of experience certificate, all academic certificates and transcripts to Human Resource executive, ABC Properties Limited, House 78, Road 32, Dhanmondi R/A, Dhaka- 1207.

Application Deadline: March 18, 2020