University of Asia Pacific
Department: CSE
Semester Final Examination, Spring 2022
Program: B. Sc in Engineering (Computer Science)
Year: 1st Semester: 1st

Course Code: HSS 101 **Course Title: English I** **Credit Hr: 3**
Time: 3 Hour **Total Marks: 50**

Instructions:
*Marks are indicated in the right margin.
*Answer all the questions

1. **Fill in the gaps with appropriate modals.** **(1 x 10 = 10)**

   a. We're not sure if this artwork is an original. It _____ be worth thousands of dollars.
   b. We ____ sort out this problem at once.
   c. ____ you say that again more slowly?
   d. We ____ say good-bye now.
   e. I ____ see any taxis. So I'll walk.
   f. You ____ smoke here. It is prohibited.
   g. ____ you pass the salt please?
   h. He gave up his old job so he ____ work for us.
   i. We'd better phone tomorrow, they ____ be eating their dinner now.
   j. _____ you like to play golf this Friday?

2. **Rewrite the sentences using the correct pronouns/ possessives.** **(1 x 5= 5)**

   a. Yes, that one is my?
   b. Peter asked her sister to the dance.
   c. Did you forget to do your homework yesterday? – No I didn't. I did mine homework.
   d. I'm sure it's our.
   e. Susan did not say anything about the picnic. I'd like to hear their opinion.

3. **Rewrite the paragraph by using correct punctuation and capitalization** **(.5 x 10 = 5)**
   In the 16th century an age of great marine and terrestrial exploration, ferdinand Magellan led the first expedition to sail around the world! As a young portuguese noble, he served the king of portugal but he became involved in the quagmire of political intrigue at court and lost the king's favor. After he was dismissed from service by the king of Portugal he offered to serve the future emperor charles V of spain.

4. **Change the following sentences into the parenthesized form.** **(1 x 10 = 10)**

a. Study well. You will pass. (Complex)
b. We won the game. We worked together as a team. (Complex)
c. The price of oil has risen sharply. Wood stoves are popular again. (Compound)
d. The students saw the teacher. They stopped making noise. (Complex)
e. Hisham loves hiking and camping. ~~Hisham~~ loves canoeing best. (Compound)
f. I could not find him in his own house. I went over to Munwar's house to see if he was there. (Complex)
g. Joe waited for the train. ~~The train~~ was late. (Compound)
h. I shouted for help as loudly as I could. No one heard me. (Compound)
i. Jack prefers watching comedy films. ~~Jack~~ rented the latest spy thriller. (Complex)
j. The book fell to the floor. It opened to a page I had never read before. (Compound)

5. Complete the following sentences by using correct conditionals **(1 x 10= 10)**

a. What will you do if you _____ the history exam?
b. _____, I would have driven you.
c. He would have gone with you _____.
d. If Ishmam does not send flowers to his mother, _____.
e. _____ we would not have so many arguments.
f. _____ she will go crazy.
g. If we weren't so tired _____.
h. If she had learnt Spanish, _____.
i. _____ if he had gone to the doctor.
j. If you mix red and green _____.

6. Write a paragraph on one of the given topic: **(10 x 1= 10)**

a. "Use of Internet"
b. "Programming"

University of Asia Pacific
Department of Basic Sciences and Humanities
Final Examination, Spring - 2022
Program: B. Sc. in Computer Science and Engineering
1st Year/1st Semester

Course Title: Physics I Course Code: PHY-101 Credit: 3.00

Time: 3.00 Hours Full Mark: 150

There are **Eight** questions. Answer **Six** including **Q-3**, **Q-4**, **Q-5** and **Q-6**. 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. 05

OR

2. (a) Explain Interferometry. 05

   (b) Write short notes on (i) diffraction grating (ii) optical activity. 20

3. (a) Define simple harmonic motion. 05

   (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. 05

   (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

5. 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

6. (a) Define intensity of wave and derive an equation for intensity of wave. 20

   (b) A train blows a whistle of amplitude 0.3 cm and frequency of 512 Hz. If the velocity of sound is 350 m/s, density of air is 1.1839 Kg/m^3, calculate the intensity of sound. 05

7. (a) Define degrees of freedom and describe it for mono, di and triatomic molecule. 10

(b) Show that the average kinetic energy associated with each degree of freedom is $\frac{1}{2}KT$. 08

(c) Show that $\gamma = 1 + \frac{2}{f}$, where the symbols have their usual meanings. 07

OR

8. State and prove Carnot's theorem. 25

University of Asia Pacific
Department of Basic Sciences and Humanities
Final Examination, Spring 2022
Programme: B.Sc. Engineering (Computer Science)
(1st Year 1st Semester)

Course Title: Bangladesh Studies: Society and Culture
Time: 2 hrs. Credit: 2 hrs. Course Code: HSS 111(a)
Marks: 100

Answer FOUR questions including Question no. 5 and 6 (4 x 25 = 100)

1. a) What is social stratification? Define social class system. 10
   b) What determines social class according to Karl Marx? Briefly discuss. 15

OR

2. a) Define three sectors of economy. 10
   b) Briefly discuss how the sectors of economy are related with the major technological revolutions. 15

3. a) Define socialization. 5
   b) Briefly discuss the agencies of socialization. 20

OR

4. a) Define marriage and family. 5
   b) Briefly discuss about the types and functions of families. 20

5. a) Define the scientific method in conducting sociological research. 5
   b) What are the steps of the scientific method? Describe them. 20

6. a) Define social mobility. 5
   b) How is social mobility related with social stratification? Discuss. 20

University of Asia Pacific

Department of Basic Sciences and Humanities

Final Examination, Spring 2022

Program: B. Sc. Engineering (Computer Science & Engineering)

(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-3 and Q-4**.

1. a. What changes were brought by the Permanent Settlement Act in 1793? 15

   b. Discuss the impact of this system in the Bengal economy. 10

Or

2. a. Explain causes and strategies of the Swadeshi movement. 15

   b. How the Partition of Bengal affected the relationship between Hindus and Muslims of Bengal? 10

3. Discuss the causes and impact of the India-Pakistan Partition of 1947. 25

4. Discuss the major achievements of the Language Movement in our national history by narrating the major events of the Language Movement. 25

5. a. Describe the economic disparity between East and West Pakistan. 10

   b. Write the Six Points and the significance of the Six Point Program. 15

Or

6. a. Describe how the Pakistanis tried to subdue the Bengali population in 1971. 10

   b. Discuss the organized response of the Bengali people in the Liberation War of 1971. 15

University of Asia Pacific

Department of Basic Sciences & Humanities

Semester Final Examination, Spring-2022

Program: B. Sc. in Engineering (CSE)

(1st Year / 1st Semester)

Course Title: Basic Calculus, Co-ordinate Geometry **Course No:** MTH 101 **Credit:** 3.00
Time: 3.00 Hours. **Full Mark:** 150

There are **Eight** Questions. Answer **Six** questions including Question **1, 2, 3 & 4**. All questions are of equal value. Figures in the right margin indicate marks.

1. (a) Evaluate $\lim_{n\to\infty}\left[\frac{1^2}{n^3+1^3}+\frac{2^2}{n^3+2^3}+\frac{3^2}{n^3+3^3}+\cdots+\frac{n^2}{n^3+n^3}\right]$. **15**

(b) Integrate any TWO of the followings: **10**

(i) $\int\frac{x^2-1}{x^4-x^2+1}dx$ (ii) $\int\frac{dx}{(x+1)\sqrt{x+3}}$ (iii) $\int\frac{dx}{5+4\sin x}$

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

(b) Evaluate the improper integral $\int_0^{\infty}\frac{x}{(x^2+a^2)(x^2+b^2)}dx$. **10**

3. (a) Obtain reduction formula for $\int_0^{\frac{\pi}{4}}\tan^n x\,dx$ and hence evaluate $\int_0^{\frac{\pi}{4}}\tan^6 x\,dx$. **15**

(b) Use the change of variables $u=x-y,\ v=x+y$ to evaluate the integral $\iint_R\left(\frac{x-y}{x+y}\right)dxdy$, where R is the region enclosed by $x-y=0,\ x-y=1,\ x+y=1,\ x+y=3$. **10**

4. (a) Show that **15**

(i) $\Gamma\left(\frac{1}{2}\right)=\sqrt{\pi}$ (ii) $\int_0^1 x^{\frac{3}{2}}(1-x)^{\frac{3}{2}}dx=\frac{3\pi}{128}$.

(b) Evaluate any TWO from the followings: 10

(i) $\int_0^1 \tan^{-1} x\,dx$ (ii) $\int_0^a y^7\sqrt{a^4-y^4}\,dy$ (iii) $\int_0^{\frac{\pi}{2}} \sin^6\theta\cos^3\theta\,d\theta$

5. (a) Find the area bounded by the Cardioide $r = a(1-\cos\theta)$. 10

(b) Find the area above the x- axis, included between the parabola $y^2 = ax$ and the circle $x^2 + y^2 - 2ax = 0$. 15

OR

6. (a) Evaluate $\iint_R e^{xy}\,dA$ over the region R enclosed between $y = \frac{1}{2}x$, $y = x$ and the hyperbolas $y = \frac{1}{x}$ and $y = \frac{2}{x}$. 15

(b) Answer any one from the followings: 10

(i) $\int_0^{\frac{\pi}{2}} \ln\cos x\,dx = \frac{\pi}{2}\ln\frac{1}{2}$ (ii) $\int_0^1 \frac{\ln(1+x)}{1+x^2}dx = \frac{\pi}{8}\ln 2$

7. (a) Evaluate the following double integral 10

$$\int_1^3\int_2^4 (40-2xy)\,dy dx.$$

(b) Evaluate the triple integral 15

$$\iiint_G 12xy^2z^3\,dV.$$

$-1 \le x \le 2$
$0 \le y \le 3$
OR $0 \le z \le 2$

8. (a) Sketch the region whose signed area is represented by $\int_{-2}^{4} |2x-3|\,dx$. 10

(b) Find the natural domain, range and the graph of $f(x) = 2 - \sqrt{2-x}$ showing details of your calculations. 15

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

Final Examination **Spring 2022** **1st Year 1st Semester**

Course Code: CSE 101 **Course Title: Introduction to Computer Science and Programming Methodology** **Credits: 3**

Full Marks: 150 **Duration: 3 Hours**

Instructions:

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

1. a. In the year 1996, Ishtiak purchased his first personal computer (PC). He used a monitor similar to the one shown in **Figure 1**. Later, he upgraded his PC and purchased an LCD monitor. He claimed that this LCD monitor solved the problems of the monitor he used earlier. **[2+4+4 =10]**

Figure 1: Monitor

Based on the above context, identify the first monitor used by Ishtiak and explain its working procedure. Perform a comparative analysis among the two types of monitor mentioned above to support Ishtiak's claim.

b. Write short notes on the following topics: **[5*3=15]**

I. Lifi
II. OCR
III. MIDI
IV. Laser Printer
V. Modem

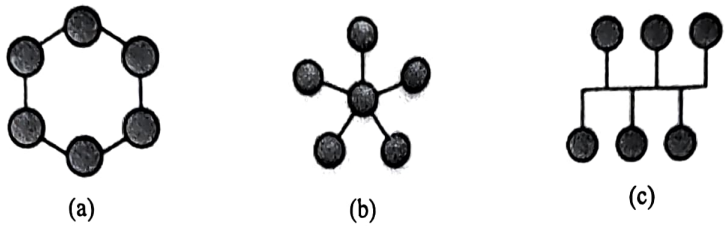
2. a. Tanmoy bought five books from the local bookstore at Nilkhet. The books were: "*The Nightingale*" by Kristin Hannah originally published on February 3, 2015; "*The Secret*" by Rhonda Byrne published on November, 2006; "*Foundation*" by Isaac Asimov published on May, 1942; "*Dear John*" by Nicholas Sparks originally published on October 30, 2006 and "*The Exorcist*" by William Peter Blatty published in the year 1971. The books belonged to the following genre: Historical fiction, Self-help, Science fiction, Romance and Horror respectively. The goodreads rating of the purchased books were 4.6, 3.7, 4.2, 4 and 4.2 **[5*5=25]**

Book Name| published Year| genre| rating

respectively. Organize the mentioned information in a table containing fields and records based on your knowledge of DBMS.

OR

a. Define the term **'Network Topology'**. Identify the network topologies represented in **Figure 2**. Write down their advantages and disadvantages. **[3+4+4+4=15]**



(a) (b) (c)

Figure 2: Network Topology

b. Yeamin installed ADT in his house which is a smart home security app. With his ADT system, he can control lights, door locks, thermostats and even garage doors of his house when he is away. ADT installed smoke alarms, carbon monoxide detectors, and flood sensors as well to ensure safety in case of accidents at Yeamin's place. This smart app is also compatible with Alexa and Google Assistant. Discuss how each fundamental characteristic of IoT is present in Yeamin's smart home security app. **[10]**

3. a. Derive the Boolean expression from the given truth table. Simplify the derived expression and construct the circuit diagram so that you need the least amount of logic gates. **[5+5=10]**

Table 1: Truth Table

Input			Output
A	B	C	x
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	1

~~A B + BC +~~

$ABC + A\bar{B}\bar{C} + A\bar{B}C$

b. Prove the following equations: **[3*5=15]**

I. $(A + \bar{B})(A + C) = A + BC$

II. $AB + \bar{A}B + BC = B$

rds based

iii. $A + \bar{A}B = A + B$

[5*2=10]

4. a. Perform the following operations:
   i. 0110 + 1111 + 1011 + 1110 = ?
   ii. 0110 * 1111 * 0001 = ?

[3*5=15]

b. Perform the following conversion as specified (upto 4 decimal places):
   i. $(3A.4B)_{16} = (?)_8$ 72.2260
   ii. $(84.13)_{10} = (?)_{16}$ 54.2147
   iii. $(1010.0101)_2 = (?)_{10}$ = 10.3125

[15+10=25]

5. a. Suppose you are working with numbers. You have to create a program which will take a number as input from the user and determine whether the number is positive, negative or equal to zero. Illustrate the **flowchart** and **pseudocode** to implement this program.

[15+10=25]

6. a. You have to implement a program where the user will provide an integer input, N. The program will print the sum of the first N positive multiples of 5.

For example:
Sample Input: 5
Sample Output: 75

Design a **flowchart** and **pseudocode** to implement the stated program.

OR

[15+10=25]

a. When a user provides a year as input to a program, the program determines whether the entered number is a leap year or not. Draw a **flowchart** and write a **pseudocode** for this program.

$A + \bar{A}B = A + B$ ——→ Hence

$\Rightarrow A(1+B) + \bar{A}B$

$\Rightarrow A + AB + \bar{A}B$

$\Rightarrow A + B(A + \bar{A})$

$\Rightarrow A + B$

$A = 0 ; \bar{A} = 1$

L.H.S

$0 + 1 \cdot B = B$

R.H.S

$0 + B = B$