KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY
B.Sc. Engineering 3rd Year 2nd Term Examination, 2022
Department of Computer Science and Engineering
CSE 3201
Operating Systems

TIME: 3 hours FULL MARKS: 210

N.B. i) Answer **ANY THREE** questions from each section in separate scripts.
ii) Figures in the immediate right column of the questions indicate full marks.
iii) The rightmost column indicates course outcomes.

SECTION A

(Answer **ANY THREE** questions from this section in Script A)

1. a) An operating system (OS) acts as a 'resource allocator' and a 'control program'. Justify it. Depict how an OS establishes a working environment among components of a computer system. (11) [CO1]
   b) Illustrate the role of 'kernel' and 'firmware' with functionalities of an OS. (09) [CO1]
   c) Depict the environment of a distributed system. Discuss reasons for distributed systems. (07) [CO2]
   d) A distributed OS deploys various migrations. Setup these migrations' requirement elaborately. (08) [CO3]

2. a) 'Failure detection' and 'Recovery' are parts of a distributed system. How are they managed? Also sketch the implementation procedure of Access Matrix. (11) [CO3]
   b) Along with structure, discuss requirements of Distributed File System (DFS). (08) [CO1]
   c) Depict how a boot-sector computer virus affects an OS. (08) [CO2]
   d) Authentication is allied with distributed system. How? Explain how RSA algorithm can resolve the authentication issue? (08) [CO1]

3. a) How do binding of instructions and data happen in memory? Depict and illustrate. (10) [CO2]
   b) To satisfy a request of size n from a list of free holes establish a comparison among 'first-fit', 'best-fit' and 'worst-fit' storage allocation algorithms. Here, n has its usual meaning. (08) [CO2]
   c) Define paging. Discuss the role of page table. Sketch a paging model for a 32-byte memory with 4-byte pages. (10) [CO1]
   d) Explain various program threats. What is masquerading attack? (07) [CO3]

4. a) Every routing strategies of distributed communication has merits and demerits. Analyze them. (09) [CO3]
   b) Explain preconditions and data structure for Banker's Algorithm. Also derive steps of Safety Algorithm. (13) [CO1]
   c) Using appropriate figures, establish relevance between 'Wait-for-graph' and 'Resource-allocation-graph'. (08) [CO3]
   d) How can resource preemption resolve deadlock? Explain. (05) [CO1]

SECTION B

(Answer **ANY THREE** questions from this section in Script B)

5. a) Consider the following systems: (15) [CO4]
      i) Air Traffic Control,
      ii) Communication system like voice over IP,
      iii)Medical System, and
      iv)Multimedia Transmission and Reception.
      To develop the above systems, what will you use among hard and soft real time systems and why?
   b) Explain a standard API function used in Linux systems with its parameters. (10) [CO1]
   c) Compare the Data parallelism and Task parallelism with proper examples. (10) [CO2]

6. a) Suppose, there are two processes named A and B. How does MS-DOS operating system execute the two processes? Briefly describe the steps. (10) [CO4]
   b) Illustrate the Microkernel System Structure briefly. What are the advantages and disadvantages of it? (13) [CO1]
   c) Create a Pthread in C program and describe each of the parameters for creating it. Write down the reasons behind the thread join operation. (12) [CO3]

7. a) How does Ubuntu operating system represent a process? Show with coding and figure. (10) [CO1]
   b) Define Implicit threading and how does it happen using Grand Central Dispatch? (10) [CO2]
   c) An operating system follows Round Robin (RR) technique to schedule the processes. (15) [CO3]
   Evaluate the performances of the RR technique for the following processes where RR uses the time quantum of 4 time units.

Process	Arrival time	Burst time
P_1	9	10
P_2	5	15
P_3	0	9
P_4	13	12
P_5	20	5

   What problem may occur here? And how can operating system solve the problem?

8. a) Interpret the problems that occur in disabling interrupt method for ensuring the mutual exclusion in inter process communication. (10) [CO3]
   b) An OS needs 1 μs to load a frame to processor if it is available in RAM, otherwise it takes extra 4000 μs. Determine the page fault rate if the OS wants to keep the performance degradation greater than 5%. (10) [CO2]
   c) For handling page fault, an OS requires an efficient page replacement algorithm for the reference string: 4 7 0 7 1 0 1 2 1 2 7 1 2. (15) [CO4]
   What should the OS developers choose among Least Recent Used and First in First out algorithms with fixed RAM size of 3?

KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY
B.Sc. Engineering 3rd Year 2nd Term Examination, 2022
Department of Computer Science and Engineering
CSE 3207
Applied Statics and Queuing Theory

TIME: 3 hours FULL MARKS: 210

N.B. i) Answer **ANY THREE** questions from each section in separate scripts.
ii) Figures in the immediate right column of the questions indicate full marks.
iii) The rightmost column indicates course outcomes.
iv) *t*-table, χ^2-table, *F*-table, *z*-table will be provided if required.

SECTION A

(Answer **ANY THREE** questions from this section in Script A)

1. a) Let events $c_1, c_2 \ldots c_n$ form partitions of the sample space S, where all the events have a non-zero probability of occurrence for any event, A associated with S, prove that: (05) [CO1]

$$P(A) = \sum_{k=1}^{n} P(c_k)P(A|c_k)$$

b) Consider the data shown in following table. (20) [CO4]

Day	Outlook	Temperature	Humidity	Wind	Play Tennis
1	Sunny	Hot	High	Weak	No
2	Sunny	Hot	High	Strong	No
3	Overcast	Hot	High	Weak	Yes
4	Rain	Mild	High	Weak	Yes
5	Rain	Cool	Normal	Weak	Yes
6	Rain	Cool	Normal	Strong	No
7	Overcast	Cool	Normal	Strong	Yes
8	Sunny	Mild	High	Weak	No
9	Sunny	Cool	Normal	Weak	Yes
10	Rain	Mild	Normal	Weak	Yes
11	Sunny	Mild	Normal	Strong	Yes
12	Overcast	Mild	High	Strong	Yes
13	Overcast	Hot	Normal	Weak	Yes
14	Rain	Mild	High	Strong	No
15	Overcast	Cool	High	Strong	No

Now,
(i) Apply Bayes' theorem with the naïve assumption of independence to calculate the probability of playing Tennis or not if today Outlook = Sunny, Temperature = Cool, Humidity = Normal, and Wind = Strong.
(ii) Discuss how Zero-Frequency problem can be resolved if it occurs while performing task (i).

c) Explain the descriptive statistics: five number summary with a suitable example. (05) [CO1]
d) How do probability and statistical inference work together? (05) [CO3]

2. a) Explain the relationship among Bernoulli, Binomial, and Poisson distributions and also derive the equation of probability mass function of Poisson distribution. (11) [CO2]
b) Prove that $Var(X) = E(X^2) - \left(E(X)\right)^2$ where, X is a random variable, Var is variance, and E is expected value. Also, derive the equations of expected value and variance for Bernoulli and Poisson distributions. (15) [CO3]
c) Explain why central limit theorem is invaluable in inferential statistics. Suppose you have a dataset with mean = 50 and a standard deviation = 10. Use Chebyshev's inequality to find the minimum proportion of data values within 2.5 standard deviations of the mean. (09) [CO1]

3. a) In a study, the effectiveness of the methods of memorization was to be determined. For this purpose, three groups of 10 students, each randomly selected from a class were taken and each group was made to adopt a particular method of memorization. In the end, the performance was tested. The number of nonsense syllables correctly recalled by the students of these groups is shown in following table. (25) [CO4]

Group1	12	10	11	11	08	10	07	09	10	06
Group2	14	08	19	15	10	11	13	12	09	12
Group3	11	11	13	09	07	05	06	08	07	10

Now, using 5% level of significance perform the followings:

(i) Apply the Analysis of Variance (ANOVA) technique for testing the significance of the difference between group means.

(ii) If (i) shows significant difference then perform *t*-tests to find out pairs of groups that are significantly different from one another.

b) Why regression line can be used for the purpose of predicting? Find linear regression equation for the two sets of data shown in following table. (10) [CO2]

x	02	04	06	08
y	03	07	05	10

4. a) Calculate the coefficient of rank correlation of the scores obtained by eight programmers competing against each other in a programming contest. Also, interpret the result. The scores are shown in following table. (15) [CO4]

Programmer	P1	P2	P3	P4	P5	P6	P7	P8
Judge1Score	15	12	20	16	18	20	26	12
Judge2Score	10	15	11	11	25	18	30	10

b) A scientist wants to know if education level and marital status are related for all people in some country. He collects data on a simple random sample of 300 people, shown in following table. (12) [CO2]

	Highest education level				
Marital status	Ordinary level	Advanced level	Degree	Masters or above	Total
Single	18	36	21	15	90
Married	12	36	45	57	150
Divorced	6	9	9	6	30
Widowed	3	9	9	9	30
Total	39	90	84	87	300

Analyze if we can infer at 5% significance level that the highest education level is associated with marital status.

c) Define Type I and Type II error. What are the important properties of a test of hypothesis? (08) [CO1]

SECTION B

(Answer **ANY THREE** questions from this section in Script B)

5. a) Derive the Chapman-Kolmogorov equation for discrete time Markov chain. (10) [CO3]

b) Consider a game of "ladder climbing". There are 5 levels in the game, level 1 is the lowest (bottom) and level 5 is the highest (top). A player starts at the bottom. Each time, a fair coin is tossed. If it turns up heads, the player moves up one rung. If tails, the player moves down to the very bottom. Once at the top level, the player moves to the very bottom if a tail turns up, and stays at the top if head turns up. (13) [CO1]

(i) Find the transition probability matrix.

(ii) Find the two-step transition probability matrix.

(iii)Find the steady-state distribution of the Markov chain.

c) Determine which of the following chains is "ergodic". (12) [CO1]

$$P_1 = \begin{bmatrix} 0.4 & 0 & 0.6 \\ 0.3 & 0.3 & 0.4 \\ 0 & 0.5 & 0.5 \end{bmatrix} \qquad P_2 = \begin{bmatrix} 0.7 & 0 & 0 & 0.3 \\ 0.2 & 0.2 & 0.4 & 0.2 \\ 0.6 & 0.1 & 0.1 & 0.2 \\ 0.2 & 0 & 0 & 0.8 \end{bmatrix}$$

6. a) A small departmental store has two light bulbs. On average, a light bulb lasts for 22 days (exponentially distributed). When a light bulb burns out, it takes an average of 2 days (exponentially distributed) to be replaced. (12) [CO1]

(i) Formulate a birth-death model of this situation.

(ii) Determine the fraction of the time that both light bulbs are working.

(iii)Determine the fraction of the time that no light bulbs are working.

b) Department of CSE is trying to determine whether to rent a slow or a fast copier. The department believes that an employee's time is worth \$15 per hour. The slow copier rents for \$4 per hour and it takes an employee an average of 10 minutes to complete copying (exponentially distributed). The fast copier rents for \$15 per hour and it takes (11) [CO4]

an employee an average of 6 minute to complete copying. An average of 4 employees per hour need to use the copying machine (interarrival times are exponential). Determine which machine should the department rent.

c) Show that, the variance of L and W_q for an $M/M/1$ queue are: (i) $var[L] = \rho(1-\rho)^2$, (12) [CO3] (ii) $var[W_q] = [\mu(1-\rho)]^{-2}$.

7. a) Define the categories of queuing model with Kendall's notation. (07) [CO1]

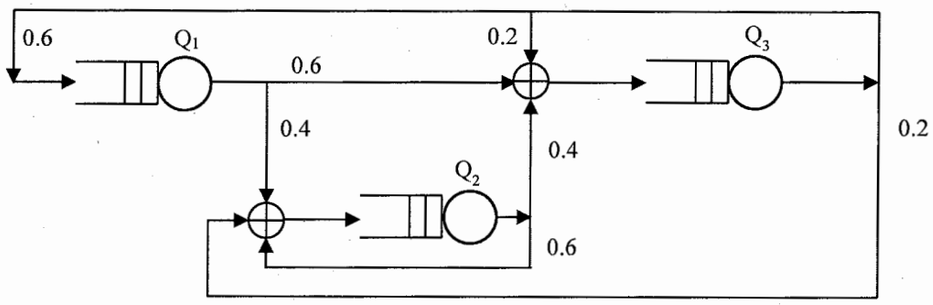
b) Ships arrive at a port at the rate of one in every 4 hours with exponential distribution of interarrival times. The time a ship occupies a berth for unloading has exponential distribution with an average of 10 hours. If the average delay of ships waiting for berth is to be kept below 14 hours, determine how many berths should be provided at the port. (14) [CO4]

c) Consider an $M/G/1/GD/\infty/\infty$ queuing system in which an average 10 arrivals occur each hour. Suppose that each customer's service time follows an Erlang distribution, with rate parameter 1 customer per minute and shape parameter 4. Now, (14) [CO4]

(i) Find the expected number of customers waiting in line.
(ii) Find the expected time a customer will spend in the system.
(iii) What fraction of the time will the server be idle?

8. a) Derive the equation to compute mean response time of an $M/M/1/GD/n/\infty$ queuing system for various traffic intensities. The symbols have their usual meanings. (12) [CO2]

b) Consider the closed queueing network of single server queues with exponentially distributed service times, as shown in the following figure. (23) [CO4]



The average service rates of Q_1, Q_2, and Q_3 are respectively, $\mu_1 = 0.5$, $\mu_2 = 1$, and $\mu_3 = 0.5$. The system has a total user population of 4. Using the convolution approach obtain the followings.

(i) The normalization constant.
(ii) The state probability distribution of the network.
(iii) The actual throughput of each queue.
(iv) The average waiting time of each queue.

Formula Chart

• Queuing Models

Parameters	$M/M/1$	$M/M/s$	$M/M/1/GD/n/\infty$	$M/G/1/GD/\infty/\infty$
π_0	$1-\rho$, $\rho = \lambda/\mu$	$\left(\sum_{j=0}^{s-1}\frac{(s\rho)^j}{j!}+\frac{(s\rho)^s}{s!(1-\rho)}\right)^{-1}$, $\rho = \lambda/(s\mu)$	• $\frac{1-\rho}{1-\rho^{n+1}}$ $for\ \rho \neq 1$ • $\frac{1}{n+1}$ $for\ \rho = 1$	$1-\rho$
π_j	$\rho^j(1-\rho)$	• $\frac{(s\rho)^j\pi_0}{j!}$ for $(j = 1,2,\ldots,s)$ • $\frac{(s\rho)^j\pi_0}{s!s^{j-s}}$ for $(j = s, s+1, s+2, \ldots)$	$\rho^j\pi_0$ $for\ j = 1,2,3,\ldots\ldots,n$ and $for\ any\ \rho$	$\rho^j(1-\rho)$
L	$\frac{\rho}{1-\rho}$	$\frac{\rho}{1-\rho}P_d + s\rho$	• $\frac{\rho[1-(n+1)\rho^n+n\rho^{n+1}]}{(1-\rho^{n+1})(1-\rho)}$ $for\ \rho \neq 1$ • $\frac{n}{2}$ $for\ \rho = 1$	$L_q + \rho$

L_q	$\frac{\rho^2}{1-\rho}$	$\frac{\rho}{1-\rho}P_d$	$L-(1-\pi_0)$	$\frac{\lambda^2\sigma^2+\rho^2}{2(1-\rho)}$
Extra	—	delay probability: P_d $= P(j \geq s)$ $= \frac{(s\rho)^s \pi_0}{s!(1-\rho)}$	Saturation Probability, • $\pi_n = \frac{1-\rho}{1-\rho^{n+1}}\rho^n$ $for\ \rho \neq 1$ • $\pi_n =$ $\frac{1}{n+1}$ $for\ \rho = 1$ • $\lambda_{lost} = \lambda\pi_n$ • $\lambda_{eff} = \lambda -$ $\lambda_{lost} = \lambda(1-\pi_n)$	Erlang Distribution: Mean: k / λ. Variance: k / λ^2, Where k: shape parameter and λ: rate parameter

• Queuing Network

Closed Queuing Network Parameters	• $\pi(\mathrm{n}) = \frac{1}{G(K,m)}\prod_{i=1}^{m}\rho_i^{n_i}$ where $\rho_i = \frac{\lambda_i}{\mu_i}$ • $G(K,m) = G(K,m-1) + \rho_m G(K-1,m)$ $G(0,m) = 1, \quad m = 1,2,\ldots\ldots,M$ $G(k,1) = \rho_1^k, \quad k = 0,1,2,\ldots\ldots,K$ • $L_i = \frac{1}{G(K,M)}\sum_{k=1}^{K}\rho_i^k G(K-k,M)$ • $e_i = \lambda_i \frac{G(K-1,M)}{G(K,M)}$ • $W_i = \frac{L_i}{e_i}$ • $P(n_i \geq k) = \rho_i^k \frac{G(K-k,M)}{G(K,M)}$ • $\rho_{e_i} = \frac{e_i}{\mu_i}$

KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY
B.Sc. Engineering 3rd Year 2nd Term Examination, 2022
Department of Computer Science and Engineering
CSE 3211
Compiler Design

TIME: 3 hours | FULL MARKS: 210

N.B. i) Answer **ANY THREE** questions from each section in separate scripts.
ii) Figures in the right margin indicate full marks.
iii) The rightmost column indicates course outcomes.

SECTION A

(Answer **ANY THREE** questions from this section in Script A)

1. a) "A context-free grammar (CFG) is capable of expressing any construct that can be described by a regular expression (RE)." Why do we use both CFG and RE in compiler design? Explain briefly. (07) [CO1]

b) Consider the following grammar. (20) [CO2]

$$S \rightarrow SaAb|BB$$
$$A \rightarrow aA|AB|c$$
$$B \rightarrow Scd|CD$$
$$C \rightarrow dc|c$$
$$D \rightarrow d$$

i) Eliminate left-recursion from the grammar,
ii) Compute FIRST and FOLLOW sets for all non-terminals,
iii) Build the predictive parsing table,
iv) Determine if the grammar is an LL (1) grammar.

c) Why is intermediate code generation considered an optional phase in compiler design? Explain the problems that might occur if the phase is removed from design. (08) [CO3]

2. a) What is regular definition? Construct the regular definition for unsigned hexadecimal number and draw the transition diagram for it. (Use lowercase letters to represent the numbers) (14) [CO1]

b) Describe how phrase level recovery works in a syntax analyzer. Why is it not recommended to alter the stack in phrase level recovery? (08) [CO2]

c) Consider the following code snippet. (13) [CO3]

```
for(i = 1; i <= 100; i++){
    for(j = i; j<=100; j += i){
        a[j] += 1;
    }
}
```

i) Generate the three-address code,
ii) Represent the three-address code by triples.

3. a) Describe how a compiler differentiate between identifiers and keywords during lexical analysis. (07) [CO1]

b) Consider the following grammar. (18) [CO2]

$$S \rightarrow aAd|bBd|aBc|bAc$$
$$A \rightarrow c$$
$$B \rightarrow c$$

i) Construct the DFA of canonical LR (0) items,
ii) Build the SLR (1) parse table,
iii) Determine if the grammar is an SLR (1) grammar.

c) Suppose, you are designing a compiler that will be used in devices with small memory. Which implementation method will you choose to represent the three-address code? Justify your answer with proper explanation. (10) [CO3]

4. a) Define activation and activation tree. Draw the activation tree for the following program. Assume that the program starts from the main function. (15) [CO3]

```
merge(b,e)
{
    ...
    ...
    ...
}
```

```
merge_sort(b,e){
    if(b>=e) return;
    m = (b+e)/2;
    merge_sort(b, m);
    merge_sort(m + 1, e);
    merge(b,e);
}
```

```
int main(){
    merge_sort(0, 6);
}
```

b) What is backpatching technique? Convert the following code into three-address code applying backpatching technique.

```
i = 10;
sum = 0;
do{
    sum += i;
    i -= 1;
}while(i>10);
```

c) Why do we need to use token attributes to describe tokens? Explain briefly. (08) [CO1]

SECTION B

(Answer **ANY THREE** questions from this section in Script B)

5. a) Define a one pass compiler with example. (10) [CO2]
   b) Design a context free grammar for the following input string maintaining the precedence order as: " − " > " * " > " + " > "/". (15) [CO2]
   c) How is the concept of "dangling else" connected to the ambiguity problem, and what measures can be taken to resolve or prevent ambiguity by addressing the "dangling else" issue? (10) [CO2]

6. a) Differentiate between Syntax Directed Translation and Syntax Directed Definition. (10) [CO1]
   b) Define a type checker. Design type checker for the following segments. (15) [CO4]
      i) Function, (ii) Statements, (iii) Expressions.
   c) Design a type expression for the following code written in C language. (10) [CO4]

```
struct Student {
    int Roll;
    char name[20];
    double CGPA;
}Total[120];
```

7. a) Suppose a target machine is Byte addressable, two-address instruction of the form (15) [CO4]

```
op source, destination
```

Now, calculate instruct cost of the following code segments.

(i)
```
MOV b, R0
ADD c, R0
MOV R0, a
```

(ii)
```
MOV c, R0
SUB 4(R0), *R1
ADD R0, *12(R1)
```

(iii)
```
MOV R0, R1
ADD #20, R1
MOV *8(R1), b
```

   b) Construct the abstract syntax tree and then DAG for the following statements. (10) [CO1]
      (i) $((x+y)-((x+y+z)*(x-y))+((x+y)*(x-y+z)))$,
      (ii) $a+a*(b-c)+(b-c)*d+a$.
   c) Differentiate between "Unreachable code" and "Dead code" with proper example. (10) [CO3]

8. a) Consider the following three address code. (20) [CO3]

1. $i = m-1$	7. $t_2 = 4*i$	13. if $t_5 > v$ goto (10)	19. $x = a[t_7]$
2. $j = n$	8. $t_3 = a[t_2]$	14. if $i >= j$ goto (19)	20. $t_8 = 4*i$
3. $k = p*1$	9. if $t_3 < v$ goto (6)	15. $t_6 = 4*p$	21. $t_9 = 4*j$
4. $p = p+0$	10. $j = j-1$	16. $p = p+1$	22. $t_{10} = 4*p$
5. $v = a[t_1]$	11. $t_4 = 4*j$	17. $t_7 = a[t_6]$	23. $a[t_{10}] = t_9$
6. $i = i+1$	12. $t_5 = a[t_4]$	18. if $t_7 < v$ goto (15)	24. goto (14)

   i) Draw the Basic Block and Flow Graph.
   ii) Apply the optimizations given below and finally show the optimized code.
   "Common Sub-expression Elimination"
   "Dead Code Elimination"
   "Algebraic Simplification"

   b) Consider a machine word addressable, runtime memory location starts at 100, three code segment and their sizes are: A (20 bytes), B (50 bytes), C (80 bytes), their starting location– 200, 500 and 800 respectively. The stack location starts at 1000 and each action size is 5 words. Now, show the runtime memory allocations for the following code segment. (15) [CO4]

```
/* code for A */        /* code for B */        /* code for C */
    action 1                action 3                action 5
    action 2                call A                  action 6
    call B                  action 4                halt
    halt                    call B
                            halt
```

KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY
B.Sc. Engineering 3rd Year 2nd Term Examination, 2022
Department of Computer Science and Engineering
CSE 3217
Mobile Computing

TIME: 3 hours FULL MARKS: 210

N.B. i) Answer **ANY THREE** questions from each section in separate scripts.
ii) Figures in the immediate right column of the questions indicate full marks.
iii) The rightmost column indicates course outcomes.

SECTION A

(Answer **ANY THREE** questions from this section in Script A)

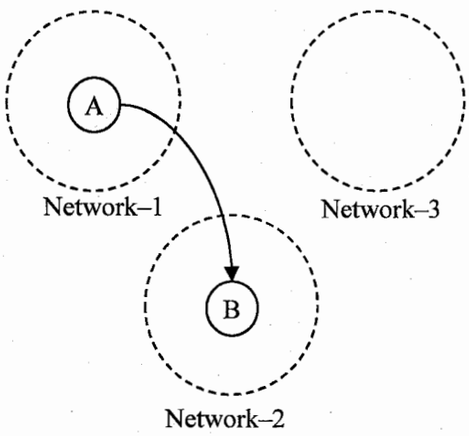
1.	a)	Explain the generations of mobile technology with necessary examples.	(08)	[CO1]
	b)	"Android OS is a combination of several layers" – justify the statement.	(14)	[CO3]
	c)	What are the challenges of mobile computing? Explain the ways to cope with them.	(13)	[CO2]
2.	a)	Define iOS. Briefly explain the iOS architectural layers with necessary figures and explanation.	(13)	[CO1]
	b)	What is Dalvik VM? Briefly explain the Native Libraries and Application Libraries of the Android architecture.	(12)	[CO2]
	c)	"Augmented Reality is changing healthcare for the better" – justify this statement with necessary explanation.	(10)	[CO3]
3.	a)	Suppose your friend wants to buy a smartphone with a Snapdragon 8 Gen 2 CPU and Cortex–X4 SoC. Is he/she searching for the smartphone with the right component names? Justify your answer.	(13)	[CO3]
	b)	Differentiate between CPU and GPU with respect to their applications.	(10)	[CO2]
	c)	What are Ahead–Of–Time (AOT) and Just–In–Time (JIT)? Explain them.	(12)	[CO1]
4.	a)	Define 'User Experience', 'Usability', and 'User Interface'.	(09)	[CO1]
	b)	"A good user interface cannot always ensure good user experience" – justify the statement.	(14)	[CO3]
	c)	Define 'Context–Aware Computing'. What are the key components of 'Context–Aware Computing'? Explain them in brief.	(12)	[CO1]

SECTION B

(Answer **ANY THREE** questions from this section in Script B)

5.	a)	Define Wireless Sensor Network. Describe the characteristics of it.	(10)	[CO1]
	b)	Differentiate between Mobile Adhoc Networks and Vehicular Adhoc Networks.	(10)	[CO3]
	c)	Describe the types of assignment protocols with examples.	(15)	[CO2]
6.	a)	Define Random Backoff Timer. Explain the reservation process in ATMA protocol.	(10)	[CO1]
	b)	"In terms of energy preserving, ADVMAC outperforms both T–MAC and S–MAC" – justify the statement with necessary explanation and diagram(s).	(12)	[CO2]
	c)	Define convergence of technology. How does a converged environment impact on user interest and what measures should be taken to preserve user right?	(13)	[CO3]
7.	a)	Explain the DFWMAC–DCF with RTS–CTS extension protocol for fragmentation mode with necessary explanation and diagram.	(13)	[CO1]
	b)	Illustrate the reasoning behind why traditional energy efficiency mechanisms don't work in cloud environment with appropriate diagram(s).	(10)	[CO2]

c) In the network shown in following figure, originally node A belongs to network–2 and node B belongs to network–3. In the above scenario, describe the data packet transmission process from node A to node B with a detailed explanation and necessary diagram(s). (12) [CO3]



8. a) Briefly explain the features of S–MAC that reduce energy wastage. (10) [CO3]
   b) "VANET is a proper example of Adhoc network" – justify the statement. (12) [CO1]
   c) As a cloud reliability engineer, you are assigned to design a data reliability and consistency system that activates as an after-failure routine. Explain your system with necessary explanations. (13) [CO2]

KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY
B.Sc. Engineering 3rd Year 2nd Term Examination, 2022
Department of Computer Science and Engineering
HUM 3227
Professional Ethics and Moral Thoughts

TIME: 3 hours FULL MARKS: 210

N.B. i) Answer **ANY THREE** questions from each section in separate scripts.
ii) Figures in the immediate right column of the questions indicate full marks.

SECTION A

(Answer **ANY THREE** questions from this section in Script A)

1. a) What is Ethics? Explain the principles of ethics for the engineers. (15)
   b) Comment on the statement: "The highest good is beyond good and evil". (10)
   c) How do you decide 'what is ethical and what is not'? (10)

2. a) Why is ethics necessary for psychological basis? Explain it with example. (15)
   b) How does morality influence our voluntary and involuntary action? (10)
   c) Why should we study engineering ethics? (10)

3. a) What is Egoism? Find out the distinctions between psychological egoism and ethical Egoism. (15)
   b) "There is no absolute moral truth" – discuss the statement in the light of relativism. (10)
   c) What is relativism? What are the advantages and disadvantages of relativism in our society? (10)

4. a) What is Professional Ethics? What are the roles of code of ethics? (10)
   b) What do you mean by Utilitarianism? Explain the view of Bentham about Utilitarianism. (15)
   c) Discuss the problems of freedom of the will. (10)

SECTION B

(Answer **ANY THREE** questions from this section in Script B)

5. a) Illustrate the relationship between organizational commitment and organizational behavior. (12)
   b) To what extent do we learn the ideas of right and wrong from our environment? (10)
   c) Describe the factors related to ethical leadership for moral decision. (13)

6. a) Do you think socialization shape a person's self-image? (05)
   b) Explain different approaches to the concept of moral development. (15)
   c) Describe Kohlberg's stages of moral development with example. (15)

7. a) What is moral situation? What are the characteristics of it? (10)
   b) Describe Piaget's theory of moral development. (10)
   c) Explore the ideas of Socrates and Aristotle with Augustine about how humans become moral being. (15)

8. a) What do you think about the role of individual factors in organizational behavior? (10)
   b) Analyze the Pillars and Factors for being an ethical leader. (15)
   c) "Moral leadership simply responds to what is right over wrong" – discuss. (10)