POSSESSION OF MOBILES IN EXAM IS UFM PRACTICE

Name_____ Enrollment No_____

Jaypee Institute of Information Tec[illegible]ology, Noida

T1 Examination, E[illegible]N 2022
B.Tech VI Seme[illegible] (CSE)

Course Name: Sensor Technology And Android Pro[illegible]mming
Course Code: 21B12CS312

Maximum Marks: 20
Maximum Time: 1 hr

After the completion of the course the students will be able to

[C331-1.1] Understand the sensor, smart sensors and variou[illegible]tform of sensing devices
[C331-1.2] Understand Anatomy of an android developmer[illegible]vironment (IDE) for sensing application
[C331-1.3] Accessing various physical sensors of the And[illegible] devices and its programming
[C331-1.4] Develop various user services/app using Andr[illegible]and sensors

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Note: Attempt all questions

Q1. What is the distinctive property that [illegible]parates MEMS sensors from simple sensors? Describe the manufacturing process of MEMS and list so[illegible] of their uses. [C331-1.1, 3Marks]

Q2. When we try to sense a gas such as C[illegible], what happens within the sensor? What scientific phenomenon is deployed to sense? How do these senso[illegible]ctually work? [C331-1.1, 3Marks]

Q3. How does Biosensors maintains its [illegible]operty to interact with an analyte, allowing it to be stored over long period of time? How does a Biosen[illegible] works and gives results? [C331-1.1, 2Marks]

Q4. What is the significance of transfe[illegible]nction in sensors? How does accuracy and precision differ?
[C331-1.1, 2Marks]

Q5. What functionality/characteristics should smart wearable sensors have? Explain in brief.
[C331-1.1, 3Marks]

Q6. What advantages are provided by shimmer platform for wearable sensor application development? Explain with suitable features of it. [C331-1.1, 3Marks]

Q7. Which wireless protocols are more popular in sensor systems? Mention its advantages and disadvantages [C331-1.1, 4Marks]

POSSESSION OF MOBILES IN EXAM IS UFM PRACTICE

Name: ..... **Enrollment No.:**.....

Jaypee Institute of Information Technology, Noida
T2 Examination, Even Semester, 2022
B.Tech. 6th Semester

Course Name: Sensor Technology and Android Programming **Maximum Marks: 20**
Course Code: 21B12CS312 **Maximum Time: 1 hr**

[C331-1.1] Understand the sensor, smart sensors and various platform of sensing devices.
[C331-1.2] Understand Anatomy of an android development environment (IDE) for sensing application
[C331-1.3] Accessing various physical sensors of the Android device and its programming
[C331-1.4] Develop various user services/app using android and sensors

Note: Answer all questions.

Q1.[C331-1.2]What are the permissions needed for network access? Write down the syntax of such permission and also mention file where to include these permission. [2 marks]

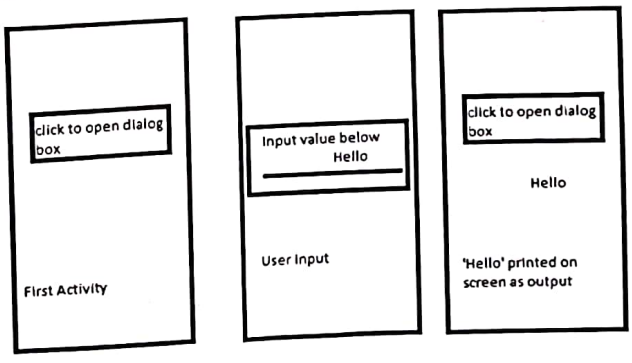
Q2. [C331-1.2] Identify what is happening in the below code. [2 marks]

```
public class FragmentOne extends Fragment {
@Overide
public View onCreateView(LayoutInflater inflater, ViewGroup container, Bundle savedInstanceState) {
return inflater.inflate( R.layout.fragment_one, container, false);
        }
}
```

Q3. [C331-1.3]You are supposed to design an application that continuously fetches the GPS coordinates and prints them on screen. Step by step show the design methodology. Write the main driver class for fetching the GPS location and explain all the functions used. [4 marks]

Q4. [C331-1.3] Write the code snippet to check if your android device supports step detector or not. [3 marks]

Q5. [C331-1.4] For the given GUI for the dialog box creation what is the code required for it? Upon clicking the open dialog button, a dialog box should pop up and take input from the user. This input would then be displayed back at the main activity. [4 marks]



Q6.[C331-1.3] Supose the user wants to use an inbuilt light sensor of android device, how is the user going to get this service and what are the override methods that will be called for sensor listener and sensor value changed? Write the complete syntax for the same. [5 marks]

POSSESION OF MOBILES IN EXAM IS UFM PRACTICE.

Name _____ _____ Enrollment No.____ _____

Jaypee Institute of Information Technology, Noida

End Term Examination, 2022
B.Tech 6th Semester

Course Title: Sensor Technology and Android Programming **Maximum Time: 2Hr**
Course Code: 21B12CI312 **Maximum Marks: 35**

[C331-1.1] Understanding the sensors, smart sensor and various platform of sensing devices
[C331-1.2] Understanding anatomy of an Android development environment for sensing application
[C331-1.3] Accessing various physical sensors of the android devices and its programming
[C331-1.4] Develop various users services/ Composing and sensors.

Note: Answer all questions

Q1. [CO-1, 4M] How to measure the statistical and dynamic characteristics of the sensors? With appropriate input and output explain these characteristics.

Q2. [CO-2, 5M] What are the advantages of using fragment in android program? Give the snippets to create new fragments and possible transactions in it.

Q3. [CO-1, 5M] When did the first version of android open accessory (AOA) was released for tablets and mobile devices? List the features of the three android development kits and its limitation.

Q4. [CO-3, 5M] Explain NFC technology and the data format used by it in mobile devices. Compare RFID with NFC and their different types of tags.

Q5. [CO-3, 5M] Describe the camera API of android in details. You are supposed to design an app that can be used for video recording. Your app opens the camera and allows the user for recording the video. Along with video audio is also recorded.

Q6. [CO-4, 6M] Which API does android uses to extract the information stored within QR codes? You are supposed to build an android application for your company which deals with courier services. Your app must scan the QR code pasted on every parcel and display its content on screen for the worker who will segregate it depending on its destination.

Q7. [CO-4, 5M] Each student is given an app to develop using android sensor. In this regards list down all the methods that are called for hardware and software resources to develop this app. Justify the selection of these recourses with architectural design.

**********GOOD LUCK**********

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POSSESION OF MOBILES IN EXAM IS UFM PRACTICE.

Name _____ Enrollment No._____

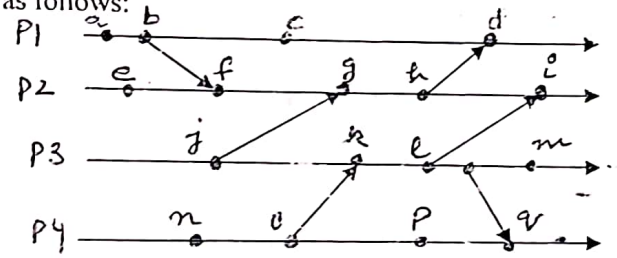
Jaypee Institute of Information Technology, Noida

T1 Examination, 2022
B.Tech VI Semester CSE/ IT

Course Title : Fundamentals of Distributed and Cloud Computing Maximum Time : 1 Hr
Course Code : 21B12CS313 Maximum Marks : 20

CO1: Identify & solve event ordering problems due to synchronization related issues in distributed systems
CO2: Compare Distributed Mutual exclusion and deadlock handling techniques in distributed environments
CO3: Evaluate data consistency, replication and fault related issues in distributed scenarios
CO4: Understand deployment models, cloud service models, characteristics, foundational elements, cloud architecture
CO5: Analyze virtualization techniques, VM provisioning, migration containerization and performance in cloud

Q1. [CO1 3+ 1 marks] a) Calculate the matrix clock timestamps for each event in the system with 4 processes as follows:



b) Show four events (if they exist) in the above diagram with their timestamps for which Lamport's clock cannot capture their causality relationship.

Q2. [CO1 3 marks] Two processes p and q communicate by continually rotating a message in between themselves. At any time, there is only one copy of m in the system. Each process's state consists of the number of times it has received m. At a certain point, p has the message and its state is 12. Immediately after sending m, p initiates the Chandy-Lamport snapshot algorithm. Explain the operation of the algorithm giving the possible global state recorded by it.

Q3. [CO1 2+ 2 marks] a) A group consists of 8 processes, P1 to P8. Initially process 8 was the coordinator but has just crashed and process 2 is the first to notice this. Explain how the next coordinator is selected?

b) Identify the Distributed System (DS) characteristic: (i) A DS allows new components to be integrated with existing components (ii)b) A DS can accommodate more users if required

Q4. [CO2 2+ 2 marks] a) In a system, each process may use critical section many times before another process requires it. Explain why Ricart-Agarwala ME algorithm is inefficient for this case and describe how its performance be improved.

b) A DS may have multiple independent critical regions (CR). Imagine Process 0 wants to enter CR A and process 1 wants to enter CR B. Can Ricart-Agarwala ME algorithm lead to deadlocks?

Q5 [CO2 2 Marks] Raymond's tree based algorithm does not order CS requests based on time. Explain whether the algorithm is fair or not

Q6 [CO2 3 Marks] Show the working of Suzuki-Kazami algorithm in the following scenario: There are 4 processes P1 to P4. Initially the token is with P1 and then P2 and P3 send request to P1. P1 sends token to P2 While P2 is in CS, P1 and P4 broadcast request messages. What will be the contents of various data structures at each step?

POSSESSION OF MOBILES IN EXAM IS UFM PRACTICE

Name.....

Enrollment No. .....

Jaypee Institute of Information Technology, Noida

T- 2 Examination, Even 2022

B.Tech VI Semester

Course Title- Fundamentals of Distributed and Cloud Computing

Course Code-21B12CS313

Maximum Time- 1 Hour

Maximum Marks-20

After pursuing this course the student will be able to:

CO1- Identify and solve event ordering related problems occurring due to various synchronization related issues in distributed systems.

CO2- Compare analysis of distributed mutual exclusion and deadlock handling techniques in distributed environment.

CO3- Evaluate data consistency, replication and fault related issues for various distributed scenarios.

CO4 Understand various deployment models, cloud service models, essential characteristics, foundational elements and enablers, cloud architecture.

CO5-Analyse various virtualization techniques, virtual machine provisioning, migration techniques, containerization and their performance in cloud environments.

Note: Attempt all Questions.

Q.1 [3, CO2] Transaction U, V and W perform operations on a data items X, Y and Z placed at three different servers: X is held by V and requested by W, Y is held by U and requested by V, Z is held by W and requested by U. Can an edge chasing algorithm detect a phantom deadlock? If yes, give an example of how it could happen. If not, justify.

Q.2 [3, CO3] A signal passes through four devices x, y, z and w in sequence and each device is replicated four times. If suppose each device has failed in each stage then how failure masking has been done using physical redundancy.

Q.3 [2+2, CO3] a) Is the memory underlying the following execution of two processes sequentially consistent (assuming that initially all variable are set to zero)?

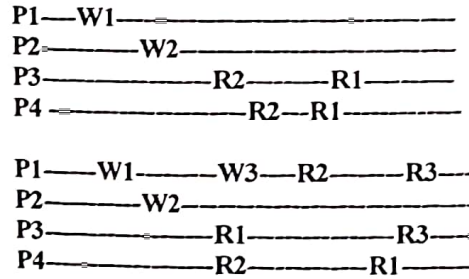
P1: R(x)1; R(x)2; W(y)1

P2: W(x)1; R(y)1; W(x)2

b) Explain why making some replica managers read only may improve the performance of a gossip system while updates are processed by just a few other replica managers.

Q.4 [3, CO3] Consider five processes P1, P2, P3, P4, P5 in a distributed system. At a certain point in time P2 crashes after multicasting the message to P4 and P5. How group communication is performed using reliable atomic multicasting.

Q.5 [3, CO3] Consider the following four executions. We write W1 as an abbreviation for W(x)1, and likewise R2 for R(x)2, where x the variable shared by the four processes P1, P2, P3 , P4. Which of these are sequentially consistent and which one are not? Explain your answer.



Q.6 [1+3, CO3] a) What is the number of consistent answers required to reach Byzantine agreement in 3f+1 nodes and f failures?

b) If an attacker compromises one process in a Byzantine fault tolerant system with 4 processes and then one other process fails, can the attacker stop forward progress in the system?

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POSSESION OF MOBILES IN EXAM IS UFM PRACTICE.

Name _____ _____ **Enrollment No.**_____ _____

Jaypee Institute of Information Technology, Noida

End Semester Examination, Even 2022
B.Tech VI Semester

Course Title: Fundamentals of Distributed and Cloud Computing **Maximum Time : 2 Hours**
Course Code : 21B12CS313 **Maximum Marks : 35**

CO1:Identify & solve event ordering related problems occurring due to synchronisatiom issues in distributed systems
CO2: Compare Distributed mutual exclusion and deadlock handling techniques in distributed environments.
CO3: Evaluate data consistency, replication & fault related issues for distributed systems
CO4: Understand deployment models, cloud service models, essential characteristics, foundational elements, enables and architecture of cloud computing
CO5: Analyse virtualization techniques, VM provisioning, migration techniques, containerization & their performance in cloud environments.

NOTE: Attempt all questions

Q1 [CO1, Marks 3] What problem of Lamport\s clocks do vector clocks solve? Give 2 examples of events concurrent with the vector timestamp (2, 8 , 4).

Q2 [CO2, Marks 3+3] a) You want to select a distributed mutual exclusion algorithm for the scenario: You have 20 low-cost, unreliable computers with varying speeds connected to the same Ethernet switch. When a request for processing a job arrives, it should be assigned to one of these computers, which then processes the job. Exactly ONE computer should handle each request. Which distributed mutual exclusion algorithm would you use? Justify.
b) Compare Lamport's distributed mutual exclusion algorithm with Ricart Agrawala algorithm in terms of correctness, fairness, deadlock freedom and message complexity.

Q3 [CO3, Marks 3+3] a) Processes P & Q access shared variables x and y, initially set as 2.
P: x:=5; print x; print y
Q: y:=5; print y; print x
If sequential consistency is maintained, can {5, 2, 2, 5} be printed? Why or why not?
b) Is it possible to solve Byzantine agreement problem in an asynchronous environment where all processes are correct but messages may be dropped?

Q4 [CO3, Marks 2+3] a) A participant P of a distributed transaction is in the state READY waiting for the coordinator which has crashed. P contacts another participant Q to take a final decision about the transaction. What are the possible outcomes?

b) How does coordinated checkpointing avoid the domino effect?

Q5 [CO4, Marks 2+4] a) How does Virtualization Technology help to achieve complete isolation and consolidation of underlying system resources for virtual machines?
b) How is Instruction Set Architecture (ISA) level virtualization different from Hardware Abstraction Layer (HAL) level virtualization? What are the advantages and limitations of each in terms of flexibility, performance, application flexibility, implementation complexity and application isolation?

Q6 [CO5, Marks 3] Out of virtualization and containerization, which approach is more suitable in each of the following scenarios:
a) a business runs multiple applications that require a dedicated operating system
b) you plan to run short term applications with limited run-times

Q7 [CO5, Marks 3 +3] a) Given a choice between Physical Clusters implementation ad virtual Clusters implementation, which one would you choose? Justify your answer.
b) What is down time of Live Migration of virtual machines? How can it be reduced? Give the complete stages.

Name.....

Enrolment No.....

Jaypee Institute of Information Technology, Noida,
Test-1 Examination, 2021-22
B.Tech. VI Sem, Even Semester

Course Title: Software Engineering
Course Code:15B11CI513

Maximum Time: 01 Hr
Maximum Marks: 20

COURSE OUTCOMES		COGNITIVE LEVELS
C314.1	Explain software engineering principles and software process models for project development.	Remembering (Level 1)
C314.2	Identify functional and non-functional requirements of a software project and design document software requirements specification.	Understand (Level 2)
C314.3	Design, represent and document software requirements specification. Plan and execute activities for a software project.	Create (Level 6)
C314.4	Apply UML modeling for software design from software requirements specification.	Apply (Level 3)
C314.5	Analyze code checklist. Perform code Reviews, Code Refactoring, and Code optimization, design pattern	Analyze (Level 4)
C314.6	Apply testing principles, develop and implement various manual and automated testing procedures, formal methods	Apply (Level 3)
C314.7	Evaluate software in terms of general software quality attributes and possible trade-offs presented within the given problem.	Evaluate (Level 5)

1. [CO314.1] "Agile software development has greater emphasis on interpersonal skills and modify the process according to people and teams and not the other way around". Analyze and explain with the help of lucid examples. (2 marks)
2. [C314.2] "What are the two most widely used technical practices of Extreme Programming (XP). Explain each one of them. (3 marks)
3. [C314.3] Write plausible user requirements for the following functionalities. (3marks)
    1. An unattended petrol (gas) pump system that includes a credit card reader. The customer swipes the card through the reader then specifies the amount of fuel required. The fuel is delivered and the customer's account debited.
    2. The spelling-check and correcting function in a word processor
4. [C314.2] Write a set of Non-functional requirements for the drone system, setting out its expected safety and response time? (2 marks)
5. [C314.1] Which software process model handles the inherent risk in the software development. Explain that model with the help of suitable diagram. (3 marks)
6. [C314.1] Write a user story and its acceptance criteria for Chat system login functionality.(2 marks)
7. [C314.3] Consider the following PERT network: (3+2=5 Marks)

Activity (i-j)	Activity Name	Optimistic Time (T_o)	Most Likely Time (T_m)	Pessimistic Time (T_p)
1-2	A	4	5	6
1-3	B	6	6	6
1-4	C	3	3	4
2-5	D	4	5	5
3-6	E	7	7	8

3-7	F	9	10	11
4-7	G	4	4	5
5-8	H	2	2	3
6-8	I	4	5	6
7-9	J	6	6	6
8-9	K	3	4	5

(i) Draw the network diagram and find the critical path and mean duration of the project.

(ii) Determine the standard deviation of the all-critical activities and total standard deviation of the critical path.

POSSESION OF MOBILES IN EXAM IS UFM PRACTICE.

Name _____ _____ **Enrollment No.**_____

Jaypee Institute of Information Technology, Noida
Test 2 Examination, EVEN 2022
B.Tech VI semester

Course Title: Software Engineering
Course Code: 15B11CI513

Maximum Time: 1Hr
Maximum Marks:20

CO1: Explain software engineering principles and software process models for project development.
CO2: Identify functional and non-functional requirements of a software project and design document software development specification.
CO3: Design, represent and document software requirements specification. Plan and execute activities of a software project.
CO4: Apply UML modelling for software design from software requirements specification.
CO5: Analyze code checklist. Perform code reviews, code refactoring and code optimization and design pattern
CO6: Apply Testing principles, develop and implement various manual and automated testing procedures, formal methods.
CO7: Evaluate software in terms of general software quality attributes and possible trade-offs presented within the given problem.

Note: Attempt all the questions:

[1] A deluxe restaurant in Connaught Place, Delhi functions as follows: When a customer walks into the restaurant, the customer is asked whether he made a reservation or not. The people with reservations are seated as quickly as possible. Those who do not have a reservation are made to wait in a well –furnished waiting room. Before the waiting customer's turn comes or the reservation customer arrives, the table is cleaned and neatly set by a buzzer. When the table is ready, customers walk to their table and call for a waiter.

The waiter shows them a menu card and asks whether they want to order a drink while they decide what to order. If someone orders a drink, the waiter goes and gets it. The waiter allows the customers five to ten minutes for making a selection from the menu. After some time, the waiter comes back to take the orders. Each waiter is allotted an area that consists of several tables. Waiters are rotated through all the different areas. The selections made by the customer are noted down on a form, which the waiter gives to the Chef. The form consists of the table number, selection and time. The time is mentioned for the Chef to prioritize his efforts in terms of when an order has arrived.

The Chef cooks the food and the waiter picks it up and brings it to the table. The people then eat their meals. When the people finish their meals, the waiter comes by and asks whether they want anything else. If they do, the waiter takes their order. If they don't want anything more, he goes and brings the bill. After a few minutes, he comes by and collects the cash or credit cards. Then, after some time the waiter brings the change or credit card receipts. The customer leaves a tip and goes out.

The restaurant management has now decided to provide a technological backbone to the restaurant so that the customers are treated better and served in time. That is, they propose to computerize the restaurant's functioning.

Answer the following:

[a] Identify all the use cases for the waiter, chef and the buzzer. Draw an activity diagram for the restaurant. **[CO4, 3+5]**

[b] Draw a class diagram that shows the relevant object classes, attributes, operations, relationships, and multiplicities. **[CO4, 7]**

P.T.O

[2] Refer to the following code. Refactor it and mention the appropriate technique used. **[CO5, 5]**

```
#include <iostream>
int calculate(int x, int y);
double calculate(double x, double y);
long calculate(long x, long y);
int main()
{
  std : : cout << " A few calculations...\n";
  int x = calculate(1,2)
 double y= calculate(2,3)
 long z = calculate(4,5);
 std :: cout <<" Answers: " <<x <<"  " <<y<<" " <<z<< "\n";
}

 int calculate ( int x, int y)
 {
    int total;
   total  = x+y;
   return(total);
 }

double calculate (double x, double y)
 {
    .....

  }
long calculate( long x, long y)
{
   long total = 0;
   for ( int i=0; i<x; i++)
   {
        total++;
   }
  for(int j=0; j<y; j++)
  {
     total ++;
 }

 return (total);
}
```

Name.....

Enrolment No.....

Jaypee Institute of Information Technology, Noida,
End-Term Examination, 2021-22
B.Tech. VI Sem, Even Semester

Course Title: Software Engineering
Course Code:15B11CI513

Maximum Time: 2 Hr
Maximum Marks: 35

Section A

1. [CO314.1]Explain scrum framework with the help of diagram and also describe its events, practices and artifacts. [5 M]

2. [C314.2]What are different Requirement Elicitation Techniques and in which stage of SDLC they are used? [5 M]

3. [C314.3] A small project consisting of eight activities has the following characteristics: [5 M]

Time – Estimates (in weeks)

Activity	Preceding activity	Most optimistic time (a)	Most likely time (m)	Most Pessimestic time (b)
A	None	2	4	12
B	None	10	12	26
C	A	8	9	10
D	A	10	15	20
E	A	7	7.5	11
F	B,C	9	9	9
G	D	3	3.5	7
H	E,F,G	5	5	5

(i) Draw the PERT network for the project

(ii) Prepare the activity schedule for the project.

(iii) Determine the critical path.

4. [C314.4]Consider the scenario, a new student has to take admission in a university XY. The academic section in the university checks the student record and after verification send the student to Accounts office for fees collection. After fee deposition in the academic office, the student has to complete formalities from hostel office, medical hospital and respective academic department. At hostel office, a room will be assigned to the student after collecting hostel fees. At hospital, the student records the student will be medically examined and record book will be issued to the student. At the academic department, the student will be registered for the certain courses. After completing all the formalities, student will get ID card from academic section. Create the activity diagram for the same. [4 M]

5. [C314.5]Suggest four different ways to reduce coupling in programs. [2 M]

6. [C314.5]A project size of 200 KLOC is to be developed. Software development team has average experience on similar type of projects. The project schedule is not very tight. Calculate the effort, development time, average staff size and productivity of the project. Following are the basic COCOMO co-efficient. [3 M]

Application	a	b	c	d
Organic	2.4	1.05	2.5	0.38
Semi-Detached	3.0	1.12	2.5	0.35
Embedded	3.6	1.20	2.5	0.32

Q.7 [C314.6] Design a cause effect graph for an e-commerce site which give the following discount to the customers. [5 M]

a) A member gets 10% discount for purchases lower than Rs 4000, else 20% discounts.

b) Purchases using HDFC card fetches 10% discount.

c) Purchases using Paytm fetches Rs. 100 cashbacks.

d) If the purchase amount after all discounts after all discounts exceeds Rs 4000/- then shipping is free.

Q8. [C314.7] Consider the following algorithm:

```
public double calculate(int amount)
 {
double rushCharge = 0;
 if (nextday.equals("yes") )
 {
rushCharge = 14.50;
 }
 double tax = amount * .0725;
 if (amount >= 1000)
 {
shipcharge = amount * .06 + rushCharge;
 }
 else if (amount >= 200)
 {
shipcharge = amount * .08 + rushCharge;
 }
 else if (amount >= 100)
 {
shipcharge = 13.25 + rushCharge;
 }
 else if (amount >= 50)
 {
shipcharge = 9.95 - rushCharge;
 }
 else if (amount >= 25)
 {
shipcharge = 7.25 - rushCharge;
 }
 else
 {
shipcharge = 5.25 - rushCharge;
 }
 total = amount - tax + shipcharge;
return total;
} //end calculate
```

a) Draw the flow graph of the given algorithm. [2 M]

b) Determine the cyclomatic complexity of the flow graph. [2 M]

c) Determine the basis set of independent paths. [2 M]

POSSESSION OF MOBILES IN EXAM IS UFM PRACTICE

3

Name: _____ Enrollment No: _____

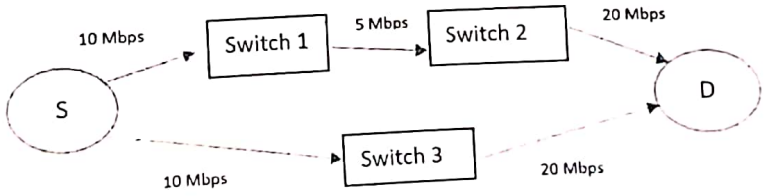
Jaypee Institute of Information Technology
Term-I Examination, 2022
B.Tech Semester-VI

Course Title: Computer Networks & Internet of Things **Max. Time: 1 Hour**
Course Code: 18B11CS311 **Max Marks: 20**

S. No.	Description	Cognitive Level (Bloom's Taxonomy)
CO1	Defining the basics of networking, components and underlying technologies	Remembering (Level 1)
CO2	Illustrate the various key protocols in OSI model and TCP/IP protocol suite and explain various application protocols.	Understanding (Level 2)
CO3	Examine various transport protocols and its performance enhancing mechanisms.	Analyzing (Level 4)
CO4	Determine the shortest path for the network using various routing protocols and evaluate it.	Evaluating (Level 5)
CO5	Choose IP & MAC addressing mechanisms and data link layer protocols to solve communication, error detection and correction problems.	Applying (Level 3)
CO6	Identification and description of various components, architectures and protocols of Internet of Things (IoT) and their real life problems.	Understand (Level 2)

Q1. [CO1] If a network designer wants to connect 90 routers as point-to-point simplex line, then how many total no. of lines required to make a network. **[1 Marks]**

Q2. [CO1] Consider the network given below with 5 links and 3 store and forward switches. The links are equidistant of 2500km and speed is 2.5*108 m/s. Now, if 5 packets of 500 KB each are sent back-to-back with packets 1 to 3 on route 1 (containing one switch:3) and packets 4 to 5 on route 2 (containing two switch:1 & 2) from S to D.



a. What is the total time required to transmit the packets across the given paths (in seconds) for packet and circuit switched network? **[4 Marks]**
b. Suppose packets arriving at switch 2 are further divided into equal smaller packets then is there any change in time elapsed when all the packets received at D? **[1 Mark]**

Q3. [CO2] Consider a http client requesting a html page of size 100KB in a apache web server. The html page contains reference of 4 different images of 500KB each. The client is connected to internet through 10Mbps link whereas one-way propagation delay is 50ms. If the control packets of TCP connection are having negligible size, then **[4 Marks]**

a. How much time it will take to load the page on the client screen (including the images) in http non-persistent, non-parallel connections (exclude the transmission delay of control packets)
b. How long it will take to appear the page on client screen in http persistent connection with out pipelining.

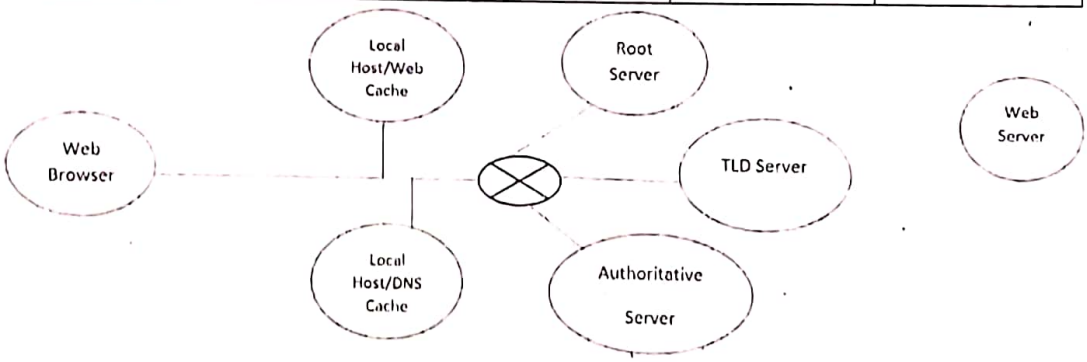
Q4. [CO2] Assume there is an institutional cache in the client's subnet. The client's initial request is stored by this cache. Since news page change frequently the client wants to make sure that it does not get served an outdated HTML page from the cache. Explain the HTTP mechanism that prevents this from happening. Explain with an example containing HTTP requests and responses **[2 Marks]**

Q5. [CO2] What is the application-layer protocol to enable email transfer between the mail servers? Is Email transfer among the mail servers a PUSH or PULL service? **[1 Marks]**

Q6. [CO2] State which resource records are returned in terms of A, NS, CNAME, MX to locate IP address of the web server if the IP address of the URL is not cached in your local host. Consider the Local DNS servers have mapping of canonical host name and IP addresses of TLD and Authoritative Servers in cache and iterative query resolution scheme is used. List the sequence of query request/response messages to obtain the webpage once we click on a link in web browser. **[3 Marks]**

For example:

Number	Request/Reply	Name	Value	Type
1.	..	..	...	.



Q7. [CO3] Answer following questions considering the TCP Header **[2 Marks]**

a. If the value of HLEN field is 1011, How many bytes of options are included in the segment.

b. What can you say about the TCP segment in which the value of the control field is 010001.

Q8. [CO3] In a TCP connection, the initial Sequence Number at the client site is 3742. The client opens the connection, sending two segments carrying 1500 bytes and 2000 bytes of data and closes the connection. What is the value of the sequence number in each of the following segments sent by the client? **[2 Marks]**

a. SYN Segment

b. Data Segments

c. FIN Segment

POSSESSION OF MOBILES IN EXAM IS UFM PRACTICE

Name ..... Enrollment No. .....

Jaypee Institute of Information Technology, Noida
Term-II Examination 2022
B.Tech VI Semester

Course Title: Computer Networks & Internet of Things
Course Code: 18B11CS311

Max. Time: 1 Hour
Max. Marks: 20

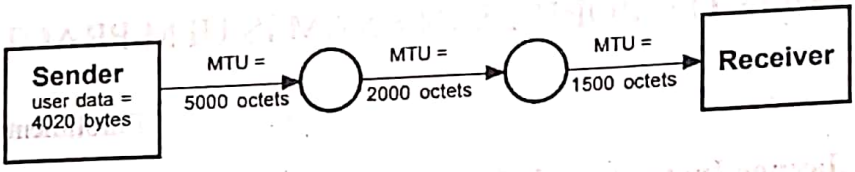
	COURSE OUTCOMES	COGNITIVE LEVELS
CO1	Defining the basics of networking, components and underlying technologies	Remembering (Level 1)
CO2	Illustrate the various key protocols in OSI model and TCP/IP protocol suite and explain various application protocols.	Understanding (Level 2)
CO3	Examine various transport protocols and its performance enhancing mechanisms.	Analysing (Level 4)
CO4	Determine the shortest path for the network using various routing protocols and evaluate it.	Evaluating (Level 5)
CO5	Choose IP & MAC addressing mechanisms and data link layer protocols to solve communication, error detection and correction problems.	Applying (Level 3)
CO6	Identification and description of various components, architectures and protocols of Internet of Things (IoT) and their real life problems.	Understand (Level 2)

Q1. [CO5] You have been appointed as system administrator in a JIIT university and assigned a task to establish a campus network. There are 4 departments and each having the requirement of computers over the network as listed below:

CSE-125, ECE-30, BT-10, Physics-64

The available IP address to be used in the network is **172.1.0.0/18**. Find out the first host IP address, last host IP address, network address, broadcast address, subnet mask and number of wasted IP addresses for each of the departments. **[4 Marks]**

Q2. [CO5] A user record of **4020** bytes (4000 data + 20 IP header) is transmitted over a TCP/IPv4 link as shown below. Show the IPv4 fragments that arrive at the receiver, giving appropriate values for all quantities (Identification, Payload length, Total Length, Fragment Offset, and More Flag) concerned with fragmentation and reassembly. Include the IPv4 headers in your calculation, but not any TCP or similar header. Assume the value for the Identification field as **9876**. **[4 Marks]**



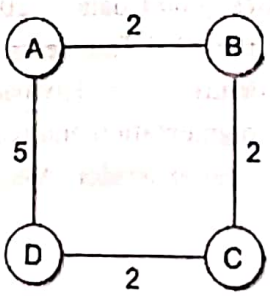
Q3. [CO3] Draw the time-line diagram for the following scenario: **[0.25 x 10 = 2.5 Marks]**

a. The client sends a segment carrying bytes **1401** to **1700**, which arrives at the server site.
b. The server sends an acknowledging the first segment from the client, which arrives.
c. The client sends a segment carrying bytes **1701** to **1900** but the segment is lost.
d. The client sends a segment carrying bytes **1901** to **2100**, but the segment is lost.
e. Time out occurs at the client site.
f. The client resends a segment in response to time-out, this packet arrived.
g. The server sends an acknowledgment after ACK-delaying timer expires.
h. Another time-out occurs at the client site.
i. The client resends a segment in response to time-out, which arrives at the server.
j. The server sends an acknowledgment after ACK-delaying timer expires.

Q4. [CO3] Consider an instance of TCP's Additive Increase Multiplicative Decrease (AIMD) algorithm where the window size at the start of the slow start phase is **2** MSS and the threshold at the start of the first transmission is **8** MSS. Assume that a timeout occurs during the fifth transmission. Find the congestion window size at the end of the tenth transmission and draw the Congestion control diagram. **[3 Marks]**

Q5. [CO3] Consider a network connecting two systems located **4000** Km apart. The bandwidth of the network is 20 Mbps. The propagation speed of the media is $4*10^6$ m/s. It needs to design a **Go-Back-N** sliding window protocol for this network. The average packet size is 10^7 bits. The network is to be used to its full capacity. Assume that processing delays and transmission delay at nodes are negligible.
Calculate the minimum size in bits of the sequence number field. **[2.5 Marks]**

Q6. [CO4] For the network given in Figure below, give global Distance Vector tables like those of when
(a) Each node knows only the distances to its immediate neighbors.
(b) Each node has reported the information it had in the preceding step to its immediate neighbors. **[2 + 2 = 4 Marks]**



POSSESION OF MOBILES IN EXAM IS UFM PRACTICE.

Name _____ Enrollment No._____

Jaypee Institute of Information Technology, Noida
End Term Examination, 2022
B.Tech VI Semester

Course Title : Computer Networks & IOT
Course Code : 18B11CS311

Maximum Time : 2 Hours
Maximum Marks : 35

CO1	Define the basics of Networking, components and underlying technologies.
CO2	Illustrate the various key protocols in OSI model and TCP/IP protocol suite and explain various application protocols.
CO3	Examine various transport protocols and its performance enhancing mechanisms.
CO4	Determine the shortest path for the network using various routing protocols and evaluate it.
CO5	Choose IP & MAC addressing mechanisms and data link layer protocols to solve communication, error detection and correction problems.
CO6	Identification and description of various components, architecture and protocols of internet of Things (IOT) and their real life problem.

Q1. **(CO1)** Suppose over a link of 1 gbps, users are active only 10 percent of the time. Users are generating data at the rate of 200 kbps when active. **[3 Marks]**

a) What is the maximum numbers of users supported in case of circuit switching?
b) Consider population of M users in case of packet switching. Find the formula for probability that more than N users are transmitting simultaneously

Q2. **(CO3)** Consider a client A for which the information of data sent and acknowledgement received are given in table 1 and table 2 respectively. Table 1 contains the information of sequence number of segments, data length of the segments in bytes and timestamp of segment sent by A. Table 2 shows the acknowledgement number and timestamp of received acknowledgement by client A. The timestamp is given in HH:MM:SS format. Draw a neat timeline diagram and calculate the value of measured RTT (RTT_M), Smoothed RTT (RTT_S), RTT Deviation (RTT_D) and retransmission timeout when initial timeout is 6s. **[5 Marks]**

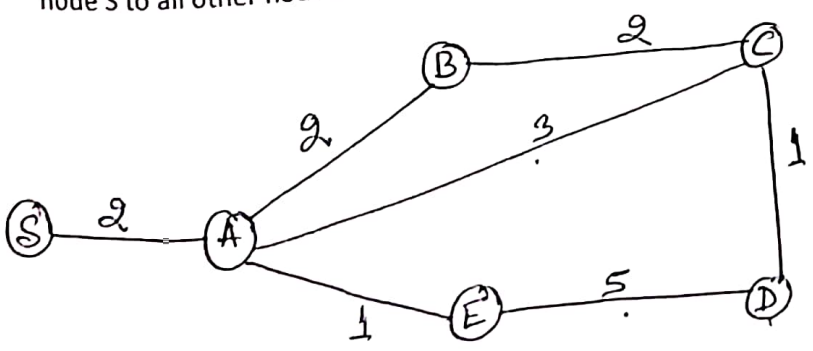
Sequence No.	Data Length	Time Stamp
500	200	00:00:00
700	100	00:00:05
800	200	00:00:11
1000	100	00:00:15
1100	100	00:00:20

Table 1

Ack No.	Time Stamp
700	00:00:07
800	00:00:10
1000	00:00:16
1100	00:00:21
1200	00:00:28

Table 2

Q3. **(CO4)** Consider the network below. Use link state routing algorithm to find out the shortest path from node S to all other nodes. Also find the cost of each path. **[3 Marks]**



Q 4. **(CO5)** Suppose 6 active nodes (N1, N2, N3, N4, N5, N6) are competing for access to a 1 Mbps channel using Slotted ALOHA. What is the throughput if each node is sending 10 frames per second & each frame is 1000 bits long? **[3 Marks]**

Q 5. **(CO5)** Suppose two nodes P & Q each having 500 bit frame to send each other attached to 1 Km long cable. 20 Mbps CSMA/CD LAN having propagation speed 200 m/s. Next, P starts transmission at t=0 & Q at t=2. After first collision P draws K=0 & Q draws K=1 in exponential back-off process **[5 Marks]**

a) At what time both detect collision (in seconds)?
b) At what time both finish sending jamming signal (in seconds)?
c) How much data has been sent by both the stations before detecting collision (in seconds)?
d) At what time does P's frame fully received at Q (in seconds)?
e) What is efficiency of CSMA/CD in above scenario?

Q 6. **(CO5)** Using Hamming to encode the binary word 11011 using even parity. Show what data is received by the receiver if the 3rd bit from right is flipped, also show the process applied by the receiver to detect & correct the error. **[4 Marks]**

Q 7. **(CO5)** While using CRC Generator 1101 for error detection, the data received by the receiver is 11010101. Find out whether receiver will accept or reject the data? **[2 Marks]**

Q 8. **(CO6)** Explain the following with working example. **[3 Marks]**

a) Describe various components LoRaWAN
b) How LoRaWAN is different from 6LoWPAN?

Q 9. **(CO6)** Describe the terms Machine-to-Machine (M2M) over IOT. Can M2M alone, realize the ubiquitous environment in daily life? Explain in Detail. **[3 Marks]**

Q 10. **(CO6)** Consider IOT reference architecture, explain the following **[4 Marks]**

a) Design and Describe the functional model of IOT.
b) Is it possible to develop IOT model without Device Manager and Identity & Access Management? Explain in detail.