**FRAGE 1 VON 78**

**DLMCSNDS01\_Offen\_leicht/Unit 01**

1. **How many key components are there for digital data transfer?**
2. **Name and describe them briefly.**

There are the following five key components of digital data transmission. (1 point)

Message: it is the data or information to be conveyed between the communicating devices. Sender: it is the device that transmits the message.

Receiver: it is the device that receives the message.

Link: it is the physical medium of communication through which the message is conveyed from sender to receiver.

Protocols: these are standardized mechanisms that assist the communication.

(1 point each per component)

**FRAGE 2 VON 78**

**DLMCSNDS01\_Offen\_leicht/Unit 01**

**List the basic steps of digital data transmission. List at least six steps in correct order.**

Message forming, source encoding, header bit (encapsulating message), encryption, channel encoding, multiplexing, modulating, transmission, reception, demodulating, demultiplexing, channel decoding, decapsulation, decryption, source decoding

(1 point each, max. 6)

**FRAGE 3 VON 78**

**DLMCSNDS01\_Offen\_mittel/Unit 01**

1. **Suppose a link capacity is 2 Mbps and a sender is transmitting at 200 kbps then what is the link utilization? Indicate your calculation path.**
2. **If the sender transmits at 3 Mbps then what is the link utilization?**
3. **Link utilization = 200 kbps/ 2 Mbps = 10% (3 points)**
4. **Data transfer rate is > capacity so link utilization is 100% (3 points)**

**FRAGE 4 VON 78**

**DLMCSNDS01\_Offen\_mittel/Unit 01**

**If the channel capacity is 2 Mbps and the transmission rate is 1000 kbps then what is the throughput in Mbps?**

**If the transmission rate is increased to 5 Mbps then what is the throughput in kbps?**

1 Mbps (3 points)

2000 kbps (3 points)

**Suppose, the distance between sender and receiver is 300 km and they are connected wirelessly. Consider the packet size is 16kb and data transmission rate is 8Mbps. If the processing delay is 0.0 second and queuing delay is 0.0 second then calculate**

1. **transmission delay,**
2. **propagation delay,**
3. **total delay.**
4. **Define transmission delay.**
5. **Define propagation delay.**
6. **Define queuing delay. Indicate your calculation path.**
7. **Transmission delay = L/R = 16kb / 8Mbps = 0.002 s (3 points)**
8. **Propagation delay = D/S = 300km / (3x10^8 m/s) = 0.001 s (3 points)**
9. **Total delay = Transmission delay + Propagation delay + Processing Delay + Queuing delay**

= L/R + D/S + 0 + 0 = 16kb / 8Mbps + 300km / (3x10^8 m/s) = 0.003 second (3 points)

1. **Transmission delay is the time a transmitting node takes to transmit a data packet. If the packet length *L* and the data transmission rate is *R* then the propagation delay is L/R. (3 points)**
2. **The propagation time is known as propagation delay which is proportional to the distance between the sender and receiver. If the distance is *D* and propagation speed is *S* then the propagation delay is D/S. (3 points)**
3. **When a packet arrives at the connecting device then packet needs to wait at the buffer queue until all previous packets are being processed. This wait time at the buffer queue is known as the queuing delay. (3 points)**

**Suppose, the distance between sender and receiver is 300 km and they are connected wirelessly. Consider the packet size is 8kb and data transmission rate is 16Mbps. If the processing delay is 0.01 second and queuing delay is**

* 1. **second then calculate**
		1. **transmission delay,**
		2. **propagation delay,**
		3. **total delay.**
		4. **Define transmission rate.**
		5. **Define link capacity.**
		6. **Define link utilization. Indicate your calculation path.**
1. **Transmission delay = L/R = 8kb / 16Mbps = 0.0005 s (3 points)**
2. **Propagation delay = D/S = 300km / (3x10^8 m/s) = 0.001 s (3 points)**
3. **Total delay = Transmission delay + Propagation delay + Processing Delay + Queuing delay**

= L/R + D/S + 0.01 + 0.1 = 8kb / 16Mbps + 300km / (3x10^8 m/s) + 0.01 + 0.1

= 0.1115 second = 1115 ms (3 points)

1. **Transmission rate is the number of bits per second a sender transmits or releases at the physical medium. (3 points)**
2. **Link capacity is the maximum number of bits a link can carry per second. (3 points)**
3. **Link utilization is the ratio of the number of bits a link is currently carrying and the channel capacity. (3 points)**

**FRAGE 7 VON 78**

**DLMCSNDS01\_Offen\_leicht/Unit 02**

1. **How many layers are there in OSI model?**
2. **Write down the names of top 5 layers of OSI model.**
3. **There are seven layers in OSI model. (1 point)**
4. **Application, presentation, session, transport, and network (1 point each)**

**FRAGE 8 VON 78**

**DLMCSNDS01\_Offen\_leicht/Unit 02**

**Define port no., MAC address, IP address, and socket address.**

Port number: a Port Number is 16-bit number which addresses an application program installed on sending or receiving end node. (1.5 points)

MAC address: a MAC address is 48-bit number that indicates the link layer device of an end a network node. (1.5 points)

IP address: an IP is a 32-bit number which indicates an end device. More specifically, it indicates the operating system of the end node. (1.5 points)

Socket address: is a combination an IP address and a port number. (1.5 points)

**FRAGE 9 VON 78**

**DLMCSNDS01\_Offen\_mittel/Unit 02**

**What are the client and server socket address of a DHCP discovery message?**

Client socket = (source IP, port) = (0.0.0.0, 68) (3 points)

Server socket = (destination IP, port) = (255.255.255.255, 67) (3 points)

**FRAGE 10 VON 78**

**DLMCSNDS01\_Offen\_mittel/Unit 02**

**Consider the following CIDR notation 192.168.0.4/20 .**

1. **How many bits are subnet bits?**
2. **How many bits are host bits?**
3. **20 bits (3 points)**
4. **12 bits (3 points)**

**Define**

1. **subnet,**
2. **CIDR notation,**
3. **subnet bits,**
4. **host bits and**
5. **masking.**
6. **How many hosts could be accommodated in the following subnet? 192.168.0.4/20**
7. **The network that connects to the internet through a common router port is called subnet.**
8. **The IP address of a subnet host is usually denoted by the following CIDR (Classless Interdomain Routing) notation a.b.c.d/e. , where e indicates that the subnet mask contains e bits.**
9. **The CIDR notation a.b.c.d/e, e indicates that the first e bits are subnet mask bits.**
10. **In the CIDR notation, the right most (32-e) bits are called host bits.**
11. **The IPs of a subnet follows a common pattern. Basically, first e bits of the IPs are same. This is known as masking.**

f. 2^(32-20) - 2 = 2^12 - 2 = 4094

(3 points each)

1. **What does CRC stand for?**
2. **What is the use of CRC?**
3. **At which layer CRC is applied?**
4. **Suppose D = 11001010, G = 1011, then calculate R using CRC. Indicate your calculation path.**
5. **What size of R is used in a data link layer frame?**
6. **What happens if bit error is detected in data link layer?**
7. **Cyclic Redundancy Check**
8. **Detecting bit error**
9. **Link layer**
10. **Size of R is 3 bits since size of G is 4 bits. So, R = remainder of (D'/G) , D' = D padded with 3 zeros. Hence, R = 101**
11. **32 bits**
12. **Received packet is dropped**

(3 points each)

**FRAGE 13 VON 78**

**DLMCSNDS01\_Offen\_leicht/Unit 03**

**Define circuit switching and packet switching.**

In a circuit switching technology, the communicating nodes are connected through a dedicated link.

In a packet switching network there is no dedicated path between sender and receiver. Packets from a same source can take different paths to reach to the destination.

(3 points each)

**List six names of the organizations who maintain internet standards. (Note: abbreviations do not get full points)**

Internet Society (ISOC), Internet Architecture Board (IAB), Internet Engineering Task Force (IETF), Internet Research Task Force (IRTF), Internet Assigned Numbers Authority (IANA), Internet Corporation for Assigned Names and Numbers (ICANN), Internet Engineering Steering Group (IESG), Internet Research Steering Group (IRSG).

(1 point each max. 6)

**FRAGE 15 VON 78**

**DLMCSNDS01\_Offen\_mittel/Unit 03**

**How many layers does TCP/IP model have? Which layers of OSI are absent in TCP/IP? Name four layers of TCP/IP.**

TCP/IP protocol stack has five layers. (2 points)

TCP/IP model Presentation and session layers are absent in TCP/IP protocol stack. These two layers lay between application and transport layers in OSI model. (2 points)

Four layers of TCP/IP stack are application, transport, network, link.

(0.5 points each)

1. **What is the difference between SMTP and POP3 protocols?**
2. **What is the difference between POP3 and IMAP4 protocols?**
3. **SMTP is used to forward email from client to email server or email server to email server. SMTP operates on TCP port no. 25.**

POP3 is used to retrieve email to the receiver’s computer or system from the email server. First, the client establishes a TCP connection on port 110 then send username and password for authentication process. After passing through the authentication process the client would be able to see the received email list. POP3 allows to delete or keep an email after retrieving it.

1. **Like POP3 IMAP4 is also used for retrieving email from server. However, unlike POP3 IMAP4 allows to organize emails in directories or folders. It also allows searching option. IMAP4 uses port 143 or 993 for secured TCP connection.**

(3 points each)

1. **What is IP?**
2. **What are the two main versions of IP and how do they differ?**
3. **Describe the purpose of the following supplementary protocols of TCP/IP protocol suite:**

**DHCP, ARP, ICMP, IGMP**

1. **IP is the network layer protocol of TCP/IP protocol suite. (3 points)**
2. **IP has two versions IPv4 and IPv6. IPv4 uses 32-bit network layer address while IPv6 uses 128-bit network layer address. (3 points)**
3. **DHCP: when a new device come to a network, initially it does not possess any IP address. The IP address can be setup by manually or automatically. DHCP is the protocol to setup IP address automatically to a new device to a network.**

ARP: actually works below IP protocol. The purpose of this protocol is to translate network layer address to link layer address that means this protocol retrieves the MAC address of a device based on its IP address.

ICMP: is an integral part of IP. ICMP provides error reporting about datagram processing, for example, if a datagram is not delivered, if a gateway does not have enough buffer space to process the datagram, if the gateway has a better route to redirect the data etc.

IGMP: provides group membership reporting for multicasting services. The IP host uses this protocol to report the immediate multicast router about multicast group membership.

Nowadays, an updated version of IGMP called IGMPv2 is used. (3 points each)

1. **Write down four services provided by a data link layer.**
2. **Describe the purpose of the following link layer protocols RARP, DRARP, NDP.**
3. **Is there any difference between link layer and data link layer?**
4. **Frame formation, error detection, media access control, and flow control. (2 points each)**
5. **RARP (Reverse Address Resolution Protocol): is opposite to ARP. In ARP, unknown MAC address is searched based on known IP address. On the other hand, in RARP, unknown IP address is searched based on known MAC address. An updated version of RARP is called DRARP (Dynamic RARP).**

NDP (Neighbor Discovery Protocol) is a link layer protocol of TCP/IP protocol suite with IPv6. NDP is used to gather network information such as discovering presence of nodes, finding routers, finding reachability information of the routes to the neighbor nodes, etc. (3 points each)

1. **No. (1 point)**

**FRAGE 19 VON 78**

**DLMCSNDS01\_Offen\_leicht/Unit 04**

1. **What is Apache server?**
2. **What is the difference between client and server?**
3. **Apache Server is an opensource HTTP server for modern operating systems including UNIX and Windows. (3 points)**
4. **Client sends request to server to receive services. A server waits to receive requests from clients and provides requested services. (3 points)**

1. **What is WireMock?**
2. **What is microservice and what is its function?**
3. **WireMock is a mock server which can be used for testing microservices. (3 points)**
4. **Microservice is an emerging distributed software architecture. The microservice architecture develops software application as a collection of small independent services where each service executes its own independent process. The processes are heterogenous which means they can be developed using different languages, they may have own data structure, may have own separate centralized management. (3 points)**

**FRAGE 21 VON 78**

**DLMCSNDS01\_Offen\_mittel/Unit 04**

**Name three types of cloud services and give an explanation for each.**

Software as a Service (SaaS): means end user applications. These applications are deployed and maintained by the service provider. The end user does not need to worry about the infrastructure, platform or underlying maintenance of the applications or software service. End user simply consumes the specific ready product i.e., software he is interested in.

Platform as a Service (PaaS): provides remote access to the desired platforms such as operating systems or hardware. It allows the user to install applications on the preferred platform.

Infrastructure as a Service (IaaS): provides the most flexible cloud services. It provides basic networking facilities, hardware virtualization, and storage services.

(2 points each)

**List six benefits of SOA.**

Leveraging existing assets.

Easier Integration of new features on top of existing assets. Easier management.

Faster adaptability with new features. services or technology. Enabling reuse of existing assets.

Reduced implementation cost.

(1 point each)

**FRAGE 23 VON 78**

**DLMCSNDS01\_Offen\_schwer\_F2/Lektion 04**

**What is a cloud?**

**Write down five properties of clouds.**

Cloud means a remote storage or computing platform provided by a third party which is remotely accessible over Internet. Basically, clouds are remote database centers that provide various services over Internet. Though logically the cloud is a centralized infrastructure, practically it is distributed over a group or cluster of servers called data centers. (3 points)

On-demand: a cloud computing system should be able to provide the recourse of services to an authorized user in on-demand basis.

Broad Access: the cloud should be accessible from multiple locations and multiple platforms such as desktop PCs, laptops, smartphones, Windows OS, MAC OS, Android OS, etc.

Resource Pooling: The cloud provider should be able to pool resources in a shared manner among customers or consumers of various hardware or software specifications.

Rapid Elasticity: the provider should be able to provide scalable services to the consumers based on their demand.

Measured Service: the cloud provider should be able to monitor and meter the provided service or resources to a consumer.

(3 points for each property)

**FRAGE 24 VON 78**

**DLMCSNDS01\_Offen\_schwer\_F2/Lektion 04**

1. **Write down three benefits of heterogenous web services.**
2. **Describe five key characteristics of web services.**
3. **Heterogenous web services are**
	1. **independent of programming language,**
	2. **independent of operating systems,**
	3. **independent of hardware specification**
	4. **and provides loose coupling between consumer and prover.**

(1 P each, 3 points max.)

1. **Key characteristics of web services:**

Self-contained a basic client application developed by XML or HTTP should be enough, no additional application would be needed. On the server side, the basic web server application and a servlet engine would be enough.

Self-describing client and server applications only needs the knowledge about the format and content of request and response message.

Modular web services are deployed over web using J2EE, CORBA, DCOM, and other technologies to ensure heterogeneity.

Language independent and interoperable client-server applications are compatible irrespective to the programming language.

Based on open standards such as XML, SOAP, UDDI, WSDL etc.

Composable a basic web service can be used as the basis to aggregate complex services.

Web services are dynamic.

(3 points each, max. 5 characteristics)

1. **Define what a system call is.**
2. **What is the purpose of Listen() system call for client-server interaction?**
3. **System call is a term in computer programming which means calling a function or system program of an operating system. (3 points)**
4. **The server machine and process are always kept active, and it waits passively to listen requests from a client. This is done by implementing a function or system call called e.g., Listen(). (3 points)**

**FRAGE 26 VON 78**

**DLMCSNDS01\_Offen\_leicht/Unit 05**

**Differentiate between little endian and big endian.**

Little-endian is an order in which the least significant value is stored in the lowest address space. Big endian is an order in which the most significant value is stored in the lowest address space. (3 points each)

**Define marshalling and unmarshalling.**

Marshalling is the process of encapsulating a parameter. The purpose of the marshalling is to represent a data in a neutralized format. For example, some computers (e.g., Intel Pentium) write data in each byte from right to left called little endian, some other computers (e.g., older ARM processors) write left to right called big endian. Hence, during RPC the data has to be represented in a neutral format that is translate-able to all types of machines. The goal of marshalling is to represent the parameter values in neutral format.

Unmarshalling the goal of unmarshalling is to converting data from neutralized format to desired format.

(3 points each)

**FRAGE 28 VON 78**

**DLMCSNDS01\_Offen\_mittel/Unit 05**

**Differentiate between deadlock and starvation.**

Starvation is a situation when a process unfairly waits for a shared resource while other processes keep progressing.

Deadlock is a situation when causally related processes wait for each other, hence no one can progress.

(3 points each)

1. **What is data centric consistency?**
2. **Describe three data centric consistency models.**
3. **What are the three criteria to characterize inconsistency?**
4. **Data centric consistency model is mainly a contract between server process and data store. As long as the process operates following the rules the memory performs correctly. (3 points)**
5. **Description of three data centric consistency models:**

Sequential consistency: was introduced for multi-process systems with shared memory. A shared memory or data store is sequentially consistent if the read and write operations of multiple processes are performed sequentially by following the preferred order specified in the program’s algorithm.

Causal consistency: is a modification of sequential consistency. Two events are said to be causally related if occurrence of an event depends on another event. Suppose process p1 performs the event e1 which writes a data x. process p2 performs the event e2 which reads the data x. If e2 is performed before e1 then the reading of x will be erroneous. Two events are called concurrent events if they are not causally related.

Causal consistency writes the causally related events in a specified order in a single machine or in multiple distributed machines. The order of concurrent events may have different order on different machine.

Eventual consistency in a large-scale distributed system if data stores do not experience updates for a long time, then all stores become consistent eventually i.e., all stores contain same data. This type of consistency is known as eventual consistency. (3 points each)

1. **i) deviation in numerical values between replicas**
	1. **deviation in staleness between replicas, and**
	2. **deviation in the ordering of update information.**

(2 points each)

1. **What is the focus of data-centric consistency and client-centric consistency?**
2. **Describe four client centric consistency models.**
3. **Data-centric consistency focuses on maintaining global consistency which means it makes replicas consistent for various users. On the other hand, a client-centric consistency focuses on maintaining local or individual consistency. It means the replicas will be consistent on distributed nodes for only the individual client. (3 points each)**
4. **Monotonic read consistency ensures that once a process has seen the updated value of a data, it will never see an older value of that data. Example, email data base. Individual email mailbox can be installed on multiple machines. Once a new mail is included in the mailbox not necessarily all the machines update the mailbox immediately. Once the user logs in and demands to check the mailbox only then the mailbox of that device updates. Monotonic write consistency: it means if the client performs write operation, then before updating the data first it will check if there was any other write operation prior to this performed on a different machine.**

Read your writes consistency: it means the write operation will be completed before read operations irrespective to whichever node has performed the writing operation.

Writes follow reads consistency: it implies any consecutive write operation by a client process on a data will be performed on a replica that is updated with the value most recently read by the client process. (3 points each)

**FRAGE 31 VON 78**

**DLMCSNDS01\_Offen\_leicht/Unit 06**

1. **Explain what distributed ledger is.**
2. **Is distributed ledger based on client-server architecture? Why?**
3. **A distributed ledger is a shared database deployed over a decentralized, distributed network that can be accessed from multiple machines from different geographical places, different machines with various hardware specifications, and different operating systems. (3 points)**
4. **No. Since, distributed ledger is a decentralized and distributed technology hence it is primarily built on P2P network architecture instead of client-server architecture. (3 points)**

**Describe public and private distributed ledger.**

Public ledger is transparent and public hence anyone can update the ledger state through transactions. Public ledger may raise privacy concerns for certain data.

Private ledger unlike public ledger, not everyone is allowed to update ledger state through transactions. Only a group of authorized entity are allowed access and update the ledger state. Private ledger preserves data privacy.

(3 points each)

**FRAGE 33 VON 78**

**DLMCSNDS01\_Offen\_mittel/Unit 06**

1. **What is IoT?**
2. **Describe an IoT microchip hardware platform.**
3. **One of the biggest outcomes of ubiquitous or pervasive computing is internet of things known as IoT. Traditional internet connects computers. On the other hand, IoT connects not only computers but also a wide variety of electronics such as home appliances, handheld devices, sensors, switches, actuators etc. Since IoT connects many other things besides computers hence it is called internet of things. (3 points)**
4. **ESP8266 is a IoT hardware platform which is in fact a WiFi based SoC (System on Chip) with a 32-bit microcontroller. It has a processing speed of 80 MHz or 160 MHz. This is compatible with Arduino programming environment. (3 points)**

**List six names of DLT protocol stack layers.**

Application layer, contract layer, consensus layer, network layer, data layer, and device layer.

(1 point each)

**FRAGE 35 VON 78**

**DLMCSNDS01\_Offen\_schwer\_F2/Lektion 06**

1. **What is DLT?**
2. **Describe contract, consensus, network, data, and device layers of DLT protocol stack.**
3. **A Distributed Ledger Technology (DLT) is distributed decentralized network infrastructure where a database is deployed over multiple distributed machines and there is not central authority of maintain the database. DLT provides a platform for developing decentralized and distributed applications for registering, sharing, and synchronizing transactions on digital. (3 points)**
4. **Contract Layer: smart contracts are computer protocols that define a set of rules about state transitions and corresponding actions. Smart contracts are executed automatically on each node, for example Ethereum. Each contract has its own set of assets and states with a unique address. Smart contract can execute polynomial computational tasks. In other words, smart contracts provide platform to build business application such cryptocurrencies. Consensus Layer: Consensus layer deals with distributed consensus in order to ensure the trustworthiness of a block. It also ensures that all nodes consistent ledger copy. Due to network faults, delay, or malicious nodes there might be disagreement between network nodes, consensus layer aims to resolve these disputes.**

Network Layer: The goal of the network layer is to provide distributed network architecture. It is done through forming a P2P network based on communication protocols.

Data Layer: data layer collects data from the lower layer through transactions and encapsulates it with data layer headers. It also digitally signs the data for authentication and integrity purposes.

Device Layer: This layer represents the hardware or physical devices such as sensors, actuators, and networking hardware which are connected wired and wirelessly by maintaining communication protocols.

(3 points each i.e., 3x5=15)

**FRAGE 36 VON 78**

**DLMCSNDS01\_Offen\_schwer\_F2/Lektion 06**

**Write down six key properties and a short explanation each of distributed ledger technology.**

Decentralized: DLT is implemented based on decentralized architecture hence there is no central authority. This architecture protects from single point failure, single point security attack, also it is a protection against tempering by single party.

Distributed: the resources of DLT are distributed on multiple machines. These resources include both software and hardware resources.

Immutability: the actions and transactions on a device can be traced and audited by a ledger. Irreversibility: the ledger transaction activities are irreversible after a certain period of time.

Data consistency: DLT ensures consistency of ledger data stored in distributed storage. Data provenance each transaction is digitally signed by public key cryptography which ensures the authenticity of the data source.

Distributed consensus: DLT is distributed, decentralized hence it does not rely on any centralized or third party authority. It follows consensus algorithms in order to come to an agreement about a data.

Accountability and transparency since DLT preserves authenticity, immutability, irreversibility, and provenance hence it promotes accountability and transparency of transactions.

(3 points each, max. 6 properties)

**FRAGE 37 VON 78**

**DLMCSNDS01\_MC\_leicht/Unit 01**

**Which of the following is a key component of digital data transmission?**

**Wählen Sie eine Antwort:**

**Protocols**

**Data integrity Cryptography DHCP**

**Die richtige Antwort lautet: Protocols**

**Which of the following is not a network node?**

**Wählen Sie eine Antwort:**

**Router**

**Twisted pair cable Client computer Server computer**

**Die richtige Antwort lautet: Twisted pair cable**

**FRAGE 39 VON 78**

**DLMCSNDS01\_MC\_leicht/Unit 01**

**In terms of spatial coverage area which of the following network is**

**smallest?**

**Wählen Sie eine Antwort:**

**PAN**

**BAN WAN MAN**

**Die richtige Antwort lautet: BAN**

**If packet size is 8kb and data transmission rate is 8Gbps then transmission**

**delay is …**

**Wählen Sie eine Antwort:**

**1ms.**

**1 s.**

**0.001 s.**

**0.001 ms.**

**Die richtige Antwort lautet: 0.001 ms.**

**FRAGE 41 VON 78**

**DLMCSNDS01\_MC\_mittel/Unit 01**

**If the distance between sender and receiver is 300 km and they are**

**connected wirelessly then what would be the propagation delay?**

**Wählen Sie eine Antwort:**

**1 s**

**10ms**

**0.001 ms**

**0.001 s**

**Die richtige Antwort lautet: 0.001 s**

**FRAGE 42 VON 78**

**DLMCSNDS01\_MC\_schwer/Unit 01**

**If packet size is 8kb, data transmission rate is 8Mbps, and there are 10 hops**

**between sender and receiver then transmission delay is …**

**Wählen Sie eine Antwort:**

**0.01 ms.**

**1 s.**

**1 ms.**

**0.01 s.**

**Die richtige Antwort lautet: 0.01 s.**

**FRAGE 43 VON 78**

**DLMCSNDS01\_MC\_schwer/Unit 01**

**Suppose, the distance between sender and receiver is 300 km and they are**

**connected wirelessly. Consider the packet size is 8kb and data transmission rate is 8Mbps. If the processing delay is 0.01 second and there is no queuing delay then calculate the total delay.**

**Wählen Sie eine Antwort:**

**0.012 s**

**0.011 ms**

**0.003 s**

**0.02 ms**

**Die richtige Antwort lautet: 0.012 s**

**Which of the following layer does not belong to a router?**

**Wählen Sie eine Antwort:**

**Network**

**Link Physical Application**

**Die richtige Antwort lautet: Application**

**FRAGE 45 VON 78**

**DLMCSNDS01\_MC\_leicht/Unit 02**

**How many layers are there in a router?**

**Wählen Sie eine Antwort:**

**2**

**3**

**5**

**7**

**Die richtige Antwort lautet: 3**

**Wireshark is not a ...**

**Wählen Sie eine Antwort:**

**packet sniffer.**

**protocol analyzer. network designing tool. packet analyzer.**

**Die richtige Antwort lautet: network designing tool.**

**FRAGE 47 VON 78**

**DLMCSNDS01\_MC\_mittel/Unit 02**

**Which layer is absent in a switch but available in a router?**

**Wählen Sie eine Antwort:**

**Network**

**Transport Link Physical**

**Die richtige Antwort lautet: Network**

**192.168.0.4/23 how may leftmost bits of this IP address are used for subnet**

**masking?**

**Wählen Sie eine Antwort:**

**4**

**22**

**23**

**9**

**Die richtige Antwort lautet: 23**

**FRAGE 49 VON 78**

**DLMCSNDS01\_MC\_schwer/Unit 02**

**The subnet of the following IP can have how many hosts? 192.168.0.4/23**

**Wählen Sie eine Antwort:**

**512**

**508**

**23**

**510**

**Die richtige Antwort lautet: 510**

**FRAGE 50 VON 78**

**DLMCSNDS01\_MC\_schwer/Unit 02**

**The destination IP of the DHCP DISCOVERY message is …**

**Wählen Sie eine Antwort:**

**127.0.0.0**

**1.1.1.1**

**255.255.255.255**

**0.0.0.0**

**Die richtige Antwort lautet: 255.255.255.255**

**FRAGE 51 VON 78**

**DLMCSNDS01\_MC\_leicht/Unit 03**

**Which of the following statements is false?**

**Wählen Sie eine Antwort:**

**Circuit switching requires a dedicated path between sender and receiver.**

**In a circuit switch, data from a same source cannot take different paths to reach to the destination.**

**Circuit switching does not require a dedicated path between sender and receiver.**

**Packet switching does not require a dedicated path between sender and receiver.**

**Die richtige Antwort lautet: Circuit switching does not require a dedicated path between sender and receiver.**

**How many layers are there in TCP/IP protocol stack?**

**Wählen Sie eine Antwort:**

**6**

**7**

**5**

**3**

**Die richtige Antwort lautet: 5**

**FRAGE 53 VON 78**

**DLMCSNDS01\_MC\_leicht/Unit 03**

**Link layer address is known as …**

**Wählen Sie eine Antwort:**

**IP.**

**MAC.**

**Port. Socket.**

**Die richtige Antwort lautet: MAC.**

**Which of the following is not a network layer protocol?**

**Wählen Sie eine Antwort:**

**IP**

**ICMP SSH DHCP**

**Die richtige Antwort lautet: SSH**

**FRAGE 55 VON 78**

**DLMCSNDS01\_MC\_mittel/Unit 03**

**Which of the following is true about DNS?**

**Wählen Sie eine Antwort:**

**Retrieves MAC address from a hostname**

**Network layer protocol**

**Retrieves IP address from a hostname DNS operates UDP port no. 53**

**Die richtige Antwort lautet: Retrieves IP address from a hostname**

**FRAGE 56 VON 78**

**DLMCSNDS01\_MC\_schwer/Unit 03**

**Suppose m = 65, krPu = {7, 187}, and krPr = {23, 187}.**

**What will be the ciphertext using RSA algorithm?**

**Wählen Sie eine Antwort:**

**65**

**23**

**187**

**142**

**Die richtige Antwort lautet: 142**

**FRAGE 57 VON 78**

**DLMCSNDS01\_MC\_schwer/Unit 03**

**Suppose krPu = {7, 187}, krPr = {23, 187}, and ciphertext c = 142.**

**What will be the plaintext using RSA algorithm?**

**Wählen Sie eine Antwort:**

**142**

**65**

**187**

**23**

**Die richtige Antwort lautet: 65**

**The combination of IP address and port number is known as …**

**Wählen Sie eine Antwort:**

**client process ID.**

**socket.**

**MAC address. server process.**

**Die richtige Antwort lautet: socket.**

**FRAGE 59 VON 78**

**DLMCSNDS01\_MC\_leicht/Unit 04**

**Which of the following is a link layer device?**

**Wählen Sie eine Antwort:**

**Router**

**Client/server RAM**

**NIC**

**Die richtige Antwort lautet: NIC**

**Which of the following is not a benefit of SOA?**

**Wählen Sie eine Antwort:**

**Enabling reuse of existing assets**

**Easier management P2P architecture**

**Leveraging existing assets**

**Die richtige Antwort lautet: P2P architecture**

**FRAGE 61 VON 78**

**DLMCSNDS01\_MC\_mittel/Unit 04**

**Which statement is false about BitTorrent?**

**Wählen Sie eine Antwort:**

**It is a file distribution protocol.**

**It is a SOA based client-server architecture. It is a P2P protocol.**

**A peer of the P2P network tracks all active peers known as tracker.**

**Die richtige Antwort lautet: It is a SOA based client-server architecture.**

**Which of the following is an example of a web service standard?**

**Wählen Sie eine Antwort:**

**DHCP**

**UDP TCP SOAP**

**Die richtige Antwort lautet: SOAP**

**FRAGE 63 VON 78**

**DLMCSNDS01\_MC\_schwer/Unit 04**

**Suppose, there are 20 clients connected through P2P architecture. If file**

**size = 5 Mb, client’s upload rate = 5 kbps, server’s upload rate = 50 kbps, client’s download rate = 50 kbps, then what is the throughput in kbps?**

**Wählen Sie eine Antwort:**

**20**

**5**

**15**

**10**

**Die richtige Antwort lautet: 15**

**FRAGE 64 VON 78**

**DLMCSNDS01\_MC\_schwer/Unit 04**

**Suppose, there are 20 clients connected through client-server architecture.**

**If file size = 5 Mb, client’s upload rate = 5 kbps, server’s upload rate = 50 kbps, client’s download rate = 50 kbps, then what is the throughput in kbps?**

**Wählen Sie eine Antwort:**

**5**

**10**

**15**

**20**

**Die richtige Antwort lautet: 5**

**FRAGE 65 VON 78**

**DLMCSNDS01\_MC\_leicht/Unit 05**

**Which of the following statement is correct?**

**Wählen Sie eine Antwort:**

**The purpose of unmarshalling is to represent a data in a neutralized format.**

**The goal of unmarshalling is to convert data to encrypted format. The goal of marshalling is to convert data to encrypted format.**

**Marshalling is the process of encapsulating a parameter.**

**Die richtige Antwort lautet: Marshalling is the process of encapsulating a parameter.**

**Which of the following statement is incorrect?**

**Wählen Sie eine Antwort:**

**Middleware is a software or program which lies between OS and application software.**

**MOM does not support synchronous communication.**

**MOM is developed to provide asynchronous communication. MOM stands for Message-Oriented Middleware.**

**Die richtige Antwort lautet: MOM does not support synchronous communication.**

**FRAGE 67 VON 78**

**DLMCSNDS01\_MC\_leicht/Unit 05**

**Which of the following statements is incorrect about token ring algorithm?**

**Wählen Sie eine Antwort:**

**It is an example of centralized algorithm.**

**It is an example of distributed algorithm. This algorithm is fair.**

**Processes of a token ring algorithm do not starve.**

**Die richtige Antwort lautet: It is an example of centralized algorithm.**

**Which of the following is a protocol/algorithm to synchronize with UTC?**

**Wählen Sie eine Antwort:**

**Lamport’s logical clock**

**Network time protocol**

**Reference broadcast synchronization Berkeley algorithm**

**Die richtige Antwort lautet: Network time protocol**

**FRAGE 69 VON 78**

**DLMCSNDS01\_MC\_mittel/Unit 05**

**Which information is incorrect about external global clock?**

**Wählen Sie eine Antwort:**

**External global clock is based on Lamport’s logical clock.**

**External global clock is known as Universal Coordinated Time.**

**40 shortwave radio stations around are used to synchronize with global clock. Multiple satellites provide global clock time keeping service.**

**Die richtige Antwort lautet: External global clock is based on Lamport’s logical clock.**

**FRAGE 70 VON 78**

**DLMCSNDS01\_MC\_schwer/Unit 05**

**Which of the following statement is true about Lamport's clock?**

**Wählen Sie eine Antwort:**

**It is a logical clock based on crystal oscillation.**

**It is a physical clock based on crystal oscillation. A** → **B means event A occurs after event B.**

**It is not a physical clock.**

**Die richtige Antwort lautet: It is not a physical clock.**

**FRAGE 71 VON 78**

**DLMCSNDS01\_MC\_schwer/Unit 05**

**Which of the following is not a benefit of MOM?**

**Wählen Sie eine Antwort:**

**Encapsulating heterogeneity of hardware and operating systems**

**Tame heterogeneity of hardware and software Providing uniform interfaces**

**Providing common services**

**Die richtige Antwort lautet: Tame heterogeneity of hardware and software**

**Which of the following is not a DLT platform?**

**Wählen Sie eine Antwort:**

**Bitcoin**

**Ethereum NodeMCU Multichain**

**Die richtige Antwort lautet: NodeMCU**

**FRAGE 73 VON 78**

**DLMCSNDS01\_MC\_leicht/Unit 06**

**What is not true about IoT?**

**Wählen Sie eine Antwort:**

**Coaxial cable is an essential component of IoT.**

**It is an example of ubiquitous computing. Cloud can be a necessary component of IoT. It is an example of pervasive computing.**

**Die richtige Antwort lautet: Coaxial cable is an essential component of IoT.**

**Which of the following does not belong to DLT stack?**

**Wählen Sie eine Antwort:**

**Application layer**

**Contract layer Device layer Presentation layer**

**Die richtige Antwort lautet: Presentation layer**

**FRAGE 75 VON 78**

**DLMCSNDS01\_MC\_mittel/Unit 06**

**Which of the following is not a property of DLT?**

**Wählen Sie eine Antwort:**

**Decentralized**

**Centralized Immutability Distributed**

**Die richtige Antwort lautet: Centralized**

**Which two layers do not belong to ESP8266 protocol stack?**

**Wählen Sie eine Antwort:**

**Transport and session**

**Application and presentation Network and transport Session and presentation**

**Die richtige Antwort lautet: Session and presentation**

**FRAGE 77 VON 78**

**DLMCSNDS01\_MC\_schwer/Unit 06**

**Which of the following statements is incorrect about NodeMCU?**

**Wählen Sie eine Antwort:**

**Operates on 60 GHz mmWave**

**Supports ESP8266**

**Open source IoT platform Supports ESP32**

**Die richtige Antwort lautet: Operates on 60 GHz mmWave**

**FRAGE 78 VON 78**

**DLMCSNDS01\_MC\_schwer/Unit 06**

**Which of the following statements is true about LoRa?**

**Wählen Sie eine Antwort:**

**LoRa is also known as NodeMCU**

**LoRa stands for Low Range.**

**It is not allowed to operate LoRa on ISM bands. LoRa operates on 60 GHz mmWave.**

**Die richtige Antwort lautet: LoRa stands for Low Range.**