|  |  |
| --- | --- |
|

|  |
| --- |
| **1.** (TCO 1) Which of the following makes the PSTN, as compared to IP networks, ideal for real-time voice services? (Points : 5)  |

       High availability (i.e., uptime)       Low latency       Low call setup delay       All of the above |

|  |  |
| --- | --- |
|

|  |
| --- |
| Question 2. **2.** (TCO 1) The circuit-switched PSTN has \_\_\_\_\_ limits on the call capacity of each line. (Points : 5)  |

       hard       soft       no       None of the above |

|  |  |
| --- | --- |
|

|  |
| --- |
| Question 3. **3.** (TCO 1) A PSTN POTS line can carry \_\_\_\_\_ call(s). (Points : 5)  |

       1       24       30       thousands of |

|  |  |
| --- | --- |
|

|  |
| --- |
| Question 4. **4.** (TCO 2) From a circuit-switched Private Branch Exchange (PBX) to Central Office (CO), multiple conversations are simultaneously carried over a T-1 voice trunk using the \_\_\_\_\_ technology. (Points : 5)  |

       Pulse Code Modulation (PCM)       Time Division Multiplexing (TDM)       Frequency Division Multiplexing (FDM)       None of the above |

|  |  |
| --- | --- |
|

|  |
| --- |
| Question 5. **5.** (TCO 2) Which of the following could be a disadvantage of circuit-switched Private Branch Exchange (PBX), as compared to client-server VoIP systems? (Points : 5)  |

       Very little maintenance.       Call latency is fixed, minimized, and not affected by other calls.       Expansion may be expensive for more and new modules.       Switching and transmission resources are dedicated to each call for its full duration. |

|  |  |
| --- | --- |
|

|  |
| --- |
| Question 6. **6.** (TCO 5) Which of the following is not true about VoIP? (Points : 5)  |

       The sending device saves up the constant rate bit stream for a short interval, and then places those bits as the data payload in a packet.       The transport of digital information is over a dedicated channel like a PSTN circuit.       The receiver extracts packet payloads and stitches them together, recreating the bit stream and turning it into sound.       None of the above |

|  |  |
| --- | --- |
|

|  |
| --- |
| Question 7. **7.** (TCO 5) Which of the following is not a function of RTCP protocol? (Points : 5)  |

       Syncs the various clock and time stamps of media streams.       Reports octets sent or received, as well as counts of lost packets.       Transmits digitized voice samples of a call.       Monitors and calculates the quality of an RTP connection. |

|  |  |
| --- | --- |
|

|  |
| --- |
| Question 8. **8.** (TCO 4) Which of the following audio codecs, in its original form, involves minimum to zero compression? (Points : 5)  |

       G.729A       G.728       G.723.1       G.711 |

|  |  |
| --- | --- |
|

|  |
| --- |
| Question 9. **9.** (TCO 3) Which of the following devices can be seen in a VoIP system? (Points : 5)  |

       IP phones       SIP servers       Soft phones       All of the above |

|  |  |
| --- | --- |
|

|  |
| --- |
| Question 10. **10.** (TCO 4) Which of the following is not a fact about the ITU G.711 codec? (Points : 5)  |

       It’s known as Pulse Code Modulation (PCM).       It samples an analog voice waveform 8,000 times per second.       It has two variations: G.711 A-law and G.711 V-law.       It produces a payload bit rate of 64 Kbps. |

|  |  |
| --- | --- |
|

|  |
| --- |
| Question 11. **11.** (TCO 6) Which of the following is a VoIP signaling protocol? (Points : 5)  |

       SIP       H.323       MEGACO       All of the above |

|  |  |
| --- | --- |
|

|  |
| --- |
| Question 12. **12.** (TCO 6) The MEdia GAteway COntrol (MEGACO) protocol is also called the \_\_\_\_\_. (Points : 5)  |

       ITU H.248 standard       IETF SIP standard       ITU G.711 standard       ITU H.323 standard |

|  |  |
| --- | --- |
|

|  |
| --- |
| Question 13. **13.** (TCO 6) \_\_\_\_\_ is not a typical function of an H.323 gatekeeper. (Points : 5)  |

       Billing       Bandwidth usage tracking       Signaling and media content transformation       End point (e.g., an IP phone) registration |

|  |  |
| --- | --- |
|

|  |
| --- |
| Question 14. **14.** (TCO 7) The Calling Line Identification (CLID) of the traditional 911 emergency service indicates a physical address without ambiguity when the destination is \_\_\_\_\_ (Points : 5)  |

       a single-family home.       a large corporation that occupies dozens of ﬂoors in a skyscraper, all with the same physical address and general phone number.       a multi-tenant residential building that is poorly managed, with customer names and apartment numbers mixed up and hidden behind a shared demarcation point.       a campus that terminates phone lines in a PBX room, with extensions in many geographically separated buildings. |

|  |  |
| --- | --- |
|

|  |
| --- |
| Question 15. **15.** (TCO 7) ITU Recommendation T.38 describes real-time faxing over a (the) \_\_\_\_\_ by deﬁning gateways and a protocol between them. (Points : 5)  |

       PSTN       packet network       modem       None of the above |

|  |  |
| --- | --- |
|

|  |
| --- |
| Question 16. **16.** (TCO 8) Which of the following, from a trunk service perspective, can improve the availability of an enterprise voice system? (Points : 5)  |

       Redundant local loops.       Separate entry points for trunks (or access lines) to enter a building.       Access trunks from two carriers.       All of the above |

|  |  |
| --- | --- |
|

|  |
| --- |
| Question 17. **17.** (TCO 8) The \_\_\_\_\_ information of a phone is sent into the trunk when placing an E911 call. (Points : 5)  |

       Calling Line ID (CLID)       IP address       Dual-tone Multi-frequency (DTMF)       Network Address Translation (NAT) |

|  |  |
| --- | --- |
|

|  |
| --- |
| Question 18. **18.** (TCO 9) Calculate the number of Erlangs that is equivalent to 72 CCS. (Points : 5)  |

       36       72       1       2 |

|  |  |
| --- | --- |
|

|  |
| --- |
| Question 19. **19.** (TCO 9) Calculate the utilization (in percentage) of a T1 trunk that on average carries 0.912 Mbps of traffic. (Points : 5)  |

       5.9%       59%       1.69%       16.9% |

|  |  |
| --- | --- |
|

|  |
| --- |
| Question 20. **20.** (TCO 10) On a packet WAN, voice packets could experience a significant \_\_\_\_\_ delay determined by the physical distance between two phones. (Points : 5)  |

       transmission       propagation       queuing       routing |

|  |  |
| --- | --- |
|

|  |
| --- |
| Question 21. **21.** (TCO 10) Granting real-time voice traffic a higher priority is no longer effective for QoS guarantees when \_\_\_\_\_ (Points : 5)  |

       a network is very heavily loaded.       data traffic is a very small portion of the total network traffic.       only voice packets (i.e., no data packets) are carried on a network.       All of the above |

|  |  |
| --- | --- |
|

|  |
| --- |
| Question 22. **22.** (TCO 12) An IP phone typically contains a LAN switch port for connecting to the network and an extra port for connecting a PC. From a security perspective, the PC \_\_\_\_\_ be able to reach call servers, gateways, or other VoIP components. (Points : 5)  |

       should       should not       must       has to |

|  |  |
| --- | --- |
|

|  |
| --- |
| Question 23. **23.** (TCO 12) For \_\_\_\_\_ purposes, a ﬁrewall opens single-port “pinholes” to allow different VoIP control signaling and active call connections to pass through. (Points : 5)  |

       Quality of Service (QoS)       bandwidth utilization       security       network performance |

|  |  |
| --- | --- |
|

|  |
| --- |
| Question 24. **24.** (TCO 11) The Request for Proposal (RFP) is also called \_\_\_\_\_ (Points : 5)  |

       Request for Information (RFI).       acceptance test plan.       Service Level Agreement (SLA).       Statement of Work. |

|  |  |
| --- | --- |
|

|  |
| --- |
| Question 25. **25.** (TCO 11) Which of the following is correct about echo in a VoIP call? (Points : 5)  |

       Echo could be caused by gateways interconnecting POTS and digital transmissions.       An echo canceler feature is often included in gateways.       Speaker phones and those designed for audio conferencing often have built-in echo canceling capability.       All of the above |

|  |  |
| --- | --- |
|

|  |
| --- |
| Question 26. **26.** (TCO 13) License terms and costs may depend on \_\_\_\_\_ (Points : 5)  |

       the number of servers.       the number of sites.       the number of end points (e.g., softphones).       All of the above |

|  |  |
| --- | --- |
|

|  |
| --- |
| Question 27. **27.** (TCO 13) Which of the following is part of a capital cost of implementing a VoIP systems? (Points : 5)  |

       VoIP Management expenses       VoIP Maintenance contracts       Voice trunks installation       VoIP Hardware leases |

|  |  |
| --- | --- |
|

|  |
| --- |
| Question 28. **28.** (TCO 13) \_\_\_\_\_ helps consumers and enterprises determine the upfront and ongoing costs of a product or system. (Points : 5)  |

       Call for proposal (CFP)       Return on investment (ROI)       Total cost of ownership (TCO)       Payback time period |