Questions from Part II (Dr. Tibor Cinkler)

1. What is the difference between ANSI SONET, ETSI SDH and ITU-T SDH?
2. How is an anologous voice signal digitalised via PCM?
3. What will be the 8-bit A-low code of an 1025 mV sample?
4. Explain how are E1, E2, E3 and E4 PDH signals formed? (Bit-by-bit multiplexing, new framing justification because of plesyochroniti.)
5. How does the E1 frame alignment work?
6. How does the E2 justification work? (When multiplexing 4 E1 signals into an E2 signal)
7. If both E1 and E2 work at nominal speed, how many E1 bits are carried per E2 frame on average by an E2 muliplexer.
8. What are the main advantages and what the drawbacks of SDH over PDH?
9. What are the RS, MS, P and RSOH, MSOH, POH in SDH networks?
10. What network topologies are supported by SDH networks?
11. What is the difference and what the relation of STM-1 and VC-4 frames?
12. What STM-N SDH frameing corresponds to OC-3/STS-3 frameing?
13. What is the same and what common for an STM-1 and an STM-4 frame?
14. How are SDH network elements synchronised?
15. How is the justification solved between two neytworks synchronised to different clocks?
16. What is the largest clock difference between two SDH networks that can still be justified? (That can still interoperate.) Why?
17. Is ATM circuit or packet switched? Why and How?
18. Why is ATM asynchronous?
19. How many bitts are used in ATM header as a “label”? How does label relate to the end (destination) address?
20. What is the CLP bit used for? Is it enough for various QoS guarantees? How is the CLP used?
21. What are the roles of the HEC field in the ATM cell header?
22. What is the size of an ATM cell? What is the size of the header?
23. What is cell delineation? How is ATM cell delineation solved?
24. What are ATM VPCs good for? How can they be used in forming virtual topologies?
25. How are cells forwarded through an ATM network? What is used for forwarding decisions? Do the cells have the same VCI/VPI fields from end to end along a multihop path?
26. What are the main ATM source traffic descriptors?
27. What are the main ATM traffic classes (Source Types)?
28. What are the 6 ATM QoS parameters?
29. Why do we have multiple different AAL (ATM Adaptation Layers)?
30. In MPLS networks what is teh difference between LER and LSR routers? What are their main roles?
31. What is an MPLS LSP? What is its relation to ATM VPCs?
32. What is the difference between label stacking and swapping?
33. What is MPLS label distribution?
34. What is MPLS TE (Traffic Engineering)?
35. What are the three main features of ngSDH?
36. How can a GbE signal carried over SDH and ngSDH (contiguous and Virtual Concatenation)?
37. What are the two multiplexing schemes that are jointly utilised in OTN systems?

38. What are the main differences between the SDH and OTN frames?
39. What is the size in bits and duration in times of SDH and OTN frames when building hierarchies?
40. What do n and m stand for in an OTM-n.m notation?
41. What is the role of the FEC field in OTN OTU frames?
42. What is the working principle of the FEC field in OTN OTU frames?
43. What are the benefits of using FEC in OTN OTU frames?
44. List a few “bandwidth-hungry” applications.
45. What is the role and what the chracteristics of the access, metro and core parts of the network?
46. What networking technologies can be used in access, metro and core parts of the network?
47. What are the 3 generations of Optical Networks?
48. What are the multiplexing techniques used in optical networks?
49. What is the main difference between MMF and SMF? What are the modes?
50. What are the attenuation windows of the fiber?
51. What are the advantages and what the drawbacks of plastic fibers?
52. What is an Arrayed waveguide grating, what is it used for and how does it work?
53. What is an EDFA: Erbium Dopped Fiber Amplifier, why is it important and how does it work?
54. What are the advantages and what the drawbacks of dynamic/switched optical networks?
55. What are the 3 planes in the ITU-T ASON architecture? What is their role?
56. Please, list and briefly explain at least 3 solutions for optical switching elements.
57. What are MLN/MRN networks? (Multi Layer/Region Networks)?
58. What is grooming?
59. What are the problems of routing in Multi-Domain networks?
60. What is the working principle of OPS? Draw an OPS switch and explain it!