Computer Networks

Standard difficulty · 20 questions · 40 marks · Time: 41 minutes

Name: _____ Date: _____ Score: ____ / 40

Show your working for Sections B and C. Answers are on the last page — try every question first!

Section A — Choose the correct answer — 8 × 1 = 8 marks

1. The first network, which linked a few universities and research centres in 1969, was:
   (a) the World Wide Web **(b)** Ethernet
   (c) NSFNET **(d)** ARPANET

2. What does a repeater do in a network?
   (a) regenerates a weakened signal so it can travel further
   (b) connects networks that use different protocols
   (c) lets a computer join a wireless network
   (d) sends the data only to the computer it is addressed to

3. Which type of network is this: the computers in one office floor sharing a printer?
   (a) MAN **(b)** PAN **(c)** LAN **(d)** WAN

4. How many cables (links) are needed to connect 4 computers in a ring topology?
   (a) 4 **(b)** 3 **(c)** 5 **(d)** 6

5. Which of these is a valid IPv4 address?
   (a) 159.216.46.285 **(b)** 152.39.329.45
   (c) 101.203.128.178 **(d)** 144.132.215.245.9

6. In the URL http://mail.example.org/notes/chapter1.html, what is the domain name?
   (a) mail.example.org
   (b) /notes/chapter1.html
   (c) http://mail.example.org
   (d) http://mail.example.org/notes/chapter1.html

7. Which describes the ring topology?
   (a) each node is connected to two neighbours, forming a closed loop
   (b) star networks joined in a hierarchy, branching from a root
   (c) every node is connected to a central hub or switch
   (d) every node is connected to every other node

8. An address is 128 bits long. How many bytes is that?
   (a) 16 **(b)** 128 **(c)** 8 **(d)** 32

Section B — Short answer — 8 × 2 = 16 marks

9. What is a computer network? Give two of its advantages.

10. Name the network device that (a) converts digital data to analog signals for a telephone or cable line, and back (b) lets a computer join a wireless network.

11. Name the type of network (PAN, LAN, MAN or WAN): the computers of one school building.

12. 18 computers are to be connected. How many links are needed in (a) a mesh topology (b) a star topology with a central switch?

13. For the URL https://maps.example.com/docs/report.pdf, write (a) the protocol (b) the domain name (c) the file path on the server.

14. Is 222.254.337.17 a valid IPv4 address? Answer Yes or No.

15. What kind of website does each top-level domain usually show: (a) .gov (b) .com?

16. Name the topology in which (a) every node is connected to every other node (b) star networks joined in a hierarchy, branching from a root.

Section C — Word problems — 4 × 4 = 16 marks

17. Describe the evolution of networking from ARPANET to the Internet.

18. A school has four blocks: Junior (49 computers), Science (12 computers), Sports (25 computers), Library (38 computers). Junior is 71 m from Library, 107 m from Sports and 92 m from Science. (a) Which block should house the server, and why? (b) Suggest a topology and draw the layout in words. (c) Where would a repeater be needed if signals weaken beyond 100 m? (d) Which device in each block connects its computers? (e) What type of network is this?

19. For http://games.example.com/about.html: (a) Name the protocol and say what it does. (b) What is the top-level domain and what does it tell us? (c) What does a DNS server do with games.example.com? (d) What is the difference between a web browser and a web server?

20. 5 computers are connected (a) in a mesh topology and (b) in a star topology. Find the number of links in each, and give one advantage and one disadvantage of each topology.

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Answer key

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Q	Answer	Working
1	**(d) ARPANET**	—
2	**(a) regenerates a weakened signal so it can travel further**	—
3	**(c) LAN**	—
4	**(a) 4**	each node links to the next, and the last back to the first
5	**(c) 101.203.128.178**	four numbers, each from 0 to 255, separated by dots
6	**(a) mail.example.org**	the domain name is the part after :// and before the first /
7	**(a) each node is connected to two neighbours, forming a closed loop**	—
8	**(a) 16**	8 bits make a byte
9	**Two or more computers linked to share data and resources; it lets users share files and printers and communicate quickly.**	—
10	**(a) modem; (b) Wi-Fi card**	a modem; a Wi-Fi card
11	**LAN**	LAN: a room, building or campus, up to about 1 km
12	**(a) 153; (b) 18**	18 × 17 ÷ 2; one cable per computer
13	**(a) https; (b) maps.example.com; (c) /docs/report.pdf**	protocol://domain/path
14	**No**	337 is more than 255
15	**(a) government; (b) commercial**	the top-level domain is the last part of a domain name
16	**(a) mesh; (b) tree**	mesh; tree
17	**ARPANET (1969) linked a few research and university computers. In the 1980s NSFNET connected universities with a faster backbone for academic use. Many networks joined them using the TCP/IP protocols, and they grew into the Internet, opened to the public and to business in the 1990s, with the World Wide Web on top.**	—
18	**(a) Junior, as it has the most computers (49), so most traffic stays inside it; (b) a star (or tree) topology with Junior at the centre, a cable from it to each other block; (c) on every cable longer than 100 m: Junior–Sports (107 m); (d) a switch; (e) a LAN.**	the server goes where most computers are; repeaters on long cables

Q	Answer	Working
19	**(a) HTTP: transfers web pages from server to browser; (b) .com: a commercial site; (c) it looks up the IP address of games.example.com so the browser can reach the server; (d) a browser (client) requests and shows web pages; a web server stores them and sends them when asked.**	URL = protocol://domain/path
20	**(a) 10 links: very reliable, as a broken link has other paths, but costly to cable; (b) 5 links: easy to add a node and to find faults, but if the central switch fails the whole network stops.**	5 × 4 ÷ 2 and 5

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