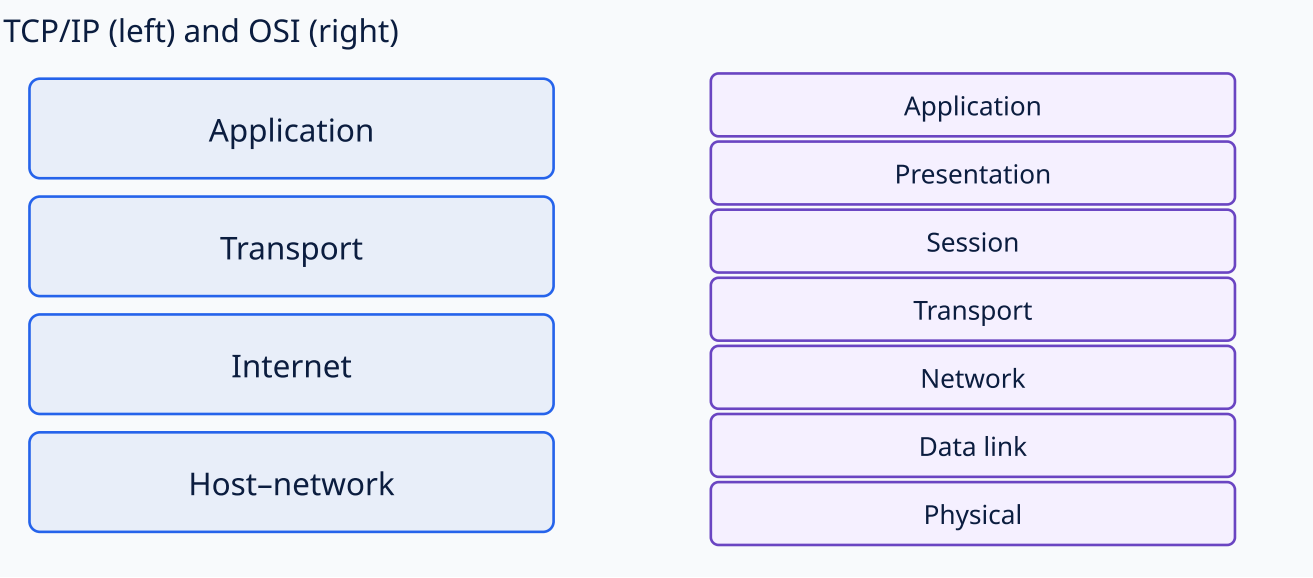
Grade 12 A/L ICT · Lesson 6

6.10 OSI and TCP/IP Reference Models

Syllabus 6.10. TCP/IP (application, transport, internet, host-to-network) and **OSI** (7 layers) describe network architecture. You name **bits**, **frames** and **packets** and follow data flow down and up the stack.

1. TCP/IP model

Application – apps (HTTP, DNS). **Transport** – TCP/UDP. **Internet** – IP routing. **Host-to-network** – link/physical technologies.



TCP/IP beside OSI

2. OSI seven layers

Application, Presentation, Session, Transport, Network, Data link, Physical – from user apps down to bits on the wire.

3. Data units

Bit on the physical medium; **frame** at data link; **packet** (IP) at network/internet. Headers are added going down and removed going up.

> 🧱 **Worked example: Data path: Application → Transport (TCP segment) → Network (IP packet) → Data link (frame) → Physical (bits).**
> OSI has 7 layers; TCP/IP is often taught as 4.

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🚀 **Beyond the syllabus (2026 update)** *Not required for the exam – read for interest.* Real stacks blur layers; exam still wants the named models and PDUs.

Key Words

TCP/IP model – Four-layer Internet model.	**OSI model** – Seven-layer reference model.
Application layer – Network apps and services.	**Transport layer** – End-to-end process delivery.
Internet / Network – Routing of packets.	**Data link** – Frames on a link/LAN.
Physical – Bits on the medium.	**Packet** – Network-layer data unit.
Frame – Data-link data unit.	**Bit** – Physical-layer symbol/unit.
Encapsulation – Adding headers down the stack.	**Presentation / Session** – OSI layers above transport.

Sample Q&A

1. TCP/IP four layers?

> **Answer:** Application, transport, internet, host-to-network.

2. OSI has how many layers?

> **Answer:** Seven.

3. PDU at data link?

> **Answer:** Frame.

4. PDU at network/IP?

> **Answer:** Packet.

5. Physical layer deals with?

> **Answer:** Bits on the medium.

6. Encapsulation direction?

> **Answer:** Headers added going down the stack.

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MCQ

1. TCP/IP has

A. 12
B. 1 only
C. 0
D. 7 only
E. 4 layers

2. OSI has

A. 11
B. 4 only
C. 7 layers
D. 2
E. 9

3. A frame is used at

A. only parity tea
B. data link
C. only DNS text
D. only HTTP verbs
E. only GUI

4. A packet is used at

A. only icons
B. only mouse clicks
C. network / internet layer
D. only fonts
E. only physical copper paint

5. Bits belong mainly to

A. the physical layer
B. only presentation slides
C. only application essays
D. only transport poems
E. only session jokes

6. Going down the stack we

A. delete the universe
B. invent gravity
C. add headers (encapsulation)
D. boil the switch
E. paint the chair

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7. HTTP sits near

A. only the hub LED
B. the application layer
C. only the PSTN tone
D. only the fiber core
E. only the fan

8. IP sits at

A. only physical pins
B. only session chairs
C. only data-link paint
D. only presentation fonts
E. internet / network layer

9. Which term means: “Four-layer Internet model”?

A. TCP/IP model
B. Encapsulation
C. Data link
D. Application layer
E. Packet

10. Which term means: “Seven-layer reference model”?

A. OSI model
B. Transport layer
C. Physical
D. Frame
E. Presentation / Session

11. Which term means: “Network apps and services”?

A. Internet / Network
B. TCP/IP model
C. Packet
D. Application layer
E. Bit

12. Which term means: “End-to-end process delivery”?

A. Encapsulation
B. OSI model
C. Transport layer
D. Frame
E. Data link

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13. Which term means: “Routing of packets”?

A. Application layer
B. Internet / Network
C. Physical
D. Presentation / Session
E. Bit

14. Which term means: “Frames on a link/LAN”?

A. Packet
B. Data link
C. Transport layer
D. Encapsulation
E. TCP/IP model

15. Which term means: “Bits on the medium”?

A. Presentation / Session
B. OSI model
C. Frame
D. Physical
E. Internet / Network

16. Which term means: “Network-layer data unit”?

A. Packet
B. Application layer
C. Data link
D. TCP/IP model
E. Bit

17. Which term means: “Data-link data unit”?

A. Transport layer
B. Encapsulation
C. OSI model
D. Physical
E. Frame

18. Which term means: “Physical-layer symbol/unit”?

A. Application layer
B. Presentation / Session
C. Internet / Network
D. Bit
E. Packet

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19. Which term means: “Adding headers down the stack”?

A. Transport layer
B. Data link
C. Frame
D. TCP/IP model
E. Encapsulation

20. Which term means: “OSI layers above transport”?

A. Physical
B. OSI model
C. Bit
D. Presentation / Session
E. Internet / Network

Structured Questions

1. List TCP/IP layers with one role each. *(2 marks)*

> App/transport/internet/host-network + roles.

2. List OSI seven layers in order. *(2 marks)*

> App…Physical top to bottom (or reverse).

3. Define bit, frame, packet. *(3 marks)*

> Physical; data link; network.

4. Describe data flow sender→receiver. *(3 marks)*

> Down stack with headers; across; up stripping headers.

5. Map HTTP and IP onto the models. *(2 marks)*

> HTTP application; IP internet/network.

Summary

- TCP/IP has four layers.
- OSI has seven layers.
- Bit, frame, packet PDUs.
- Encapsulation down the stack.
- Models organise network functions.

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MCQ answer key – 6.10

1. **E** – Four.
2. **C** – Seven.
3. **B** – Data link.
4. **C** – Network.
5. **A** – Physical.
6. **C** – Encapsulate.
7. **B** – Application.
8. **E** – Internet layer.
9. **A** – TCP/IP model – Four-layer Internet model.
10. **A** – OSI model – Seven-layer reference model.
11. **D** – Application layer – Network apps and services.
12. **C** – Transport layer – End-to-end process delivery.
13. **B** – Internet / Network – Routing of packets.
14. **B** – Data link – Frames on a link/LAN.
15. **D** – Physical – Bits on the medium.
16. **A** – Packet – Network-layer data unit.
17. **E** – Frame – Data-link data unit.
18. **D** – Bit – Physical-layer symbol/unit.
19. **E** – Encapsulation – Adding headers down the stack.
20. **D** – Presentation / Session – OSI layers above transport.

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