

1.5 Sleep

Name: _____ Class: _____ Date: _____ **Total: 11 marks**

KEY WORDS rem 快速眼动 • sleep 睡眠 • circadian rhythm 昼夜节律 • rem sleep 快速眼动睡眠
• narcolepsy 发作性睡眠病

Objective

Build the skills to answer exam questions on **sleep** 睡眠 and **circadian rhythms** 昼夜节律.

You must be able to:

- describe the **sleep cycle** 睡眠周期 and what changes across the night
- state what happens in **REM** 快速眼动 sleep and why it matters
- explain what a **circadian rhythm** is and what disrupts it
- match a **sleep disorder** 睡眠障碍 to its defining feature

1 Worked examples

Study these first. Each one shows the method for a task used later.

■ The cycle

Sleep moves through stages of progressively deeper non-REM sleep and then into REM, repeating roughly every 90 minutes. Across the night, deep non-REM shortens and REM periods lengthen.

■ REM sleep

In REM, brain activity resembles waking, the eyes move rapidly, most vivid dreaming occurs, and the skeletal muscles are effectively paralysed. REM appears to support memory consolidation and emotional processing.

■ Circadian rhythm

A roughly 24-hour biological cycle governing sleep, alertness and body temperature, entrained mainly by **light**. Shift work, jet travel and late-night screens push it out of alignment with the clock.

■ Two disorders

Insomnia is persistent difficulty falling or staying asleep. **Narcolepsy** is sudden uncontrollable sleep onset, often with immediate REM.

2 Practice

2.1 State two things that happen to the body during REM sleep. [2]

2.2 Explain what a circadian rhythm is and name the main cue that sets it. [2]

2.3 A student sleeps five hours a night for a week before an exam.

(a) State one likely effect on memory. [1]

(b) Explain why cutting sleep short removes proportionally more REM than deep sleep.[2]

3 Exam-style questions

3.1 Muscle paralysis during dreaming is characteristic of [1]

- **A** stage 1 non-REM
- **B** deep non-REM
- **C** REM sleep
- **D** wakefulness

3.2 A worker on permanent night shifts sleeps badly on days off. The best explanation is [1]

- **A** insomnia caused by anxiety
- **B** a circadian rhythm entrained to an unusual light schedule
- **C** narcolepsy
- **D** too much REM sleep

3.3 A person falls asleep suddenly during a conversation.

(a) Name the disorder this suggests.

[1]

(b) State one way it differs from ordinary tiredness.

[1]

Solutions

2.1 any two of: brain activity resembles waking; the eyes move rapidly; vivid dreaming occurs; skeletal muscles are effectively paralysed.

2.2 a roughly 24-hour biological cycle governing sleep, alertness and body temperature; set mainly by light.

2.3 (a) poorer consolidation, so weaker recall of what was studied. (b) REM periods lengthen across the night, so the hours cut from the end of sleep contain proportionally more REM.

3.1 C. muscle atonia during vivid dreaming is a defining feature of REM.

3.2 B. the rhythm has adapted to the night schedule and is misaligned on days off.

3.3 (a) narcolepsy. (b) onset is sudden and uncontrollable, often entering REM immediately, rather than gradual drowsiness.