

I 次の英文を読み、下記の設問に答えなさい。

Sleep is an essential function that allows your body and mind to recharge, leaving you refreshed and ⁽⁷⁾alert when you wake up. Healthy sleep also helps the body remain healthy and stave off^{*1} diseases. (1) enough sleep, the brain cannot function properly. This can impair your abilities to concentrate, think clearly, and process memories.

Most adults require at least seven hours of nightly sleep. Children and teenagers need substantially more sleep, particularly (2) they are younger than five years of age. Work schedules, day-to-day stressors, a disruptive bedroom environment, and medical conditions can all prevent us from receiving enough sleep. A healthy diet and positive lifestyle habits can help ensure an ⁽⁸⁾adequate amount of sleep each night — but for some, chronic lack of sleep may be the first sign of a sleep disorder.

An internal “body clock” regulates your sleep cycle, controlling when you feel tired and ready for bed or refreshed and ⁽⁷⁾alert. This clock operates on a 24-hour cycle known as the circadian^{*2} rhythm. After waking up from sleep, you’ll become increasingly tired throughout the day. These feelings will peak in the evening leading up to bedtime.

This sleep drive — also known as sleep-wake homeostasis^{*3} — may be linked to adenosine^{*4}, an organic compound produced in the brain. Adenosine levels increase throughout the day as you become more tired, and then the body breaks down this compound during sleep.

Light also influences the circadian rhythm. The brain contains a special region of nerve cells known as the hypothalamus^{*5}, and a group of cells in the hypothalamus (3) the suprachiasmatic nucleus^{*6}, which processes signals when the eyes are exposed to natural or artificial light. These signals help the brain determine whether it is day or night.

As natural light disappears in the evening, the body (4) melatonin, a hormone that ⁽⁹⁾induces drowsiness. When the sun rises in the morning, the body (4) the hormone known as cortisol^{*7} that promotes energy and alertness.

Stages of Sleep

Once we fall asleep, our bodies follow a sleep cycle divided into four stages. The first three stages are known as non-rapid eye movement (NREM) sleep, and the final stage is known as rapid eye movement (REM) sleep.

○**Stage 1 NREM:** This first stage marks the transition between wakefulness and sleep, and (5) light sleep. Muscles relax and your heart rate, breathing, and eye movements begin to slow down, as do your brain waves, which are more active when you are awake. Stage 1 typically lasts several minutes.

- Stage 2 NREM:** This second NREM sleep stage is characterized by deeper sleep as your heart and breathing rates continue slowing down and the muscles become more relaxed. Eye movements will cease and your body temperature will decrease. Apart from some brief moments of higher frequency electrical activity, brain waves also remain slow. Stage 2 is typically the longest of the four sleep stages.
- Stage 3 NREM:** This stage (6) in making you feel refreshed and ⁽⁷⁾alert the next day. Heartbeat, breathing, and brain wave activity all reach their lowest levels, and the muscles are as relaxed as they will be. This stage will be longer at first and decrease in duration throughout the night.
- REM:** The first REM stage will occur about 90 minutes after you fall asleep. As the name suggests, your eyes will move back and forth rather quickly under your eyelids. Breathing rate, heart rate, and blood pressure will begin to increase. Dreaming will typically occur during REM sleep, and your arms and legs will become paralyzed — it's believed this is intended to prevent you from physically acting out on your dreams. The duration of each REM sleep cycle increases as the night progresses. Numerous studies have also linked REM sleep to memory consolidation ^{*8}, the process of ⁽¹⁰⁾converting recently learned experiences into long-term memories. The duration of the REM stage will decrease as you age, causing you to spend more time in the NREM stages.

These four stages will repeat cyclically throughout the night until you wake up. For most people, the duration of each cycle will last about 90-120 minutes. NREM sleep constitutes about 75% to 80% of each cycle. You may also wake up briefly during the night but not remember the next day. These episodes are known as “W” stages.

注：*1 stave off 「～を避ける，～を(一時的に)阻止する」

*2 circadian 「約24時間周期の」

*3 homeostasis 「恒常性，恒常性維持」

*4 adenosine 「アデノシン(核酸を構成するヌクレオシドの一種)」

*5 hypothalamus 「視床下部」

*6 suprachiasmatic nucleus ^{しこうさじょうかく} 「視交叉上核，視交叉上核(脳の視床下部にある非常に小さい領域)」

*7 cortisol 「コルチゾール(副腎皮質から分泌されるホルモンの一種)」

*8 consolidation 「固定，強化」

問1 本文中の(1)～(6)の各空欄に入る最も適切なものを、それぞれ①～④の中から一つずつ選びなさい。ただし、(4)は2か所あり、同じものが入ります。

- (1) ① As ② During ③ Without ④ For
(2) ① so ② if ③ because ④ unless
(3) ① call ② calling ③ has called ④ called
(4) ① will release ② release ③ had released ④ released
(5) ① in spite of ② runs out of ③ because of ④ consists of
(6) ① plays along ② plays an important role
 ③ plays it by ear ④ plays on words

問2 本文中の下線部(7)～(10)の語に意味が最も近いものを、それぞれ①～④の中から一つずつ選びなさい。ただし、(7)は3か所あり、同じ意味になります。

- (7) alert
 ① excited ② sharp ③ delighted ④ fatigued
(8) adequate
 ① deficient ② excessive ③ obscure ④ sufficient
(9) induces
 ① confuses ② prevents ③ relieves ④ causes
(10) converting
 ① transforming ② transmitting ③ transporting ④ transferring

問3 次の(11)～(15)の各問いの答えとして最も適切なものを、それぞれ①～④の中から一つずつ選びなさい。

- (11) What hormone does the body release in the evening to trigger sleepiness?
 ① Adenosine
 ② Melatonin
 ③ Serotonin
 ④ Cortisol

- (12) Which stage of NREM sleep is characterized by the deepest level of relaxation?
- ① Stage 1
 - ② Stage 2
 - ③ Stage 3
 - ④ They are equally relaxing.
- (13) What is the purpose of muscle paralysis during REM sleep?
- ① To increase breathing rate, heart rate and blood pressure
 - ② To prevent the body from physically acting out on dreams
 - ③ To decrease brain wave activity
 - ④ To improve memory consolidation
- (14) Which statement about the sleep cycle described in the passage is true?
- ① The sleep cycle is divided into three stages of NREM sleep and one stage of REM sleep.
 - ② The duration of each sleep cycle lasts for about 60-90 minutes.
 - ③ REM sleep is characterized by slower heart rate and breathing compared to NREM sleep.
 - ④ “W” stages refer to the periods of deep sleep that occur throughout the night.
- (15) Which of the following statements is **NOT** true based on the passage?
- ① Body temperature regulates the sleep cycle.
 - ② Lack of sleep can impair intellectual abilities.
 - ③ REM sleep is associated with dreaming and memory consolidation.
 - ④ Healthy sleep also contributes to maintaining overall health and preventing disease.

Ⅱ 次の(16)～(25)の各英文の空欄に入る最も適切なものを、それぞれ①～④の中から一つずつ選びなさい。

(16) () the population of India?

- ① How much is ② What number is ③ What is ④ How many are

(17) This bicycle is () mine.

- ① less expensive as ② not so expensive than
③ not as expensive so ④ not as expensive as

(18) Since people use heaters a lot in winter, electricity () rises sharply.

- ① amount ② consumption ③ sum ④ quantity

(19) He lost () little money he had.

- ① what ② which ③ whose ④ how

(20) The taxi driver did not come on time, and we were made () for over twenty minutes before we got in the taxi.

- ① waiting ② wait ③ to wait ④ waited

(21) I () you for fifteen years and I still don't know very much about you.

- ① have married ② have married to
③ have got married to ④ have been married to

(22) His explanation was very much to the ().

- ① point ② dot ③ spot ④ place

(23) Mary has three daughters, all () are doctors.

- ① who ② which ③ of whom ④ of which

(24) The Prime Minister made a speech in Australia () an interpreter.

- ① in ② through ③ from ④ between

(25) Take your time, or you () make mistakes.

- ① should not ② must not ③ should ④ may

(余 白)

Ⅲ 次の電話での会話文と価格表を見て，下記の設問に答えなさい。

著作権の都合により，省略。

著作権の都合により、省略。

*(the price list of extra warranty coverage)

The warranty period	Price
1 year	\$ 50
2 years	\$ 75
3 years	\$ 100

注：*¹ LCD (Liquid Crystal Display) 「液晶ディスプレイ」

*² warranty 「保証」

問1 (26)～(32)の各空欄に入るものを、それぞれ①～⑦の中から一つずつ選びなさい。

ただし、選択肢は一度しか使えません。また、文頭に来る語も小文字の書き出しになっています。

(26)～(32)

- ① oh, I don't know.
- ② no, I'm afraid not.
- ③ will you send out a reminder?
- ④ if we have to replace any parts, that will be extra.
- ⑤ we'll send a technician anytime the bike needs services.
- ⑥ does it cover both labor and materials?
- ⑦ the standard warranty only covers a year.

問2 以下の(33)と(34)の各英文の問いの答えとして最も適切なものを、それぞれ①～④の中から一つずつ選びなさい。

(33) How much is the customer's payment of the bill?

① \$ 50

② \$ 70

③ \$ 75

④ \$ 100

(34) Which of the following statements is true according to the conversation?

① Lisa purchased the exercise bike 12 months ago.

② Lisa purchased the extra warranty coverage at the time of purchase.

③ The technician will only accept cash payment for the repair.

④ The two-year warranty covers both labor and materials.

Ⅳ 次の(ア)～(ウ)の各日本語の文の意味を表すように、空欄にそれぞれ①～⑧の語(句)を入れて英文を完成させ、(35)～(43)の空欄に入るものの番号を選びなさい。選択肢は一度しか使えません。また、文頭に来る語も小文字の書き出しになっています。

(ア)曇りやひびが少ないほど、ダイヤモンドの価値は高い。ダイヤモンドのうち、工業目的ではなく宝飾品として使えるほど透明だと見なされるものはおよそ20%しかない。

() cloudy spots and cracks, (35) the value of the diamond. () around 20% of diamonds () (36) clear () to use in jewelry (37) industrial ().

- ① enough ② the fewer ③ only ④ are
⑤ purposes ⑥ considered ⑦ instead of ⑧ the higher

(イ) 19世紀の写真の発明は絵画の発展に大きな影響を与えた。肖像画や風景を正確に描くのもはや絵画の巨匠は必要ではなくなった。

() of photography in the 19th Century () (38) on the development () painting. (39) () a master painter (40) () accurately depict a portrait or landscape.

- ① had profound ② no longer ③ effects ④ of
⑤ needed ⑥ was ⑦ to ⑧ the invention

(ウ) ダンス療法はすでに確立されて、心理学の分野における治療法の一つとして高い認知を得ている。最近では他の医療分野でも治療法として有効であると検討され始めている。

Dance therapy is already () () and highly (41) () a course of () in the field of psychology. Recently, other fields of medicine () also begun to look at (42) as a possible (43) of healing.

- ① method ② have ③ well ④ it
⑤ treatment ⑥ regarded ⑦ established ⑧ as

