

英 語

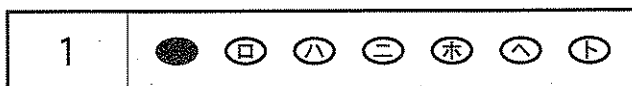
注 意

1. 問題は全部で17ページである。
2. 解答用紙に氏名・受験番号を忘れずに記入すること。(ただし、マーク・シートにはあらかじめ受験番号がプリントされている。)
3. 解答はすべて解答用紙に記入すること。
4. 解答用紙は必ず提出のこと。この問題冊子は提出する必要はない。

マーク・シート記入上の注意

1. 解答用紙(その1)はマーク・シートになっている。HBの黒鉛筆またはシャープペンシルを用いて記入すること。
2. 解答用紙にあらかじめプリントされた受験番号を確認すること。
3. 解答する記号・番号の○を塗りつぶしなさい。○で囲んだり×をつけたりしてはいけない。

解答記入例(解答がイのとき)



4. 一度記入したマークを消す場合は、消しゴムでよく消すこと。×をつけても消したことになる。
5. 解答用紙をよごしたり、折り曲げたりしないこと。

1 次の英文を読み、以下の問いに答えなさい。

Every urbanite knows that the bright lights of the city make it impossible to see all the stars in a night sky. What most of us don't know is that those lights might also be making us sick.

The cause is light pollution—the unearthly glow of billions of street lamps, security lights, searchlights, office lights and signs—as people everywhere try to dispel the limitations of the night.

For the first time, light is being investigated seriously as a human health hazard, a possible contributor to the increased incidence of breast cancer, depression and other ailments. And for many wildlife species, light pollution seems to be as grave an environmental threat as bulldozed habitats and toxic-chemical dumping. “People are beginning to take it much more seriously,” says Alan Outen, a British ecologist who has written extensively on the dangers of night brightness. “Its implications are far bigger than ever realised.”

Nearly two-thirds of the world's population live under night skies polluted by light, according to the first atlas of the world's artificial night-sky brightness, published by Italian and US researchers in 2001.

In the most heavily urbanised regions, it no longer really gets dark. Satellite images reveal that in large areas of eastern North America, western

Notes:

urbanite 都会人

unearthly ぞっとする
ような

dispel …を一掃する

hazard 危険

ailment(s) 病気

bulldoze(d) …をブルドーザーで取り除く

habitat(s) (動物の) 生息地

toxic 有害な

dumping 投棄

ecologist 生態学者

implication(s) 影響

atlas 地図帳

urbanised 都市化された

Europe, Japan and South Korea, night has become a constant twilight.

In a natural night sky, someone looking at the heavens with the unaided eye should be able to see nearly 3500 stars and planets and the glow from the Milky Way, our home galaxy. But in large cities, the number of visible stars has dwindled to about a few dozen.

This stunning drop has caused Canadian astronomy writer Terence Dickinson to lament, "It's now possible to grow up never having been exposed to the natural beauty and inspiration of the night sky."

The key author of the bright-sky atlas, astronomer Pierantonio Cinzano of the University of Padua in Italy, and his research team have found that many people's eyes now never get to the stage where they are fully adapted to darkness. The researchers have calculated that one-tenth of people in the world have lost much of their night vision.

Other creatures appear also to be highly susceptible to this disturbance. Lighting from office towers confuses migratory birds, which fly into buildings lit up at night. Millions of birds in North America die from these crashes. In the city of Toronto alone, downtown skyscrapers injure or kill an estimated 24,000 birds a year, according to monitoring by a local environment group.

Florida researchers have noticed since the 1980s

twilight 薄明かり

the Milky Way 天の川

galaxy 銀河

dwindle (d) 少なくなる

stunning 驚くべき

astronomy 天文学

lament 悲しむ

adapted to …に適した

susceptible to …の影響を受けやすい

disturbance 妨害

migratory 移住性の

skyscraper (s) 超高層ビル

that artificial light along ocean beaches confuses baby sea turtles. Statewide, more than a million hatchlings have been affected. Observers say that the turtles instinctively crawl to the brightest thing on the horizon — normally the reflection of the stars and the moon on the sea. But where beaches are illuminated, baby turtles often crawl towards lit roads, where they are flattened by cars, or wander in circles on the beach. Once day breaks, they bake to death in the sun.

Bryant Buchanan, a biology professor at Utica College in New York, has conducted experiments in which he showed that even the dim light of a child's night-light is enough to blind nocturnal frogs. He reports that when a sports stadium lit up for nighttime games, frog courtship stopped. "Clearly, if you're reducing the number of nights a frog can breed, year after year, that's going to have an effect," he says.

9 Biologists also say that light at night has an effect similar to habitat loss and can render an area unsuitable for some wildlife. As well, like many toxic compounds, light has the ability to cause mental distress or impairment in vulnerable species.

Why the effect is so dramatic is not fully known and may differ depending on the species. Outen says an intuitive explanation is evolutionary. "Life

statewide 州全体に
わたって

hatchling(s) 孵化
(ふか)した動物

instinctively 本能的
に

flatten(ed) …をべ
しゃんこにする

dim かすかな

nocturnal 夜行性の

courtship (動物の)
求愛活動

render (…を)…に変
える

distress 苦痛

impairment 損傷

vulnerable (病気な
どに)弱い

evolved in the presence of alternating darkness and light.”

Sea turtles and birds are clearly in peril because of light at night, but scientists have begun to study whether humans may share something of the same fate. Richard Stevens, an epidemiologist at the University of Connecticut Health Centre, has developed the idea that light at night can disrupt critical hormone levels that affect human health.

Stevens came to this conclusion while trying to solve the puzzle of why breast-cancer risk is five times higher in industrialised societies than in developing countries.

In the early 1980s, researchers speculated that the disparity might have something to do with fatty Western diets, genetics or exposure to toxic chemicals — explanations that have since been found wanting.

Stevens was working at a US Department of Energy lab, where studies were being done on the biological effects of magnetic fields. Thinking about the fields electric currents produce, he realised that “the most interesting aspect of electricity is light, the light environment.”

Stevens turned to the scientific literature on circadian rhythms — the 24-hour biological clock that guides daily body functions — and on melatonin, a hormone most living creatures produce only in darkness. Since then, he’s been developing the

intuitive 直感的な

evolutionary 進化に

かかわる

evolve(d) 進化する

peril 危険

epidemiologist 疫学

者

disrupt …を混乱さ

せる

disparity 相違

genetics 遺伝的特徴

circadian 24時間周

期の

melatonin メラトニ

ン

theory that something as harmless as a lit light bulb may affect people's health.

In a study published in 2001, Stevens says that there is “mounting ¹⁰evidence to suggest that disruption of the melatonin rhythm may lead to chronic fatigue, depression, reproductive anomalies and perhaps even cancer.”

Another study Stevens worked on showed that women who worked the overnight shift, such as nurses, seemed to have a ¹¹substantially higher risk of breast cancer. Those in the study who had a history of working night shifts presented a 60-percent higher risk.

Stevens was impressed by other research that reported a 20- to 50-percent lower risk of breast cancer in blind women. In one of these studies, it appeared the more visually impaired a woman was, the lower her risk of cancer.

How does light do it? Stevens thinks the key is melatonin, produced in the brain's pineal gland only when the eyes signal it is dark. Production begins around nightfall, peaks between 1 a.m. and 2 a.m., and shuts off during the day.

Those who work under lighting at night could be reducing the amount of melatonin they produce. Experiments have shown that melatonin may inhibit oestrogen from stimulating the growth of breast-cancer cells, which explains why blind women, who presumably maintain high melatonin levels, could be

mounting ますます
増える

chronic 慢性の

fatigue 疲れ

reproductive 生殖の

anomalies < anomaly

異常

impaired 障害のある

pineal gland 松果体

inhibit …を抑制する

oestrogen エストロ

ゲン

less at risk, while night-shift workers are more susceptible.

A big question is whether the public is at risk from milder night light such as the artificial glow of the sky or even a light shining into a bedroom.

In Stevens's research, there was also an indication of elevated breast-cancer risk in women who reported sleeping in the brightest bedrooms — where there was just enough light pollution at night that they could read. That result suggests that light levels in major cities could be dangerous, although it is too early to draw conclusions. Still, Stevens says, people should take seriously anything that leads to even a tiny change in the level of a critical hormone. “If you have a small suppression of a hormone for many years, it might have a big impact.”

David Blask, a scientist at the Bassett Healthcare's Research Institute in Cooperstown, New York, became interested in melatonin after experiments showed that pineal-gland extracts from cows or pigs injected into humans with cancer had some improving effects. “It acts like a roadblock, like tamoxifen, in slowing down breast-cancer growth,” he says.

In his research on rats, Blask found that even a slight amount of light at night shuts down production of melatonin. Surprisingly, rats exposed to a tiny amount of night light had the same rate of

suppression 抑圧

extract(s) 抽出されたもの

inject(ed) …を注射する

roadblock 障害物

tamoxifen タモキシフェン

tumour growth as rodents exposed to light around¹²
the clock. Luckily for humans, we're far less
sensitive to light at night than rats and other lower
animals.

Blask is still testing the melatonin hypothesis,
trying to zero in¹³ on how dim light has to be before it
no longer seems to stimulate¹⁴ cancer-cell growth.
There is much that scientists don't know about
melatonin. Some people seem to be far more
sensitive to the night-light effect, and women appear
to be more vulnerable than men. At this point,
Blask says he wouldn't go as far as to advise people
to turn off their lights and sit in darkness for health
reasons. "But I think there's enough evidence to be
cautious and limit our exposure to bright light at
night."

Travis Longcore, science director at The Urban
Wildlands Group (a Los Angeles conservation think
tank), says that light pollution should be receiving
the same attention as other environmental ills.
Environmentalists say light pollution has been
growing by about ten percent a year since the 1960s,
and only recently have serious efforts begun to try
to control it.¹⁵

tumour 腫瘍

rodent(s) げっ歯類

動物

conservation 保護

〔1〕 下線部A, Bを日本語に訳しなさい。(解答用紙その2)

〔2〕 1～7の質問に対しては英文の内容から判断し, また, 下線部8～15の質問に対しては前後関係から判断してもっとも適切と思われるものをひとつ選び, その番号のところをマークしなさい。(解答用紙その1)

1. People everywhere turn on the lights at night because they try to
 - (1) eliminate the limitations of the night.
 - (2) investigate the cause of light pollution.
 - (3) see all the stars in a night sky.
 - (4) save an endangered species.

2. Which area from satellite images is not in constant twilight?
 - (1) Western Europe.
 - (2) Japan.
 - (3) South Korea.
 - (4) South America.

3. Florida researchers have found that
 - (1) natural light along ocean beaches confuses baby sea turtles.
 - (2) lighting from office towers confuses migratory birds.
 - (3) downtown skyscrapers injure or kill an estimated 24,000 baby turtles a year.
 - (4) baby sea turtles often go to artificially lit roads or get lost on beaches.

4. Biologists say that light at night

- (1) has the ability to cause mental disorders in strong species.
- (2) has an effect different from habitat loss.
- (3) can make homes unsuitable for some wildlife species.
- (4) causes toxic compounds in all species.

5. Richard Stevens was impressed by other research showing that

- (1) the more visually impaired a man was, the higher his risk of cancer.
- (2) the more health-conscious a woman was, the lower her danger of cancer.
- (3) the more hearing-impaired a man was, the higher his risk of cancer.
- (4) the more visually impaired a woman was, the lower her danger of cancer.

6. What is the relationship between light and melatonin production?

- (1) Melatonin is produced when the eyes give the signal that it is dark.
- (2) Night-shift workers could be increasing the amount of melatonin they produce.
- (3) Day-shift workers produce more melatonin than night-shift workers.
- (4) Melatonin production begins around nightfall and ends during the day regardless of the eyes' signal.

7. In Blask's research on rats, he found that

- (1) rats are less sensitive to light at night than humans.
- (2) humans are far more sensitive to light at night than rats.
- (3) even dim light at night shuts off production of melatonin.
- (4) a slight amount of daylight speeds up tumour-growth rate.

8. The word “grave” means

- (1) very strong.
- (2) very serious.
- (3) very important.
- (4) very heavy.

9. The word “effect” means

- (1) depth.
- (2) affection.
- (3) answer.
- (4) influence.

10. The word “evidence” means

- (1) issue.
- (2) mission.
- (3) proof.
- (4) performance.

11. The word “substantially” means

- (1) proportionately.
- (2) greatly.
- (3) efficiently.
- (4) purposely.

12. The phrase “around the clock” means

- (1) day and night.
- (2) from sunrise to sunset.
- (3) during the daytime.
- (4) during the nighttime.

13. The phrase “zero in” means

- (1) focus.
- (2) depend.
- (3) rely.
- (4) switch.

14. The word “stimulate” means

- (1) release.
- (2) free.
- (3) encourage.
- (4) diminish.

15. The word “it” refers to

- (1) about ten percent a year.
- (2) light pollution.
- (3) the 1960s.
- (4) the same attention.

〔3〕 次の文の中から、本文の内容と一致するものを4つ選んで、その番号のところにマークしなさい。(解答用紙その1)

1. 過剰照明公害は環境に対する脅威ではあるが、有毒物質の不法投棄などと比較すると、それほど深刻なものではない。
2. 世界の人口の約3分の2が光に汚染された夜空のもとで生活をしている。
3. イタリアのPadua大学の研究者らの調査によると、世界の人口の10分の1が暗視力の多くを失っているということである。
4. トロントでは、1年間に数百万羽の渡り鳥が夜間に照明のついた超高層ビルにぶつかり死んでいる。
5. Richard Stevensが最も興味をもったのは、光ではなく電流が発する電磁場である。
6. メラトニンとは、松果体で作られ分泌されるホルモンで、外界の光周期情報と連動する。
7. 夜に少しだけ光にさらされたネズミと、一日中光にさらされたげっ歯類動物を比較すると、腫瘍の増殖率は同じであった。
8. 過剰照明公害は、1980年代から年間10パーセントの割合で増えてきている。
9. 過剰照明公害については、1960年代から本格的に研究されている。
10. すべての生物が夜間の過剰照明公害の影響を全く同じように受ける。

- 2 以下のそれぞれの定義に従って、指定された頭文字で始まる単語を書きなさい。(ただし、解答は与えられた頭文字から書くこと)(解答用紙その2)

(解答例)

someone who is trained in science, especially someone whose job is to do scientific research

→(s)

正解 (scientist)

1. a unit of money that is used in the U.K. and several other countries

→(p)

2. the amount that you get when you add several numbers or things together

→(t)

3. advanced scientific knowledge that is used for practical purposes, especially in industry

→(t)

4. the smallest amount or degree of something that is necessary or possible

→(m)

5. an area or structure that a ball must go into or through to score points in some sports

→(g)

6. the lightest gas, with no color, taste or smell, that combines with oxygen to form water

→(h)

7. a running race of slightly over 26 miles (42.195 kilometers)

→(m)

8. the direction that points straight up, at an angle of 90 degrees to a flat surface

→(v)

9. the force of the atmosphere on the earth's surface

→(p)

10. a group of letters, numbers or other symbols which represent a scientific or mathematical rule

→(f)

3 次の会話文を読んで、以下の問いに答えなさい。

〔1〕 選択肢 1～10の中から、空欄A～Fに入れるのに最も適切と思われるものを一つ選び、その番号のところにマークしなさい。(解答用紙その1)

Tina: Look, Lynn. They've (A) the new flavor!

Lynn: So (B)? I always get Double Chocolate anyway.

Tina: Yeah, but (C) you ever want to try something new?

Lynn: No, I'm happy with my favorite. So, (D) you going to try the new one?

Tina: I'll have a taste first.

(Upon receiving a tasting scoop, Tina samples the new flavor.)

Lynn: Well, (E) is it? Like you expected?

Tina: Well, not really. I think I'll have Vanilla.

Lynn: That's very adventuresome! You're just as predictable as me. When was the last time you ordered something other than Vanilla?

Tina: Well, at least I (F) new things.

Lynn: Hurry up and order. We could have eaten our cones by now if you had not wanted to experience the new flavor.

- | | |
|------------|----------|
| 1. how | 6. which |
| 2. what | 7. got |
| 3. doesn't | 8. don't |
| 4. are | 9. try |
| 5. have | 10. can |

〔2〕 次の文の中から会話文の内容と一致と思われるものを4つ選んで、その番号のところにマークしなさい。(解答用紙その1)

1. Tina is excited to see the new flavor is available.
2. They are talking about ice cream.
3. Lynn is excited there is a new flavor.
4. Lynn always orders the same flavor.
5. Tina liked the new flavor.
6. Tina wants to order a chocolate flavor but doesn't.
7. Tina is like Lynn in the sense she always orders the same flavor.
8. Most likely, Tina and Lynn are not in an ice cream shop.

4 次の日本語の文を表現するような英文を、与えられた書き出しを使って完成しなさい。(解答用紙その3)

1. アメリカの歴史の中でアフリカ系アメリカ人たちは、どんな役割を果たしてきましたか。

What...

2. 我々の新しい家は、半世紀前に建てられた古い家の約4倍の大きさがある。

Our new house is...

3. すぐに家を出なければ、列車に間に合わないでしょう。

Unless...

