

臺北市立松山高級中學 115 學年度第 3 次正式教師甄選初試

英文科 筆試試題卷

— 作答注意事項 —

考試時間：120 分鐘

題型配分：

第壹部分

- 單選題共 40 分

第貳部分

- 非選擇題共 60 分

作答方式：

- 選擇題請用 2B 鉛筆在「答案卡」上作答；未依規定畫記答案卡，致機器掃描無法辨識答案，其後果由考生自行承擔。
- 非選擇題請用藍色或黑色原子筆作答在「答案卷」上，紙張用完不再加紙。

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英文科 筆試試題卷

第壹部份：單選題 (40%)

I. **Vocabulary (10%):** Choose the word that best completes the sentence.

1. Door handles can _____ germs, so they should be disinfected regularly.
(A) engender (B) harbor (C) cultivate (D) incubate
2. Though the Hagia Sophia in Istanbul is an old building, it is still structurally _____.
(A) grounded (B) adequate (C) rigid (D) sound
3. I am _____ sure that this is the right address, but let's double-check with the neighbor to be safe.
(A) positively (B) fairly (C) vaguely (D) barely
4. Customers who enjoyed fizzy drinks complained about being served _____ soda at the restaurant.
(A) bland (B) stale (C) flat (D) rancid
5. Despite all that we know about the octopus, many aspects of its behavior still defy _____ and continue to puzzle scientists.
(A) explanation (B) analysis (C) pattern (D) routine
6. The Paris Climate Agreement is not legally _____, allowing countries to set their own targets without strict enforcement mechanisms.
(A) permissible (B) binding (C) sanctioned (D) flexible
7. Research should be focused on seeking truth instead of serving the _____ of faceless bureaucrats or satisfying the desire for personal profit.
(A) sentence (B) motive (C) vision (D) agenda
8. The collapse of the Rana Plaza building in Bangladesh in 2013 was traced to construction companies that cut _____ on safety inspections and structural standards.
(A) obligations (B) ropes (C) corners (D) volumes
9. Beijing's military maneuvers and hints of a blockade _____ speculation about whether China might attempt a more aggressive move if US support for Taiwan appeared to weaken.
(A) dismissed (B) arose (C) cast (D) invited
10. Before the 2008 financial crisis, few banks _____ the thought that housing prices could collapse nationwide and were therefore ill-prepared for the cascading defaults that followed.
(A) entertained (B) reasoned (C) projected (D) hatched

II. **Matching Headings (12%):** Choose the correct heading for each paragraph from the list of headings below.

List of Headings

- (A) Attentional focus during aerial rotation
- (B) Digital mediation of kinesthetic awareness
- (C) Rotational dynamics and the distribution of mass
- (D) The role of gravitational alignment in athletic stability
- (E) Angular momentum as a determinant of jump success
- (AB) The pursuit of the quintuple jump in competitive skating
- (AC) Center of mass displacement during multi-rotation jumps
- (AD) The paradox of mass and momentum in elite competition

11. _____

One of the best places to explore a variety of physical forces is figure skating. A skater's every twist, turn, and leap begins with balance. And balance relies on being able to keep your center of mass—which, as the name implies, is the center of where an object's mass is located—directly over a point of contact with the ice. For a highly symmetric object like a circle or sphere, that is in the dead center. For the lumpier, bumpier shape of the human body, the center of mass varies from person to person but tends to be a bit below the navel. Through glides, spins, takeoffs and landings, a figure skater has to keep their center of mass aligned with a foot on the ice—or risk taking a tumble.

12. _____

It's not just the center of mass that matters in figure skating. The 'moment of inertia,' a measure of how that mass is distributed relative to the center of gravity, makes a difference too. This is best illustrated by the conservation of angular momentum: as a skater pulls their arms inward, they decrease their moment of inertia, which forces their rotational speed to increase. Extending the arms has the opposite effect, spreading the mass out and slowing the spin. This is the same principle one experiences when spinning in an office chair; the tighter the tuck, the faster the world blurs by.

13. _____

Jumps are perhaps the most complex expression of these forces, requiring a precise trade-off between vertical lift and rotational energy. According to James Richards, a professor of kinesiology and applied physiology at the University of Delaware, a successful jump relies on the angular momentum generated at takeoff, the time spent in the air, and how small the skater can make their moment of inertia. Interestingly, many elite skaters already possess enough power to complete high-level jumps but struggle with the mechanics of the spin itself. Even a tiny correction—moving the arms by just three or four degrees—can be the difference between a clean landing and an incomplete rotation.

14. _____

To help athletes visualize these invisible forces, scientists have moved away from abstract charts and toward digital avatars. By translating high-speed video into 3D models, coaches can show skaters exactly how small adjustments to their body position affect their performance. This data shows that the strength required for these adjustments is actually well within a skater’s physical limits. The real hurdle is often neurological; humans seem to have an ‘internal speed limit’ for rotation, and it takes months of training to convince the brain to allow the body to spin faster than its natural comfort zone.

15. _____

The push from triple jumps to quadruples—and the theoretical quintuple—highlights the physical limits of the sport. There is a delicate ‘balance of balance’: while building more muscle might help a skater jump higher, that extra mass can increase the moment of inertia and slow the rotation down. If the increase in airtime is offset by a slower spin, the extra height becomes a disadvantage. This leads some experts to believe that under current rules, the quadruple jump may be the human ceiling, as there is very little room left to pull the arms in tighter or jump significantly higher without gaining slow mass.

16. _____

Despite these constraints, the future of the sport remains an open question. While some scientists view the quintuple jump as a bridge too far, others suggest that optimizations in landing technique, such as bending more deeply at the hips to eke out a few more degrees of rotation, could make five turns possible by the 2030s. Some have even experimented with hand weights to artificially boost rotational speed, though this is currently banned in competition. For now, the quest for more rotations remains a grueling test of how much an athlete can manipulate the laws of physics before their own biology pushes back.

III. Matching Information (8%): There are eight paragraphs labelled (A) to (AD) below. Which paragraph or paragraphs contain the following information?

- 17. _____ behavioral signs used to measure mood
- 18. _____ a potential medical application of gut science
- 19. _____ a hypothesis about bacteria using exercise byproducts
- 20. _____ evidence that microbes can boost physical performance

(A) What if you could get more out of your workout just by transferring microbes from an athlete’s gut into yours? That’s the question scientists at Harvard University wanted to explore. They collected daily stool samples over the course of two weeks from 15 runners in the 2015 Boston Marathon—starting one week before the race, ending one week after—and compared them with daily stool samples taken for two weeks from a control group of 10 non-runners. A few days after the marathon, the scientists found, the runners had significantly more *Veillonella atypica* bacteria in their stool than did the non-runners.

(B) 'It set up a bit of a light bulb because of the unique metabolism of *Veillonella*, which uses lactate as its preferred source of energy,' says Aleksandar Kostic, of the Joslin Diabetes Center and Harvard Medical School. Lactate is generated by muscles during intense exercise. 'That got us thinking: Is it possible that the *Veillonella* is metabolizing muscle-derived lactate in the athletes? And if it was, could infusions of *Veillonella* help nonathletes perform better?'

(C) Next they turned to lab mice. They extracted *Veillonella* from one runner's stool and infused the bacterium into 16 mice with normal microbiomes that had been screened for pathogens. Then they put the mice on tiny treadmills and had them run to exhaustion. They did the same with 16 control mice, using a different bacterium that isn't involved in lactate metabolism. The *Veillonella* mice could run for 13 percent longer than the control mice, leading the investigators to conclude that the microbiome might play a critical role in physical performance.

(D) Kostic says the experiment offers 'a really elegant example of how symbiosis comes to happen.' The *Veillonella* benefits when the muscles of the host, through exercise, generate the lactate it lives on. The host, in turn, benefits because *Veillonella* turns lactate into propionate, which enhances the capacity for exercise by, among other things, increasing heart rate and oxygen metabolism, and possibly by reducing muscle inflammation. 'This kind of relationship, I think, underlies most human-microbiome relationships,' Kostic says. 'Ultimately, there's this kind of mutualistic relationship happening.'

(E) The microbiome might account for some less advantageous traits too, including mental states such as anxiety and depression. In 2016 scientists at University College Cork in Ireland published a demonstration of the microbiome-depression link when they transplanted stool from depressed humans into rats. Would the rats become depressed too?

(AB) The scientists divided 28 lab rats into two groups. The experimental rats received fecal transplants from a pooled preparation from three severely depressed male patients; the control rats got transplants of pooled feces from three healthy males.

(AC) It turned out that getting fecal transplants from the depressed men made the rats depressed. Compared with the controls, they exhibited a loss of interest in pleasurable activities (as measured in rats by how often they chose to drink sugar water), and increased anxiety (which in rats means avoiding open or unfamiliar sections of a laboratory maze).

(AD) While acknowledging it's a leap from rats to humans, the scientists say their work adds to the evidence that the microbiome of the gut could play a role in how depression develops. Targeting these microorganisms, they say, might one day help treat depression and other mood disorders.

IV. Discourse Structure (10%): Rearrange the following sentences to form a coherent paragraph.

- (A) These cavernous foramina are likely buffered by internal air sacs, which act as protective cushions to prevent arterial rupture while the raptor rotates its head to scan its surroundings.
- (B) The amazing 270-degree head rotation of the owl, a feat that would result in a fatal stroke in humans, was recently illuminated by Johns Hopkins researchers using contrast-enhanced CT scans on cadaveric specimens.
- (C) Complementing this vascular layout, the cervical vertebrae contain transverse foramina—bony canals roughly ten times the diameter of the arteries they house—providing ample clearance for the vessels to shift without being pinched.
- (D) This imaging revealed that the birds avoid ischemic injury through specialized blood vessels beneath the jaw that balloon into expandable reservoirs, ensuring a continuous supply of oxygenated blood to the brain during extreme torsion.
- (E) But even with uninterrupted blood flow, injury-free rotation would not be possible without the owl’s carotid arteries strategically sequestered near the center of rotation in front of the spine, a midline placement that subjects the vessels to significantly less mechanical shear than the lateralized arteries of other species.

21. _____ → 22. _____ → 23. _____ → 24. _____ → 25. _____

第貳部分：非選擇題 (60%)

I. Vocabulary Explanation & Vocabulary Test Design (10%)

- (1) **Vocabulary Explanation:** Explain the differences between the word pairs in (A) and (B) to 11th-grade students. (6%)
- (2) **Vocabulary Test Design:** Create a fill-in-the-blank vocabulary question for each word to assess students' comprehension, and provide the answers. (4%)

(A) custom vs. tradition	(B) contain vs. include
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II. Worksheet Design: Sentence Pattern “S + V, V-ing” (10%)

Participial constructions frequently appear in senior high school English textbooks; however, students often struggle to use them accurately. Design a worksheet that helps students effectively master the **three** core usages of the “S + V, V-ing” sentence pattern. The worksheet must provide clear explanations and example sentences for each of the three usages.

III. Test Design: Reading Comprehension (20%)

- (1) **Passage Rewrite:** Rewrite the following passage in 300–350 words at a level appropriate for 12th-grade students. (8%)
- (2) **Multiple-Choice Questions:** Based on the rewritten passage, design four multiple-choice reading comprehension questions in the style of the GSAT. Provide the correct answer for each question. (12%)

Ocean acidification is sometimes called “climate change’s equally evil twin,” and for good reason: it's a significant and harmful consequence of excess carbon dioxide in the atmosphere that we cannot see or feel because its effects are happening underwater. At least one-quarter of the carbon dioxide (CO₂) released by burning coal, oil, and gas doesn't stay in the air, but instead dissolves into the ocean. Since the beginning of the industrial era, the ocean has absorbed 525 billion tons of CO₂ from the atmosphere, presently around 22 million tons per day.

At first, scientists thought this might be beneficial because it would leave less carbon dioxide in the atmosphere to warm the planet. But in the past decade, they’ve realized that this slowed warming has come at the cost of changing the ocean’s chemistry. When carbon dioxide dissolves in seawater, the water becomes more acidic, and the ocean’s pH—a measure of how acidic or basic it is—drops. Even though the ocean is immense, enough carbon dioxide can have a significant impact. In the past 200 years alone, ocean water has become 30 percent more acidic—faster than any known change in ocean chemistry in the last 50 million years.

Scientists previously didn’t worry about this process because they always assumed that rivers carried enough dissolved chemicals from rocks into the ocean to keep the ocean’s pH stable through a natural stabilizing effect known as “buffering.” But so much carbon dioxide is dissolving into the ocean so quickly

that this natural buffering hasn't been able to keep up, resulting in a relatively rapid decline in the pH in surface waters. As those surface layers gradually mix into deep water, the entire ocean is affected.

Such a rapid change in ocean chemistry doesn't give marine life, which evolved over millions of years in an ocean with a generally stable pH, much time to adapt. In fact, the shells of some animals are already dissolving in the more acidic seawater, and that's just one way that acidification may affect ocean life. Overall, it's expected to have dramatic and mostly negative impacts on ocean ecosystems—although some species, especially those that live in estuaries, are finding ways to adapt to the changing conditions.

However, while the chemistry is predictable, the details of the biological impacts are not. Although scientists have been tracking ocean pH for more than 30 years, biological studies really only started in 2003, when the rapid shift caught their attention and the term "ocean acidification" was first coined. What we do know is that marine ecosystems will look different, and we can't predict in any detail how they will look. Some organisms will survive or even thrive under the more acidic conditions, while others will struggle to adapt, and may even go extinct. Beyond lost biodiversity, acidification will affect fisheries and aquaculture, threatening food security and livelihoods for millions of people worldwide, as well as tourism and other sea-related economies. *(Word Count: 491)*

(from Smithsonian)

IV. Essay Writing Feedback (10%)

Read the following English writing prompt for GSAT preparation and the sample essay written by a 12th-grade student. Then, complete the tasks below:

(1) Error Correction & Scoring: Correct the language errors in the essay and assign an overall score based on the GSAT grading rubrics (5%)

(2) Constructive Feedback: Suggest specific ways to improve idea development and overall content quality. (5%)

英文作文（占 20 分）

說明：依提示在「答案卷」上寫一篇英文作文。文長至少 120 個單詞（words）。

提示：在全球化的趨勢之下，各級學校的國際交流活動日益頻繁，教育部亦將「培育全球公民」、「促進教育國際化」及「拓展全球交流」列為重要的國際教育政策目標。請寫一篇英文作文，文分兩段，第一段描述當外國學校到你的學校參訪時，你會如何安排交流活動；第二段請說明這些活動能達成什麼目標或參與者能從中學到什麼。

Sample Essay:

When the foreign school visit our school next month, I think we should prepare many interesting activity for them because if not they maybe feel boring and think our school is not warm. First, we can arrange them to visit our campus, such as library, gym and classroom, and let student introduce our school history, this can make them know more about us. After that, we can have a elaborate welcome

performance, maybe dancing, singing songs, and some club shows, because students in our school are very talent. Also don't forget to eat lunch together in the hot food place, and we can prepare Taiwanese foods like bubble tea and fried chicken. After lunch we play basketball, do English class together maybe go to the night market if time is ok.

I choose these activities because it can improve our friendship more stronger and let them understand our school deeply, also we can make good memory. The goal is to improve international view and increase English speaking chance. This exchange will bring a influence to our English ability and improve friendship relationship between two schools in the future.

V. Essay Question (10%)

With the widespread use of AI-powered translation and language tools, some students argue that learning English is no longer necessary. How would you guide students to reconsider this mindset, and what specific adjustments would you make to your pedagogical approach?