

中央警察大學 113 學年度碩士班入學考試試題

所 別：各所
科 目：英文

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一、Vocabulary and Usage: Choose the best word or phrase to complete each sentence. (20 分)

1. Law enforcement agencies are increasingly prioritizing measures to combat the prevalence of _____, a form of harassment that involves unwanted and obsessive attention towards an individual.
(A) hacking (B) stalking (C) graffiti (D) jaywalking
2. The defendant claimed that the confession was made under _____, arguing that he was coerced into admitting guilt by threats of violence against his family.
(A) duress (B) consent (C) compliance (D) corroboration
3. The British Royal Family decided to sue a French magazine for publishing paparazzi photographs of their members and _____ their privacy.
(A) detecting (B) infringing (C) adventuring (D) violating
4. After the earthquake, the authorities ordered the immediate _____ of all buildings in the affected area.
(A) reinforcement (B) demolition
(C) evacuation (D) detention
5. A bomb _____ outside an elementary school and injured lots of passersby, prompting the city police to start investigating this case.
(A) set out (B) went off (C) lit up (D) put out

6. The defense attorney successfully argued that the evidence obtained through illegal search and seizure was _____ in court proceedings.
(A) adoptable (B) legitimate (C) inadmissible (D) reliable
7. Several gangsters involved in the assault of a police officer are still _____.
(A) out of hand (B) down to earth (C) at large (D) out of breath
8. Without permission, passengers are not allowed to stay within the _____ of MRT routes, stations, or trains during non-service hours.
(A) gratitude (B) confines (C) privilege (D) alliance
9. The city council allocated funds for the renovation of critical _____, including bridges, roads, and water supply systems.
(A) recreational facilities (B) attractions
(C) landmarks (D) infrastructure
10. The company's accountant was charged with _____, accused of unlawfully transferring company funds into her personal accounts.
(A) conspiracy (B) extortion (C) mischief (D) embezzlement

二、Translation : (30 分)

(一) 英譯中 (15 分)

Internet fraud, or cyber fraud, involves deceitful practices conducted over the internet to swindle individuals or organizations for financial gain. It encompasses a range of fraudulent activities, including phishing scams, identity theft, fake auctions, investment fraud, and credit card fraud. Perpetrators utilize sophisticated methods to trick victims into disclosing sensitive information or transferring money, posing substantial risks to personal and financial security.

(二) 中譯英 (15 分)

毒品販運活動對社會造成了嚴重的影響，包括犯罪率上升、社會穩定受到威脅以及人民健康問題增加。為此，政府加大了對毒品販運的打擊力度，提高了刑事懲罰和查緝行動，並加強邊境巡邏及國際合作以打擊販毒集團的行動。

三、Reading Comprehension and Cloze Test : (20 分)

(一) Reading Comprehension : After reading the passage, choose the best answer to each question. (10 分)

We have been cautioned that whether cell phone conversation is simply small talk with our friends or the making of a complex financial deal, when we are behind the wheel, it distracts us from the business at hand. Researchers have found out exactly why. The brain has limited capacity to handle multiple tasks simultaneously, leading to compromised processing of visual signals when engaged in a conversation. With visual and auditory signals competing, a driver's ability to see and react to what's ahead--even when gazing directly at a car, sign or pedestrian--is diminished. This phenomenon of "inattention blindness," in which the brain doesn't fully process what the eyes are taking in, helps explain how cell phone conversations distract drivers and contribute to an increasing number of accidents.

With over 330 million cell phone subscribers in the U.S., studies indicate that a significant portion of them use their phones behind the wheel. "Looking and seeing aren't one and the same," said University of Utah psychologist David Strayer, who has spent five years studying how the use of cellular phones affect driving. "Your eyes being directed at something doesn't mean you're processing it. Looking means paying attention. When you're not attending to driving, you're more of a hazard." With a conversation diverting their attention from the road, drivers are unable to react quickly to sudden events such as a child running into their path or a light change. The damage occurs equally with handheld or hands-free models. That suggests the problem lies in the distraction of the conversation, not in the holding of the phone.

1. What is the best title for this passage?
 - (A) The Hazards of Cell Phone Conversations While Driving
 - (B) The Benefits of Hands-Free Models in Driving Safety
 - (C) Exploring the Cognitive Impact of Multitasking While Driving
 - (D) The Role of Cell Phones in Car Accidents

2. How does University of Utah psychologist David Strayer characterize the difference between “looking” and “seeing” in the context of driving?
 - (A) Looking means paying attention, while seeing means being distracted.
 - (B) Looking implies processing visual signals, while seeing implies visual distraction.
 - (C) Looking and seeing are synonymous in the context of driving.
 - (D) Looking involves gazing directly at objects, while seeing involves understanding the road environment.

3. What is the definition of the term “inattention blindness” as described in the passage?
 - (A) A condition where one is blind to certain visual stimuli while driving
 - (B) A phenomenon where one's visual perception is hindered due to lack of attention
 - (C) A cognitive state where one becomes hyper-aware of surrounding distractions
 - (D) A neurological disorder affecting the eye's ability to process visual information

4. According to the author, what is the real cause behind all the cell phone-related accidents?
- (A) The act of holding the cell phone.
 - (B) The cause is still unknown.
 - (C) The phone conversation itself.
 - (D) Drivers cannot see what is ahead of them.
5. According to the passage, why does engaging in cell phone conversation while driving lead to distraction?
- (A) Because it increases the visual processing capacity of the brain.
 - (B) Because it reduces the brain's ability to process visual signals.
 - (C) Because it enhances the driver's reaction time.
 - (D) Because it improves the driver's attention to the road.

(二) Cloze Test : Choose the best words or phrases to complete the following passage. (10分)

Taiwan was struck by a devastating earthquake on April 3, which had a significant impact on the eastern coast and the city of Hualien. ___1___ the chaos and destruction, the brave efforts of emergency responders, including police and specialized search and rescue teams, emerged as beacons of hope amid the crisis.

The ___2___ of the Hualien earthquake unfolded rapidly, demanding quick and decisive action from rescue teams. Rescuers ___3___ collapsed buildings, risking their lives to extract survivors trapped beneath the rubble. With every moment crucial, these courageous individuals displayed remarkable courage and determination in their rescue missions.

Alongside the search and rescue workers, police officers played a ___4___ role in maintaining order and coordinating rescue operations. Despite the dangers posed by aftershocks and unstable structures, these valiant professionals remained steadfast in their commitment to saving lives.

Notably, the indispensable contribution of rescue dogs cannot be overstated. Highly trained and incredibly resolute, these ___5___ heroes sniffed out survivors buried deep within the debris, guiding rescue teams to locations where human senses alone could not penetrate. Their unwavering dedication and fortitude exemplified the true spirit of service and sacrifice.

- 1.(A) Despite (B) In accordance with
(C) While (D) In terms of
- 2.(A) onset (B) aftermath (C) magnitude (D) afterwards
- 3.(A) plunged into (B) bumped into
(C) indulged into (D) ventured into
- 4.(A) redundant (B) optional (C) capricious (D) pivotal
- 5.(A) feline (B) canine (C) rodent (D) equine

四、Essay : (30 分)

Write a short essay on the following topic. The length of the essay should be no less than 100 words and no more than 250 words.

The pros and cons of being a police officer - from the perspective of the general public.

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一、Find the general solution：

(一) $y' = 3x^2 - \frac{y}{x}$; $y(1) = 5$ (8 分)

(二) $xy' - \frac{y^2}{x} = y$ (8 分)

(三) $y' + \frac{1}{x}y = \frac{1}{x^4}y^{-3/4}$ (9 分)

二、研究建築物火災問題時，經常要得到火場中空氣密度 (ρ ，單位： kg/m^3) 與溫度 (T ，單位： K) 的值，然而火場空氣密度 (ρ) 與火場空間內的溫度 (T) 是有相互關聯，請推導出火場空氣密度與火場溫度兩者相乘積 (ρT) 的值，大約是多少？在此，假設火場是在一大氣壓下 ($P_{\text{atm}}=1.01 \times 10^5 \text{ Pa}$)，空氣的平均分子量為 28.97 g/mol ，理想氣體常數為 8.31 J/mol.K 。

三、海龍滅火設備對滅火及環境之影響，請依序回答下列問題：

- (一) 請說明海龍滅火設備之滅火原理及環境之傷害？並舉例說明其命名規則。
- (二) 海龍替代品滅火設備對於臭氧層及溫室效應之影響為何？

四、有關突沸 boilover 之火災現象，請依序回答下列問題：

(一) 請闡述突沸 boilover 之原理？

(二) 突沸 boilover 之徵兆？

(三) 對救災人員之危害？

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科 目：消防安全設備與檢查

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- 一、世界各國火災統計幾乎均指出，建築物火災每年致死人數，均以「住宅類用途使用空間」高居第一。試問住宅火災安全防護專用的撒水頭(residential sprinklers)，與臺灣一般常用的法定撒水頭，在設計目的、撒水分佈態樣、系統構件、放射壓力與流量/密度等有何差異？試申論之。
- 二、消防署中央災害應變中心曾發生夜間火災災例，即使所設氣體藥劑自動滅火設備全區放射，卻仍造成機具損失、資料流失與部分營運中斷的重大事件。試問關鍵風險因子為何？此類 data center 及其周邊適合的滅火設備為何？請申論之。
- 三、有一供資訊科技研發使用之建築物(地上 15 層地下 3 層)，各層樓高約 4 公尺，其中地上 12 層供資訊中心使用，該樓地板面積為 1,600 平方公尺，設置有惰性氣體(IG-541)滅火設備，請繪製其化學滅火設備構造昇位圖及動作流程圖？請寫出有關 IG-541 滅火設備之藥劑化學式及安全濃度值、人體傷害值、溫室效應係數、熱分解生成物、設計濃度與計算公式等規定？其在個案申請審核認可時應注意事項為何？並依照「消防安全設備及必要檢修項目檢修基準」規定，應如何進行該化學滅火設備的性能檢查？

四、某一大樓第 2 層供美術館使用，該樓地板面積為 4,500.8 平方公尺，從業員工有 90 人，閱覽室、展示室、展覽室、會議室及休息室之樓地板面積和為 600 平方公尺，其收容人數應為多少？至少應設置多少具避難器具？依據「消防安全設備及必要檢修項目檢修基準」規定，請說明有關該避難器具之操作面積、下降空地及性能檢查等應注意事項及判定方法？

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- 一、火場救災指揮決斷（size-up）是火場指揮相當重要的程序之一，請以某消防分隊接獲轄內一高爾夫球代工工廠火災為例，說明初期消防救災指揮官到達火災現場時，火場救災指揮決斷的意義與過程為何？
- 二、近年來火災現場屢傳消防人員因救災導致傷亡的案例，為強化消防人員的火場救災安全，消防機關也有許多具體的措施。請以內政部消防署出版的救災安全手冊為例，說明該手冊第一章中對於國內現行建立救災安全的重要方案策略有哪些具體的做法。
- 三、2023 年底新竹縣發生消防分隊長入室搜索受困不幸殉職的事故，為避免憾事再次發生，請針對該項任務前準備、執行搜救中、退出火場以及迷失受困等過程，說明所需注意的事項。
- 四、有關消防安全檢查協助通報建築管理事業主管機關處理，已由「消防機關辦理消防安全檢查注意事項」中移除，如消防檢查時，遇有公共安全相關缺失，要如何處理？（10 分）在消防檢查時，常見的建築物公共安全缺失又有哪些？（15 分）

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一、求下列各極限：

(一) $\lim_{x \rightarrow 0} \frac{\sin x - \tan x}{x^3}$ 。(12 分)

(二) $\lim_{x \rightarrow 0} \frac{1 - \cos x}{x \ln(1+x)}$ 。(13 分)

二、請回答下列問題：

(一) 請證明 $\frac{d}{dx} \sin^{-1} x = \frac{1}{\sqrt{1-x^2}}$ ， $|x| < 1$ 。(13 分)

(二) 若 $y = \tan^{-1}(x - \sqrt{x^2 + 1})$ ，求 $\frac{dy}{dx}$ 。(12 分)

三、請回答下列問題：

(一) 求 $\int_1^{\infty} (1-2x)e^{-2x} dx = ?$ (13 分)

(二) 求 $y = \frac{(x-2)^3}{(x^2+1)^{1/3}}$ ， $x \neq 2$ 的導函數。(12 分)

四、請回答下列問題：

(一) 室溫（環境溫度）維持在 60°F ，如果某物從 100°F 降到 90°F 費時 10 分鐘，請問該物從 90°F 降至 70°F 還需要多少時間？
($\ln 2=0.6931$, $\ln 3=1.0986$, $\ln 4=1.3863$) (13 分)

(二) 求函數圖形在其指定區間的弧長：(12 分)

$$8y = x^4 + 2/x^2, \quad [1, 4]$$

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一、Find the eigenvalues and eigenfunctions.

(一) $y'' + \lambda y = 0, y(0) = 0, y(10) = 0$ (12 分)

(二) $(y'/x)' + (\lambda + 1)y/x^3 = 0, y(1) = 0, y(e^\pi) = 0$ (13 分)

二、A sinusoidal voltage $E \sin \omega t$, where t is time, is passed through a half-wave rectifier that clips the negative portion of the wave. Find the Fourier series of the resulting period function.

$$u(t) = \begin{cases} 0 & \text{if } -L < t < 0 \\ E \sin \omega t & \text{if } 0 < t < L \end{cases} \quad p = 2L = \frac{2\pi}{\omega}.$$

三、請以史帝芬—波茲曼 (Stefan-Boltzmann) 公式，說明幅射熱熱傳特性(10 分)，並針對設備測試、系統功能及性能設計方面，提出 3 種在防火工程 (Fire Safety Engineering) 上的運用情境 (15 分)。

四、請針對以下火羽在溫度層化環境下 (Plumes in Temperature - Stratified Ambients) 的描述，解讀附圖的物理現象。

原文：When a buoyant, turbulent plume rises, it cools by entrainment of ambient air. If the ambient air increases in temperature with height, which is normal in buildings, and the fire source is weak, the temperature difference between the plume and the ambient, which gives the plume buoyancy, may vanish and actually reverse in sign. Eventually the plume ceases to rise.

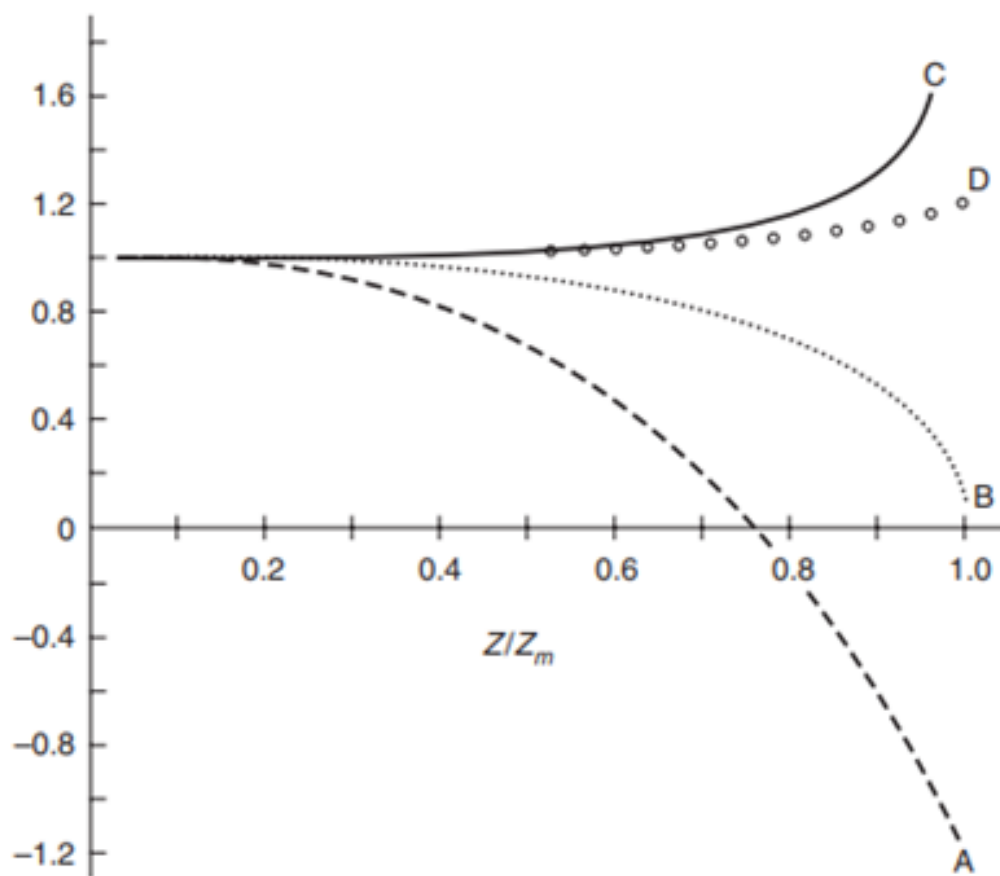


Figure: Theoretical behavior of centerline plume variables in linearly temperature-stratified ambients. Curve A: ratio of temperature rises (stratified versus unstratified), Curve B: ratio of axial velocities. Curve C: ratio of plume radii. Curve D: ratio of volumetric species concentrations. Where z : height above top of combustible (m) and Z_m : maximum vertical penetration of plume fluid in stratified ambient (m)

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- 一、現代滅火技術主要考慮因素為滅火效果、人身安全和保護環境三位一體的發展思路。世界先進國家無不致力於海龍替代藥劑之研發與驗證，因此，海龍替代藥劑之一的潔淨氣體滅火藥劑被研發出來，亦不斷改進。請寫出潔淨氣滅火系統中有關 Novec 1230 及 FM 200 滅火設備之藥劑化學式及啟動系統之流程圖？並簡述渠等設備之滅火性能中，有關安全濃度值、人體傷害值、溫室效應係數、熱分解生成物、設計濃度與計算公式等規定？從渠等藥劑安全資料表所敘述內容，深入檢討對人體造成健康及安全上的危害影響程度，並剖析目前消防及環保主管機關對其管理要求？消防主管機關現積極督促廠商自主檢驗及登錄機構檢討改善之策進作為有哪些？
- 二、請依照「各類場所消防安全設備設置標準」列出有關火焰式探測器設置規定為何？某展示中心室內裝置標稱監視距離為 25 公尺、偵測角度為 100 度的防爆型 UV/IR 紅外紫外複合火焰探測器，依照「火警探測器認可基準」，應如何進行該探測器的反覆試驗及溼度試驗？各項試驗時所發現何種不合格情形，應判定為致命缺點？
- 三、電動車因鋰電池的熱失控火災風險，讓住宅用途大樓附設地下停車場的居民，擔心停放過夜中之電動車發生火災而波及之風險；但電動車的製造開發使用又是世界必然的趨勢，試問有何關鍵必要可行的減災對策？請申論說明之。

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四、冷凍高架倉儲/物流中心，依法是否要檢討設置防火區劃及自動撒水設備？如果不設，對消防救災人員有何火災風險？試申論之。

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科 目：消防實務

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- 一、高雄城中城大樓大火，引發對全國 500 餘棟老舊集合住宅消防安全的關切，請問類似前述未成立管理委員會之場所，中央主管機關要求處理的做法為何？（15 分）地方消防機關應積極任事的方式又有哪些？（10 分）
- 二、受到國際地緣政治影響，以及烏俄戰爭的啟示，請說明大量傷患醫療應變之基本原則與現場作業流程（15 分），以及特殊衝突緊急救護應變上應注意的事項（10 分）。
- 三、火災調查目的為何？並請探討火災調查流程各階段之效益？
- 四、車上架梯射水為消防搶救訓練重點，請探討車上架梯射水與地面射水之不同高度射水對消防救災之差異？並從指揮官角度論述車上架梯射水之見解為何？

中央警察大學 112 學年度碩士班入學考試試題

所 別：各所
科 目：英文

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一、Vocabulary and Phrases : A word or phrase is missing in each of the following sentences. Please select the best answer to complete the sentence. (20 分)

1. Officer Chen appears to be polite, hardworking and _____. That's why he was appreciated by his supervisor.
(A) aggressive (B) absolute (C) accommodate (D) approximate
2. This journal article _____ organized crime in our city. The police should read it carefully.
(A) deals with (B) goes out (C) does without (D) runs out of
3. In order to lay up a flexible mechanism for national rescue service, the National Rescue Command Center needs to build up its organization and establish its legal _____ in detail.
(A) status (B) statistician
(C) stationer (D) stationmaster
4. A police focus on controlling disorder has been hypothesized to be an important way to reduce more serious crimes in _____.
(A) nomads (B) nerves
(C) narratives (D) neighborhoods
5. After the government carried out an effective policy, crime rate is on the _____.
(A) mission (B) decline (C) frustration (D) merchandise

6. The professor said that the unemployment rate moved up to 4.2% would _____ more social problems.
(A) cost in (B) survive from (C) result in (D) locate in
7. The chief looks cool and strict; he _____ displayed any sign of emotion.
(A) forgive (B) rarely (C) prepare to (D) activate to
8. Captain Wang got a promotion last week. It proved _____ to work hard in the agency.
(A) world-wise (B) wordplay (C) worthless (D) worthwhile
9. People who _____ themselves to financial stress feel frustrated easily and intend to commit fraud.
(A) represent (B) expose (C) announce (D) recommend
10. People are glad to see _____ economic recovery because looking for a job is easier than before.
(A) subordinate (B) temporary (C) articulate (D) sustainable

二、Translation (30 分)

(一) 英翻中

Five ways law enforcement agencies can implement the task force's recommendations:

1. Review and update policies, training, and data collection on use of force.
2. Increase transparency of data, policies, and procedures.
3. Call on the POST (Peace Officer Standards and Training) Commission to implement all levels of training.
4. Examine hiring practices and ways to involve the community in recruiting.
5. Ensures officers have access to the tools they need to keep them safe.

(二) 中翻英

「問題導向警政 (POP)」是 1979 年 Herman Goldstein 教授所提出的警政策略，其確認與分析特定犯罪及脫序問題，以發展有效的回應策略。常被用來解決問題的方法是 SARA 模式，包括：掃描、分析、回應、評估四個要項。

三、Reading Comprehension (20 分)

Confessions have been proved false in a number of situations, such as when it is discovered that the confessed crime was not 1; when new evidence shows it was physically impossible for the confessor to have committed the crime; when the real perpetrator is captured; and when DNA and other scientific evidence 2 establishes the confessor's innocence. False confession may be voluntary. Voluntary false confessions are those in which people claim responsibility for crimes they did not committed without 3 or pressure from police. There are several reasons why innocent people might volunteer confessions, for example a pathological need for attention or self-punishment; feeling of guilt or 4; or the desire to protect a parent, child or someone else. Undoubtedly, false confession may also be involuntary. An involuntary confession is one extracted by any sort of 5. It is a forced confession obtained under means of 6, enhanced interrogation technique or duress.

- | | | | |
|---------------------|-------------------|------------------|-----------------|
| 1. (A) committed | (B) commit | (C) committing | (D) to commit |
| 2. (A) aggressively | (B) affirmatively | (C) attractively | (D) assembly |
| 3. (A) prompt | (B) prompted | (C) prompting | (D) be prompted |
| 4. (A) exclusions | (B) conclusions | (C) collisions | (D) delusions |
| 5. (A) flavors | (B) privileges | (C) threats | (D) capacities |
| 6. (A) reward | (B) torture | (C) souvenir | (D) pleasure |

A turning point came 7 May, when the Trump administration announced a rule that would bar Huawei and its suppliers 8 using American technology and software. The decision, 9 to take effect in September, could throw Huawei's supply chain 10 chaos.

7. (A) during (B) from (C) on (D) in
8. (A) for (B) of (C) from (D) by
9. (A) slate (B) slated (C) slating (D) to slate
10. (A) into (B) by (C) at (D) beyond

四、Essay (30 分)

Many governments implemented social distancing and social isolation in response to the Covid-19 pandemic, which transformed citizens' social life. These drastic changes in social patterns likely changed the demand for police and other first responders services. Please describe your experience or opinion about this situation. The length of your essay should be no less than 150 words and no more than 400 words.

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科 目：微積分(同等學力加考)

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一、請回答下列各小題：

(一)計算 $y = (\ln x)^x$ 的導函數。(8 分)

(二)計算 $y = \frac{\sin 2x}{e^{x+1}}$ 的導函數。(8 分)

(三)計算 $y = (\ln^2 x)x^2$ 的導函數。(9 分)

二、請回答下列各小題：

(一) $\int_{-\infty}^{\infty} \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2} dx$ (15 分)

(二) $\int \frac{x+1}{x+2} dx$ (5 分)

(三) $\int \frac{(1+\ln x)^2}{x} dx$ (5 分)

三、求下列極限：

(一) $\lim_{x \rightarrow 0} x^x$ (12 分)

(二) $\lim_{x \rightarrow 0} (1 - \frac{x}{2})^{\frac{3}{x}}$ (13 分)

四、求下列微分：

(一) $\frac{d}{dx} e^2$ (5 分)

(二) $\frac{d}{dx} 2^x$ (10 分)

(三) $\frac{d}{dx} (\sin x)^x$ (10 分)

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科 目：火災科學

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- 3.禁用鉛筆作答，違者不予計分。
- 4.不需使用計算機，可用中文答題。

一、求下列函數的傅立葉級數（Fourier Series）：

$$f(x) = \begin{cases} \frac{2k}{L}x & , 0 < x < L/2 \\ \frac{2k}{L}(L-x) & , L/2 < x < L \end{cases} \quad , \text{請分別以偶函數展開 (even period extension) 及奇函數展開 (odd period extension) 表示。}$$

二、求解下列微分方程式的解：

(一) $y' + xy = xy^{-1}$, $y(0) = 3$ (12 分)

(二) $y'' + 3y' + 2.25y = -10e^{-1.5x}$, $y(0) = 1$, $y'(0) = 0$ (13 分)

三、請以戊烷燃燒之化學反應計量濃度說明下列問題：

(一) 戊烷燃燒下限 $LEL = 0.55 \times C_{st}$ 。

(二) 上述方程式對於滅火之意義為何？

其中：戊烷燃燒下限 LEL 為 1.4%， C_{st} 為計量濃度。

四、請說明一般可燃性氣體之最少發火能量？並說明影響最少發火能量之要素為何？

中央警察大學 111 學年度碩士班入學考試試題

所 別：消防科學研究所
科 目：消防安全設備與檢查

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- 一、試從現行消防設備法規申論：「工廠類別用途場所」是否依法可設自動撒水設備，以防阻夜間工廠無名火的火災損害性能需求？
- 二、某既存合法長期照顧機構內之住房用途空間，因與設有法定排煙口裝置之某居室空間相鄰接，專業人員建議採取在其隔間牆上方設置 2% 常時開口，以使該住房於消防會審勘查檢查過程中，被認定為得免設排煙口之實務性作法。試評論如此作法方式，對長照機構收容住民遭遇火煙波及侵害時，其避難安全減災思維之合宜性。
- 三、桃園蘆竹美福冷凍倉儲因外牆結構為鋼板、泡棉夾層，造成消防人員射水不易悶燒多日。對於每一層樓地板面積都將近 6,000 平方公尺，而且樓層挑高近 12 公尺的建築量體，如何檢討應設消防安全設備？（15 分）另外，該場所現場儲存 8,000 公升柴油供發電機使用，請檢討管制量及違規裁處方式，並說明室內儲槽位置、構造及設備相關要求？（10 分）
- 四、我國六都高層建築物林立，建築量體因考量節能氣密性高，發生火災容易產生大量濃煙，影響避難動線及消防搶救，因此，排煙設備維持一定功能至關重要；請針對前述各設備形式，說明檢修方式（15 分）以及實務上常見的檢查缺失（10 分）。

中央警察大學 111 學年度碩士班入學考試試題

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- 一、某 14 層收容 COVID-19 檢疫民眾的防疫旅館，於 7 樓發生火警，火勢延燒至 9 樓，各樓層內部收容防疫隔離民眾多人。如果你是轄區消防分隊長，到達現場後，應優先蒐集的火場情報為何？對於現場人命救助作業應該如何進行？為避免救災人員受 COVID-19 病毒威脅，參與救災的出勤人員應遵守的標準作業程序(SOP)有哪些？
- 二、某化學工廠發生火災，如果你是轄區消防分隊長，到達現場後，從該廠防火管理人得知，廠房內有大量過氧化氫儲放。請問，對於過氧化氫的火災危險你應有的了解為何？請根據過氧化氫的危險與威脅擬定一火災搶救計畫，並說明你的考量事項為何？
- 三、臺灣為科技之島，科技廠火災之損失及搶救人員之潛在危險，均為當前消防之極大挑戰，請從火災預防及火災調查角度，探討科技廠火災之因應對策？
- 四、水源管理為火場救災重要指標項目之一，請說明消防水源有哪些？消防法令對水源有何規定？如有一山區木材家具工廠大火，水源缺乏，請問應注意何類火災之危險？如何解決水源問題？

中央警察大學 111 學年度碩士班入學考試試題

所 別：各所
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一、Vocabulary and Phrases: Choose the word that has the same meaning as the underlined word in each of the sentences. (20 分)

1. Special equipment is required to find latent fingerprints.
(A) obvious (B) hidden (C) human (D) mammal
2. As soon as the Department of Corrections' recommendations for prison reform were released, the department was inundated with calls from people who said they supported.
(A) provided (B) bothered (C) rewarded (D) flooded
3. Changes in our environment, lifestyle and human behavior all help to encourage the spread of infectious diseases.
(A) infective (B) unknown (C) new (D) deadly
4. Commissioner Wang regarded budget cuts as a panacea for all the problems faced by the police department.
(A) cure (B) result (C) cause (D) necessity
5. One of the duties of a captain is to delegate responsibility.
(A) analyze (B) respect (C) criticize (D) assign
6. The number of people committing crimes seems to dwindle steadily.
(A) decline (B) disappear (C) increase (D) rise
7. If you struggle with any law enforcement predicament, you can benefit from brainstorming.
(A) situation (B) meeting (C) dilemma (D) deal

8. The laws require advertisers to substantiate their claims.
(A) review (B) prove (C) explain (D) promote
9. In the small suburb in New Taipei City, local police have implemented a neighborhood watch program that has yielded extraordinary results.
(A) implant (B) ceased (C) started (D) prolonged
10. The Adamsville Police Department's computer system was outmoded.
(A) worthless (B) unusable (C) obsolete (D) unnecessary

二、Translation: Translate the following sentences into Chinese or English. (30 分)

(一) 英翻中 (15 分)

The virtuality, covertness and cross-border nature of the Internet as well as its rapid and wide-ranging propagation effects has made it a major medium for fraud crimes in the country.

(二) 中翻英 (15 分)

兩岸間的走私、海盜、偷渡、偽造貨幣、詐欺、洗錢等跨境犯罪，已呈現件數居高不下及手法推陳出新之現象。因此，雙方應拋棄主權絕對觀念，務實地採取有效對策，並積極地推動兩岸刑事司法互助作法，以達成遏阻兩岸跨境犯罪之目標。

三、Reading Comprehension (20 分)

The authorities involved are working closely with INTERPOL to 1 the movements of the gang's money worldwide, with investigations focusing on a worldwide criminal syndicate known as Axe, which allegedly used business email compromise (BEC) scams to defraud a US-based mental health institute.

BEC scams usually target third-party vendors to gain access to business email accounts after which payments are 2 to the bank accounts of money mules.

The US Secret Service official said: “The fight against cyber-enabled crime knows no boundaries, and the 3 efforts in this case show how vital it is to work collectively with our international partners to execute impactful 4 of these highly organized transnational criminal syndicates.”

Eight suspected Axe leaders were arrested in Cape Town and Johannesburg in 2021, leading to a massive drop in the group’s activities and similar crimes. They face 5 to the US, where they are charged with stealing more than EUR 6.25 million from romance scam victims there.

1. (A) track (B) revoke (C) suspect (D) integrate
2. (A) rejected (B) apprehended (C) diverted (D) intimidated
3. (A) vulnerable (B) reliable (C) lethal (D) collaborative
4. (A) testimonies (B) takedowns
 (C) terminations (D) transformations
5. (A) hostage (B) tantalization (C) sovereignty (D) extradition

Europol supported the Spanish National Police to take down a large high-risk organized crime network in Spain. The investigation 6 how the criminal leaders contacted the investigated individuals to carry out money laundering operations. These activities included various investment projects such as land acquisition to develop luxury real estate projects, and purchasing restaurants, industrial warehouses, and boats. To 7 the foreign assets the group used a network of bogus companies established in different countries, including South America. The criminals used advanced technologies, such as cryptocurrencies. They were planning to purchase one of the main nightclubs and to take over the nightlife and catering sector. This is a clear indication that this organized crime network was planning to control key sectors of the Spanish economy, such as the tourism sector, and to 8 state institutions.

Europol 9 the information exchange and provided analytical support. During the action day, Europol 10 experts on the spot to cross-check operational information in real-time against Europol’s databases and to provide technical support with digital forensic capabilities.

6. (A) delivered (B) uncovered (C) testified (D) penetrated
7. (A) launder (B) volunteer (C) compromise (D) press
8. (A) terrorize (B) infiltrate (C) streamline (D) inspect
9. (A) curtailed (B) operated (C) facilitated (D) shifted
10. (A) immobilized (B) exploited (C) interrogated (D) deployed

四、Essay (30 分)

Write a short essay on the following topic. The length of the essay should be no less than 100 words and no more than 250 words.

Impact of the COVID-19 pandemic on Police Officers' Work Condition

中央警察大學 111 學年度碩士班入學考試試題

所 別：消防科學研究所、交通管理研究所

科 目：微積分(同等學力加考)

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- 3.禁用鉛筆作答，違者不予計分。

一、請回答下列問題：

(一) 求 $\lim_{n \rightarrow \infty} \frac{1}{n} \left[\left(\frac{1}{n}\right)^9 + \left(\frac{2}{n}\right)^9 + \left(\frac{3}{n}\right)^9 + \cdots + \left(\frac{n}{n}\right)^9 \right] = ?$ (8 分)

(二) 求 $\int \sin x \sin(\cos x) dx = ?$ (8 分)

(三) 求 $\int_0^1 \frac{e^z + 1}{e^z + z} dz = ?$ (9 分)

二、請回答下列問題：

(一) 在 $0 \leq x \leq \frac{\pi}{2}$ 的範圍中，求由兩曲線 $y = \cos x$ 與 $y = \sin 2x$ 所圍成之區域面積。(12 分)

(二) 函數 $y = \sqrt{x-1}$ 在 $y = 0$ 和 $x = 5$ 的範圍內圍成一個區域，求該區域繞 x 軸旋轉所形成的立體形狀之體積。(13 分)

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三、請回答下列問題：

(一) 求 $\int_2^4 \frac{4}{x^2-6x+10} dx = ?$ (8分)

(二) 求 $\int_0^{1/\sqrt{2}} \frac{\sin^{-1}x}{\sqrt{1-x^2}} dx = ?$ (8分)

(三) 求方程式 $y = \frac{4}{\sqrt{16-x^2}}$ ， $x = -2$ ， $x = 2$ ，及 $y = 0$ 所圍成之區域面積。(9分)

四、假設心臟線方程式為 $r = a(1 - \cos\theta)$ ， $a > 0$ 。求此線全長(12分)
與形心(13分)。

中央警察大學 110 學年度碩士班入學考試試題

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4. 不需使用計算機，可用中文答題。

一、令 $S(x)$ 是一個函數集合，其表示如下 $S(x) = \left\{ 1, \cos \frac{m\pi x}{L}, \sin \frac{n\pi x}{L} \right\}$ ，且 $-L \leq x \leq L$ ，其中 m 和 n 為自然數。請證明 $S(x)$ 是一個正交函數集合 (orthogonal function set)。

二、請回答下列問題：

(一) 求 A 之反矩陣 (inverse of the matrix A)， $A = \begin{bmatrix} -1 & 1 & 2 \\ 3 & -1 & 1 \\ -1 & 3 & 4 \end{bmatrix}$

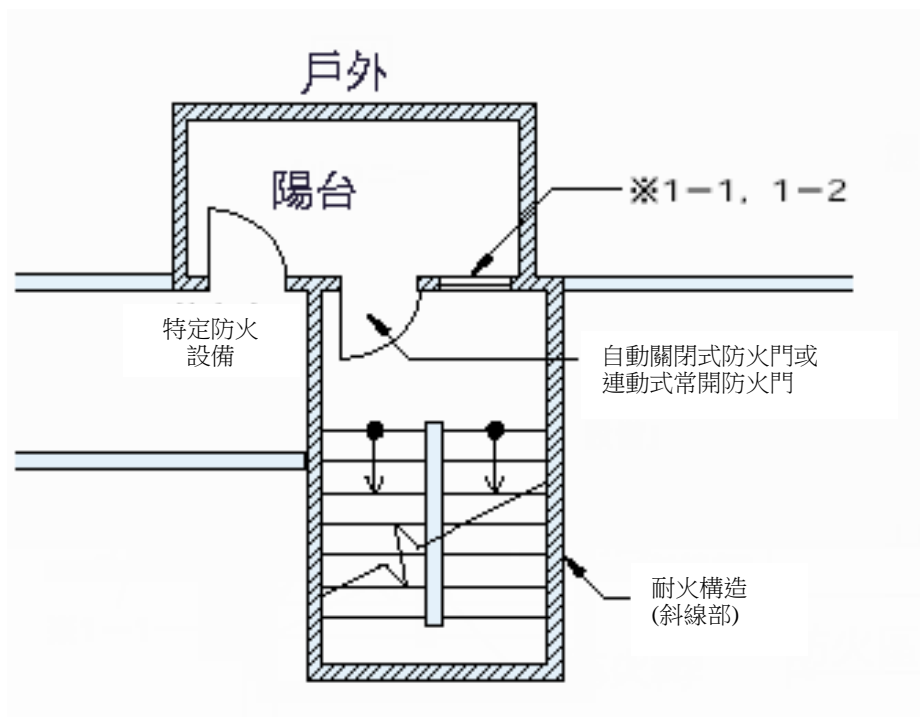
(10 分)

(二) 求 B 之特徵值 (eigenvalues) 及特徵向量 (eigenvectors)，

$B = \begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{bmatrix}$ (15 分)

三、都市化發展讓建築防火安全工程新工法、新技術及新設備也日新月異，使得煙控策略可選擇靜態與動態的方式也愈多元，請說明不同方式所採用的設計方法與手段有哪些？(15 分) 另外，請分就上述方法手段例舉實際建築空間的運用？(10 分)

四、如下圖室外陽台做為特別安全梯前室，在高層建築規劃是常採用的設計手段，但是受風壓影響，常常讓走廊進入陽台的防火門經常難以開啟，假設依中央氣象局觀測該建築物地區最大平均風速為 1.7 m/s，對於寬 1.0 m、高 2.4 m、距門邊推力距離 0.1 m、以及必須克服門弓器之摩擦力 44N 之防火門，內外壓差 ΔP 最大為多少？（15 分）必須要有多大的力量才能把門打開？（10 分）



中央警察大學 110 學年度碩士班入學考試試題

所 別：消防科學研究所
科 目：消防安全設備與檢查

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一、請申論既設長照機構應增設自動撒水設備之法定及政策依據，並提出消防機關應如何有效促進作為？

二、試申論未達 3 層以上之工廠作業場所，依法是否做得到侷限夜間下班後的火災侵害範圍與程度？你有何減災對策建言？請提出並說明之。

三、某大數據運算之電腦室（長度 30 公尺、寬度 15 公尺、高度 4 公尺），其室內未裝設有石膏板材質之天花板及高架地板，已知該空間無法自動關閉之開口部分總面積達 7 平方公尺，設計環境溫度為攝氏溫標 21 度（ $^{\circ}\text{C}$ ），試求：

（一）若設置二氧化碳高壓式全區放射滅火設備防護時，該系統所需滅火藥劑量為多少？如採 68 公升，充填比為 1.7 之鋼瓶裝填二氧化碳，則所需二氧化碳鋼瓶數量為何？二氧化碳高壓式全區放射滅火設備須於多少規定時間內全部放射完畢？

（二）若設置海龍替代物 HFC- 227ea 滅火設備防護時，其防護區域內氣相藥劑之比體積 $S=0.1269+0.0005t$ （ $^{\circ}\text{C}$ ），設計濃度假設為 7%，則該系統所需滅火藥劑量為多少？如採 80 公升，充填比為 0.8 之鋼瓶裝填 HFC- 227ea，則所需 HFC- 227ea 鋼瓶數量為何？HFC- 227ea 滅火設備須於多少規定時間內全部放射完畢？

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(三) 請說明上述各設備所用滅火藥劑之物理及化學特性、對室內無防護裝備人員之安全指標與安全措施規定為何？

(四) 有關上述各設備之滅火藥劑儲存鋼瓶之儲存場所規定為何？試說明之。

四、某一公共危險物品製造工廠，有室外儲槽儲存閃火點在攝氏70度以下之非不溶性第四類公共危險物品之顯著滅火困難場所，請回答下列有關消防安全工程設計題目：

(一) 若應設置固定式泡沫滅火設備時，其所配置泡沫放出口之泡沫水溶液量及放出率、補助泡沫消防栓及連結送液口之設計規定為何？

(二) 若不幸在該廠區內之倉庫發生火警或露天危險物品製造之製程管路（線）破裂致閥類開關等發生洩露及爆炸事故後，該工廠擬申請繼續開工營運時，為維公共安全，請問災後其消防安全設備之設置標準依據、中央及地方消防主管機關之審查與列管原則為何？

(三) 若該廠房於 1999 年取得建築物（非特種建築物）使用執照，火災後擬檢視全廠房之警報設備設計時，請比較說明新舊法規修正條文中，有關設置規定內容之差異處？

(四) 該廠房內部分場所若因施工之原因，不得已必須停用其消防安全設備時，如何依施工內容，採取何種必要之代替措施，以維持廠區安全有效狀態？

中央警察大學 110 學年度碩士班入學考試試題

所 別：消防科學研究所
科 目：消防實務

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- 一、火災現場消防人員進行救災，發生傷亡事故時有所聞，請分析造成消防人員火場救災傷亡的主要原因有哪些？另外，當消防人員要進入地下室火災現場進行人命搜救時，要如何避免救災人員自身發生傷亡事故？
- 二、依據《消防法》第 20-1 條規定，各級搶救人員應於救災安全之前提下，衡酌搶救目的與救災風險後，採取適當之搶救作為；如現場無人命危害之虞，得不執行危險性救災行動。請說明，此處所謂「危險性救災行動」所指為何？另外，請舉一救災實例，說明各級搶救人員進入災害現場，若遭遇何種情況，即可採取撤離行動，並適時回報緊急求救口令？
- 三、請就 2021 年 4 月份花蓮火車出軌案，分析、檢討消防救災之派遣、救助技能、救助器材和救護勤務，並提出你個人的改進意見。
- 四、居室火災的中性線關係著消防戰術的 ventilation policy。請以中性線為基準，就消防戰術的目的說明各種 ventilation 的定義、應用時機與操作要領。

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一、 Vocabulary and Phrases (20 分)

1. George Jung, who introduced cocaine for mass consumption to people in the United States, was arrested in 1972 and subsequently c_____d (i.e. condemned) on drug trafficking charges.
2. Every person's fingerprints are u_____e (i.e. exclusive), so no two people have the same fingerprint pattern.
3. The d_____t (i.e. lawbreaker) committed a misdemeanor to exceed the speed limit, leading to the injury of two people.
4. The gang members in Peter's neighborhood tried to c_____e (i.e. pressure) him into selling drugs, but he refused to be bullied.
5. P_____s (i.e. Wallet lifters) operate most effectively when there are prospective victims in heavily congested areas.
6. As of this evening, the Fire Department says that two bodies have been r_____d from the building.
7. The cause of the accident is unclear and still under i_____n, but one local said the stretch of highway is in bad condition.
8. Law e_____t agency means a lawfully established central or local public agency that is responsible for the prevention and detection of crime.
9. Hot-spot policing is a strategy that involves the targeting of police resources and activities to those places where crime is most c_____d.
10. The COVID-19 p_____c is an ongoing global disease similar to severe acute respiratory syndrome (SARS).

二、 Translation (30 分)

1. 中翻英 (15 分)

社區警政是一種新的警務哲學思維，理論上是將警務人員和民眾一起共同合作投入解決犯罪問題、犯罪恐懼感、社會失序及地區治安敗壞等問題。

2. 英翻中 (15 分)

Police officers may not, under color of authority, make any public statement that could be reasonably interpreted as having an adverse effect upon department morale, discipline, operation of the agency, or perception of the public.

三、 Reading Comprehension (20 分)

1-5 題

Opinions run to extremes about the abolition of the death penalty. According to Taiwan Alliance to End the Death Penalty (TAEDP), they claim that everyone should ____1____ the right of existence, criminals included, and this right cannot be deprived of its substance. However, on the other side of spectrum, some people still hang tough that the ____2____ serves the example to other would-be criminals, deterring them from committing crimes and some terrorist attacks. Moreover, it can seek retribution on behalf of victims.

Well, what ____3____ those who support the abolition of the death penalty? First of all, death constitutes “cruel and unusual punishment” and the various means used by the authorities to kill are over cruel at times. Secondly, the death penalty is used ____4____ against the poor, who can barely afford expensive legal counsel. What’s more, if we give a second chance for criminals to rehabilitate, they may make contributions to society in the end. Considering all the above, those who are for the abolition have firmly believed that only with much consideration of complementary measures and proper education can public support for retribution be changed and a general ____5____ formed on the abolition of the death penalty.

1. (A) look upon (B) be led to
(C) be endowed with (D) think of
2. (A) revocation (B) life imprisonment
(C) incarceration (D) capital punishment
3. (A) backs up (B) if only (C) even if (D) copes with
4. (A) proportionally (B) disproportionately
(C) thoroughly (D) selectively
5. (A) consensus (B) drill
(C) recommendation (D) sympathy

6-10 題

Mass surveillance uses systems or technologies that collect, analyze, and/or generate data on indefinite or large numbers of people instead of limiting surveillance to individuals about which there is reasonable suspicion of wrongdoing. Under currently available forms of mass surveillance, governments can capture virtually all aspects of our lives. Mass surveillance can subject a population or significant component thereof to indiscriminate monitoring, involving a systematic interference with people's right to privacy and all the rights that privacy enables, including the freedom to express yourself and to protest. People are getting used to being monitored by cameras, having private messages inspected at work, and having conversations recorded by financial institutions or other businesses (such as telecommunication companies). Today, intelligence agencies and law enforcement conduct mass surveillance through a diverse - and increasing - range of means and methods of surveillance. These include the direct mass interception of communications, access to the bulk communications stored by telecoms operators and others, mass hacking, indiscriminate use of facial recognition technology, indiscriminate surveillance of protests using mobile phone trackers, and more.

6. What is the best title of this passage?
- (A) Government is watching you.
 - (B) Mass surveillance is indiscriminate surveillance.
 - (C) The new technology of mass surveillance is coming.
 - (D) The result of mass surveillance is the trend of this era.
7. What conflict (if any) do you see in this passage?
- (A) People don't care about being monitored and watched.
 - (B) How to balance protecting people from crime and still keep privacy.
 - (C) How to achieve a balance between people's pursuit of technology and being monitored.
 - (D) How to cope with the human pursuit of technology and the balance of being monitored.
8. Which of the following is Not the reason why the authorities would prefer mass surveillance?
- (A) The protection of society.
 - (B) The invasion of privacy.
 - (C) The prevention of crimes.
 - (D) The collection of information.

9. According to the message, which of the following statement is true?
- (A) The biometric system can be used to identify all criminals.
 - (B) People have become accustomed to being monitored in various ways without knowing it.
 - (C) In the near future, it will be easy to become a hacker.
 - (D) None of above.
10. What is the closest meaning of “interception” from the passage?
- (A) Capture
 - (B) Interference
 - (C) Connection
 - (D) Interruption

四、Essay (30 分)

Write an essay on the following topic. The length of the essay should be no less than 100 words and no more than 350 words.

The Role of Social Media in Modern Policing

Many law enforcement agencies have begun using social media outlets such as Facebook, Instagram, YouTube and Radio Station to their benefit. From critical incidents, to large-scale events, to day-to-day operations, police agencies are also using social media tools to enhance communications. If used appropriately, social media can be a great asset to any agency. What’s your opinion on the role of social media for today’s policing? Use reasons and specific examples to support your arguments.

中央警察大學 110 學年度碩士班入學考試試題

所 別：消防科學研究所
科 目：微積分（同等學力加考）

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一、求積分

$$\int x\sqrt{x-1}dx$$

- (一) 用 $u=x-1$ 代換 (7 分)
- (二) 用分部積分 $u=x$, $dv=\sqrt{x-1}dx$ (8 分)
- (三) 比較上述結果 (10 分)

二、求積分

- (一) $\int_{-1}^1 \frac{1}{x} dx$ (10 分)
- (二) $\int 2^x dx$ (7 分)
- (三) $\int 0 dx$ (8 分)

三、(一) 求由曲線 $x^2 - y=0$ 與 $x^2 + y = 8$ 所圍成之區域面積。(12 分)

(二) 求心臟線 $r = 2(1 + \cos\theta)$ 所圍成之區域面積。(13 分)

四、(一) 若 $y = x^2 - 4x$ 且 $x = \sqrt{2t^2 + 1}$ ，當 $t=2$ 時，求 $\frac{dy}{dt} = ?$ 。(12 分)

(二) 求方程式 $y = 6\sqrt[3]{x^2} - \frac{4}{\sqrt{x}}$ 的圖形在點 $(1, 2)$ 的切線方程式。
(13 分)

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