

高雄醫學大學九十二學年度學士後醫學系招生考試試題

科目:國文

考試時間: 80 分鐘

共 三 頁

說明：一、選擇題用 2B 鉛筆在「答案卡」上作答，修正時應以橡皮擦拭，切勿使用修正液（帶），未遵照正確作答方法而致無法判讀者，考生自行負責。  
二、非選擇題限黑色或藍色墨水之鋼筆、原子筆或鉛筆，在「答案卷」上作答。  
三、試卷必須繳回，不得攜出試場。

一、綜合測驗：(單選題，每題 2 分，共 30 分)

請選出一個最適當的選項，標示在答案卡上。答錯一題倒扣 0.5 分，倒扣至本大題零分為止；未作答者，不給分亦不扣分。

- 下列敘述，何者用字完全正確？  
(A) 夜闌人靜，四處寂寥，此時最能啟發靈感 (B) 阿里山櫻花盛開，遊客絡繹不絕  
(C) 我和他的行事風格大相逕庭，所以很難成為好友 (D) 桂樹隨風搖曳，班駁的影子映在窗上，顯得錯落有致  
(E) 小李做事好高騖遠，總是說得多，做得少
- 下列成語，何者可以用來形容「賢愚不分」？  
(A) 由剝而復 (B) 牛驥同皁 (C) 門可羅雀 (D) 異曲同工 (E) 禮賢下士
- 《左傳》僖公二十二年：「君子不重傷，不禽二毛。」意思是：  
(A) 君子不再受傷，不養兩種鳥類 (B) 君子不傷害人，不拿兩毛錢  
(C) 君子不傷害人，不監禁頭髮花白的老人 (D) 君子不再傷害已經受傷的人，不俘虜頭髮花白的老人  
(E) 君子不受重傷，因為他不捉老人
- 韓愈〈柳子厚墓誌銘〉：「議論證據今古，出入經史百子，踔厲風發，率常屈其座人。」是說柳宗元：  
(A) 學養才華過人 (B) 進退得體，頗受器重  
(C) 積極進取，是權貴網羅的對象 (D) 鋒頭太健，易招致忌妒  
(E) 當時同僚都甘拜下風
- 蘇軾〈韓文公廟碑〉盛讚韓愈「道濟天下之溺」，是說他：  
(A) 勸阻憲宗迎佛骨入宮 (B) 領導古文運動  
(C) 振興儒家學說 (D) 以大義責鎮州亂軍，終使其歸順  
(E) 以文章濟世
- 〈登幽州臺歌〉：「前不見古人，後不見來者」，寫出陳子昂何種情懷？  
(A) 憤怒 (B) 落空 (C) 期望 (D) 寧靜 (E) 孤絕
- 下列何者寫出閒適的心情？  
(A) 坐觀垂釣者，徒有羨魚情（孟浩然〈望洞庭湖贈張丞相〉）  
(B) 會當凌絕頂，一覽眾山小（杜甫〈望嶽〉）  
(C) 臥聞海棠花，泥污胭脂雪（蘇軾〈寒食雨〉）  
(D) 行到水窮處，坐看雲起時（王維〈終南別業〉）  
(E) 張良未逐赤松去，橋邊黃石知我心（李白〈扶風豪士歌〉）
- 「頭上紅冠不用裁，滿身雪白走將來。平生不敢輕言語，一叫千門萬戶開。」（唐寅〈無題〉），這是一首「題畫詩」，請問畫的是什麼？  
(A) 丹頂鶴 (B) 公雞 (C) 鴨子 (D) 燕鷗 (E) 白鵝
- 下列文句所傳達的情感，何者並非鄉愁？  
(A) 雕闌玉砌應猶在，只是朱顏改（李後主〈虞美人〉）  
(B) 幾年來，我已把自己的一些靈魂交給了海神，而心臟的跳動由自己來控制，我想（夏曼．藍波安〈冷海情深〉）  
(C) 舊時王謝堂前燕，飛入尋常百姓家（劉禹錫〈烏衣巷〉）  
(D) 我的血系中有一條黃河的支流，黃河太冷，需要摻大量的酒精（余光中〈五陵少年〉）  
(E) 那天，我輕輕觸著了你的傷口，一聲叫痛，肉的傷痛是能捱的，難捱的是，被操控的語言，被污衊的魂靈（江自得〈那天，我輕輕觸著了你的傷口〉）

10. 下列敘述，哪一選項是正確的？  
 (A) 宋代經學、理學皆集大成於蘇軾  
 (B) 《呂氏春秋》在《漢書·藝文志》中被列為雜家  
 (C) 所謂「今文經」，係指用楷書寫成的經書  
 (D) 《詩經》中的「風」，是民間歌謠；「雅」，是音樂家作品；「頌」，是既歌且舞的樂章  
 (E) 《詩經》是四言古詩、南方文學的代表
11. 「告別了白帝城，便進入了長約二百公里的三峽。在水路上，你絕不會覺得造物主在作過於冗長的文章。」(余秋雨〈三峽〉)，其中「文章」所代表的意義，與下列何者最接近？  
 (A) 天恐文章中道絕，再生賈島在人間 (B) 文章千古事，得失寸心知  
 (C) 好鳥枝頭亦朋友，落花水面皆文章 (D) 文章一小技，于道未為尊  
 (E) 文章者，經國之大業，不朽之盛事
12. 「車轟隆隆的進了隧道，被紅燈照著的牆壁，是一片桔子色的艷紅。這時似乎才感到有些涼意，彷彿跳進一杯剛從冰箱裡拿出來的桔子汁，晶瑩剔透的玻璃杯外，還帶著幾顆晶亮的水珠。桔子汁中摻了白開水，車子出了隧道。」(朱天心《方舟上的日子》)，其中「桔子汁中摻了白開水」的「白開水」是指：  
 (A) 雨水 (B) 霧氣 (C) 天空 (D) 陽光 (E) 來車的車燈
13. 林武憲〈秋天的信〉：「秋天，要給大家寫信，用葉子做信紙，請「」當郵差，偷懶的郵差，每到一個地方，就把信一拋，有的信，落在松鼠頭上，有的信，掉在青蛙身旁，趕路的雁，也銜了一頁回家」，「」中填入哪一個字最貼近詩情？  
 (A) 樹 (B) 人 (C) 雨 (D) 風 (E) 雲
14. 「和尚撐傘—無法無天。」這則歇後語運用的修辭技巧與下列何者相同？  
 (A) 像披著如絲的長髮的少女，椰子樹嬌羞的站在寂寞的窗口 (B) 東邊日出西邊雨，道是無晴卻有晴  
 (C) 大漠孤煙直，長河落日圓 (D) 浮光耀金，靜影沈璧  
 (E) 兩情若是長久時，又豈在朝朝暮暮
15. 關於題辭，下列何者使用正確？  
 (A) 「宜室宜家」用於新居落成 (B) 「杏壇之光」用於診所開張  
 (C) 「福壽全歸」用於祝賀長者高壽 (D) 「絃歌不輟」用於學校落成  
 (E) 「高山安仰」用於喪父

## 二、閱讀測驗：(單選題，每題 2 分，共 20 分)

請選出一個最適當的選項，標示在答案卡上。答錯一題倒扣 0.5 分，倒扣至本大題零分為止；未作答者，不給分亦不扣分。

(甲) 讀孟嘗君傳 宋·王安石

世皆稱孟嘗君能得士，士以故歸之，而卒賴其力，以脫於虎豹之秦。嗟呼！孟嘗君特雞鳴狗盜之雄耳，豈足以言得士？不然，擅齊之強，得一士焉，宜可以南面而制秦，尚何取雞鳴狗盜之力哉！夫雞鳴狗盜之出其門，此士之所以不至也。

16. 下列選項何者解釋有誤？  
 (A) 擅齊之強—擁有強大的齊國 (B) 南面而制秦—制服秦國而居霸主之位  
 (C) 孟嘗君特雞鳴狗盜之雄耳—孟嘗君特別成為雞鳴狗盜的領袖  
 (D) 卒賴其力—終於靠他們的力量 (E) 虎豹之秦—日益強大且野心勃勃的秦國
17. 所謂「孟嘗君能得士」，王安石認為是：  
 (A) 世俗習見 (B) 司馬遷的觀點 (C) 稗官野史 (D) 真知灼見 (E) 蓋棺論定
18. 王安石認為「士之所以不至」的原因是：  
 (A) 不齒孟嘗君所為 (B) 缺乏雞鳴狗盜之能  
 (C) 怯於與秦為敵 (D) 與孟嘗君的門客理想不同  
 (E) 孟嘗君有雞鳴狗盜的人才就夠了

(乙)

詩品·序

南朝梁·鍾嶸

嘉會寄詩以親，離群託詩以怨。至於楚臣去境，漢妾辭宮；或骨橫朔野，或魂逐飛蓬；或負戈外戍，或殺氣雄邊；塞客衣單，嫺閨淚盡。又士有解珮出朝，一去忘返；女有揚蛾入寵，再盼傾國。凡斯種種，感蕩心靈，非陳詩何以展其義，非長歌何以釋其情？

19. 本文主旨是在說明：

- (A) 詩的優劣 (B) 詩人品第 (C) 詩的作法 (D) 詩的功用 (E) 詩的源流

20. 「女有揚蛾入寵，再盼傾國」中的「蛾」，與下列哪一選項所暗示的五官相同？

- (A) 說什麼好呢？唯「吃」是第一義的，歌，偶而也唱，也曾吻過不少的，啊——酒瓶  
(B) 只有羽翼，而無身軀的鳥。在哭與笑之間不斷飛翔  
(C) 一對相戀的魚，尾巴要在四十歲以後才出現  
(D) 沒有碑碣，雙穴的墓。梁山伯和祝英台就葬在這裡  
(E) 長江繞郭知魚美，好竹連山覺筍香

21. 「楚臣去境，漢妾辭宮」的用典分別指誰？

- (A) 屈原、王昭君 (B) 項羽、王昭君 (C) 項羽、趙飛燕 (D) 劉邦、李夫人 (E) 屈原、趙飛燕

(丙)

「人」這個字

民國·張志民

聽書法家說：  
書道之深，著實莫測！  
歷代的權貴們  
為著裝點門面  
都喜歡弄點文墨附庸風雅，

他們花了一輩子功夫  
把「功名利祿」幾個字  
練得龍飛鳳舞，  
而那個最簡單的「人」字，  
卻大都是  
缺骨少肉，歪歪斜斜

22. 作者在本詩中，藉著「書道」來談什麼？

- (A) 修養的方法 (B) 做人的道理 (C) 書法的原理 (D) 人字的寫法 (E) 做官的方法

23. 「附庸風雅」在本詩中的意思是什麼？

- (A) 權貴喜歡學問 (B) 權貴風流瀟灑 (C) 權貴文采雅麗 (D) 權貴不學無術 (E) 權貴沒有雅興

24. 作者說「把「功名利祿」幾個字／練得龍飛鳳舞」這句話主要的意思是什麼？

- (A) 讚美權貴的書法 (B) 練習書法要花一輩子功夫 (C) 諷刺權貴其實只重視「功名利祿」  
(D) 權貴把「功名利祿」這四個字練得最好 (E) 為了巴結權貴所說的話

25. 作者在本詩中說權貴把「人」字寫得「缺骨少肉，歪歪斜斜」，這句話主要的意思是什麼？

- (A) 諷刺權貴做人不正 (B) 權貴不會寫「人」字 (C) 權貴的書法別具一格  
(D) 讚美權貴勞心勞力 (E) 權貴的書法是乾筆法

### 三、情境引導寫作：十五分

請先閱讀下段文字，再依提示寫作。

王溢嘉：「在醫生面前，病人順從地赤裸著。誰有權能如此坦然地檢視另一個同類的痛苦呢？我毋寧覺得我是缺乏這種權利的，但我卻被賦予這種權利，這就是我的劫難。」《實習醫生手記》

- 提示：1. 請寫一篇兩百字左右的短文，說明你為什麼想選擇醫生這個「劫難」。  
2. 不需擬題，直接書寫即可。

### 四、命題作文：三十五分

#### 作文題目：尊重生命

- 說明：1. 請抄題。  
2. 字數不得少於四百字。  
3. 須用新式標點符號。

高雄醫學大學九十二學年度學士後醫學系招生考試試題

科目: 英文

考試時間: 80 分鐘

共 五 頁

說明: 一. 選擇題用 2B 鉛筆在「答案卡」上作答, 修正時應以橡皮擦拭, 切勿使用修正液(帶), 未遵照正確作答方法而致無法判讀者, 考生自行負責。  
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三. 試卷必須繳回, 不得攜出試場。

PART I. Vocabulary. 30 points.

1 ~ 10: Please choose one answer that is closest in meaning to the underlined word or phrase.

11 ~ 20: Please choose one best answer to fill in each of the blanks.

每題 1.5 分, 共 20 題。答錯一題倒扣 0.5 分, 倒扣至本大題零分為止; 未作答者, 不給分亦不扣分。

1. The publication disseminated information about endangered species.  
(A) dissected (B) analyzed (C) spread (D) contained
2. Adam's attitude toward his boss was always subservient.  
(A) subdued (B) submissive (C) subsistent (D) subsumed
3. The conversation between the two leaders went beyond platitudes and got into real issues.  
(A) greetings (B) blessings (C) quarrels (D) clichés
4. So far nobody has found a silver bullet to kill programming errors as the more you try to fix bugs the more you often introduce.  
(A) weapon (B) tool (C) solution (D) device
5. In giving an equivocal answer, the senator tried to please everyone but actually pleased no one.  
(A) ambiguous (B) equitable (C) adequate (D) artistic
6. If you closed your eyes and just listened, you would have sworn it was a labor protest.  
(A) promotion (B) strike (C) starvation (D) evaluation
7. Linguists believe that our ability for language is innate.  
(A) acute (B) acculturate (C) brew (D) hereditary

If education is the transmission of civilization, we are unquestionably progressing. Civilization is not inherited; it has to be learned and earned by each generation anew. If the transmission should be interrupted for one century, civilization would die, and we should be savages again. So our finest contemporary achievement is our unprecedented expenditure of wealth and toil in the provision of higher education for all.

8. (A) transformation (B) transference (C) transit (D) translation
9. (A) the uncultivated (B) the subjugated (C) the tamed (D) the endangered
10. (A) emancipated (B) inevitable (C) unparalleled (D) undoubtedly
11. The odor didn't vanish, but \_\_\_\_\_ on for weeks.  
(A) stumbled (B) resided (C) lingered (D) strolled
12. He \_\_\_\_\_ into her eyes and declared his love for her.  
(A) glanced (B) glared (C) gazed (D) glimpsed
13. Unless you give up smoking, you \_\_\_\_\_ the risk of damaging your health.  
(A) bear (B) suffer (C) make (D) run
14. Feeling \_\_\_\_\_ by the heavy work in the office, I need a break.  
(A) accomplished (B) detracted (C) infuriated (D) overwhelmed
15. People are out of work in high numbers in most European countries, but no governments are about to \_\_\_\_\_ as a result.  
(A) refuse (B) topple (C) transmit (D) cancel
16. Waiting is a \_\_\_\_\_ of imprisonment. One is being punished not for an offense of one's own but often for the inefficiencies of those who impose the wait.  
(A) form (B) person (C) trend (D) virtue

Americans are, well, being American. They're (17) their faith in the future. If they don't own a home, they want one. The homeownership rate—the share of households not renting—is now a (18) high of 68 percent: in 1990 it was 64 percent. Those who already own want to “trade up.” On average, Americans' homes are (19) while their yards are shrinking. Since 1987 the size of the median new home has grown 17 percent to 2059 square feet, while the size of the median lot has (20) 6 percent to 8750 square feet. In 1987 only 23 percent of new homes had four or more bedrooms. By 2000 about 35 percent did. (Source: *Newsweek*. Feb. 25, 2002. )

17. (A) expecting (B) exhausting (C) expanding (D) exercising  
 18. (A) rhetorical (B) theoretical (C) historical (D) reciprocal  
 19. (A) expanding (B) extending (C) enervating (D) eradicating  
 20. (A) deduced (B) dropped (C) decayed (D) deceased

**PART II. Structure: Choose the best answer to complete the sentence, 10 points.**

每題 1 分，共 10 題。答錯一題倒扣 0.33 分，倒扣至本大題零分為止；未作答者，不給分亦不扣分。

21. John Hancock participated in signing the historic Declaration of Independence, which set forth the reasons for the independence of \_\_\_\_\_ is now the United States from Great Britain.  
 (A) that (B) where (C) which (D) what
22. \_\_\_\_\_ the fact that it's overpriced, the house will certainly sell.  
 (A) In spite of (B) Despite of (C) Although (D) While
23. I-lan used to rain year round \_\_\_\_\_ location near the Pacific Ocean.  
 (A) because it's (B) owing to that (C) is that whose (D) because of its
24. Not until the 1960s \_\_\_\_\_.  
 (A) did women's movements begin to surge in the West.  
 (B) women's movements began to surge in the West.  
 (C) began women's movements to surge in the West.  
 (D) were women's movements began to surge in the West.
25. “It's cold in the hospital.” “Let's get some heating \_\_\_\_\_. ”  
 (A) installing (B) be installed (C) install (D) installed
26. “Where have you been?” “Sorry, I had \_\_\_\_\_ some milk.”  
 (A) to stop to get (B) stop getting (C) to stop getting (D) to stop get

Those who live nobly, even if they live obscurely, need not fear that they will have lived in vain. Something radiates from their lives, some light that shows the way (27) their friends and neighbors—with an impact that perhaps reaches far into the future. I find many men nowadays (28) with a sense of impotence, with a feeling that in the vastness of modern societies there is nothing (29) importance that the individual can do. The individual, if he is filled (30) love of mankind, with breadth of vision, with courage and with endurance, can do a great deal.

27. (A) against (B) to (C) on (D) with  
 28. (A) oppressing (B) oppress (C) oppresses (D) oppressed  
 29. (A) at (B) in (C) of (D) between  
 30. (A) with (B) of (C) at (D) on

**PART III. Cloze: Choose the best answer to fill in the blanks in the passage. 10 points.**

每題 1 分，共 10 題。答錯一題倒扣 0.33 分，倒扣至本大題零分為止；未作答者，不給分亦不扣分。

A team of scientists have found a cheap and effective way of helping save the lives of millions of children – by providing them with clean water. More than six million children in the developing world die (31) waterborne diseases every year, but the scientists have brought to (32) a simple Indian seed which naturally cleans polluted water.

In developed nations, chemicals are used to clean water. These are much (33) for developing nations to import. (34), the discovery that (35) seeds of the Meringa Olefera tree will (36) impurities such as bacteria to stick together is of (37) importance.

The seed has proved successful in full-scale water treatment works. As a result, poorer countries will be able to save substantial (38) of money as well as reducing the potential threat (39) infection.

There are also other benefits of cultivating the Meringa Oleifera tree. It is very fast-growing, highly nutritious, (40) vegetable oil and can be used to make fertilizer and medicinal ointment.

31. (A) after (B) from (C) about (D) for  
32. (A) brightness (B) light (C) glow (D) flare  
33. (A) excessive (B) steep (C) precious (D) costly  
34. (A) Therefore (B) However (C) Then (D) In addition  
35. (A) grated (B) abraded (C) ground (D) polished  
36. (A) attrat (B) cause (C) make (D) create  
37. (A) grand (B) large (C) superior (D) great  
38. (A) lots (B) numbers (C) amounts (D) extents  
39. (A) in (B) from (C) to (D) of  
40. (A) yields (B) bears (C) gives (D) turns

**Part IV. Reading Comprehension.** Please select one best answer to each of the following questions which are based on the preceding passage. 30 points.

每題 2 分，共 15 題。答錯一題倒扣 0.67 分，倒扣至本大題零分為止；未作答者，不給分亦不扣分。

The attack on competitive sports in schools comes in two new forms these days. One has to do with gender. Since boys tend to grow up throwing a ball against a wall or a stoop, and most girls may not, there's a feeling that girls reach school age with an athletic disadvantage. The schools are addressing this problem, but some people want to avoid the whole issue by downgrading or eliminating team games.

The other, more serious argument comes from the cooperative learning movement and other school movements that promote "equity issues," and are less concerned with excellence than with equality. The basic teaching, that nobody is better than anybody else, leads believers to oppose any activity that produces winning individuals.

The anti-achievement ethic buried in the "equity" argument is a deadly one. People can lose without humiliation and win without feeling superior.

(Source: Stephen McDonald & William Salomone's *The Writer's Response*. 7<sup>th</sup> ed. 2000.)

41. According to the passage, which of the following is untrue about anti-competitive theories?  
(A) Girls are less athletic than boys so competitive games should be abolished.  
(B) Competitive games emphasize on excellence and hence violate the spirits of equality.  
(C) The production of winners in competitive sports is a violation of human rights.  
(D) Schools downgrade competitive sports in order to ensure gender equality.
42. From the passage, what can be inferred about the author's attitude?  
(A) The attack on competitive sports is well grounded.  
(B) Competitive games have merits and should stay.  
(C) Competitive theories are wrongly based on equity.  
(D) Team games should be eliminated to avoid humiliation.

The British civil service has a largely deserved reputation for absolute political impartiality. Many ministers have remarked on the struggle for power between them and their top civil servants, but very few have ever complained of any political bias. Top civil servants know that their power depends on their staying out of politics and on their being absolutely loyal to their present minister.

Modern criticism of the civil service does not question its loyalty but its efficiency. Despite reforms, the top rank of the civil service is still largely made up of people from the same narrow section of society—people who have been to public school and then on to Oxford or Cambridge, where they studied subjects such as history or classical languages.

(Source: James O'Driscoll's *Britain-- The Country and Its People: An Introduction for Learners of English*. 1995. )

43. Which of the following is untrue about civil servants in Britain?
- (A) Party loyalty is not expected of them.
  - (B) Efficiency is where they need to improve.
  - (C) Playing politics is one of their major responsibilities.
  - (D) A majority of them share similar backgrounds.
44. What is the topic of this passage?
- (A) The rising power of the British civil service.
  - (B) The merits and weaknesses of the British civil service.
  - (C) The contribution of Oxford and Cambridge.
  - (D) Civil servants' political bias and impartiality.

Organically grown plants are not free from chemicals and pesticides. Some pesticides leave traces in the soil for years, and the traces may be absorbed by the plant that is "organically" grown. Rainfall may wash pesticides from neighboring farms onto "organic" field, and sprays or other applications of chemicals drift and cause the same problem.

45. What is the main idea of this passage?
- (A) Organic foods are safer than conventional foods.
  - (B) Despite their popularity, organic foods aren't very different from conventional foods.
  - (C) The FDA carefully examines conventional foods.
  - (D) The FDA examines organic foods.
46. The author says in the passage that \_\_\_\_\_
- (A) conventional, not organic, foods contain toxins.
  - (B) organic, not conventional, foods contain toxins.
  - (C) both conventional and organic foods contain toxins.
  - (D) neither conventional nor organic foods contain toxins.
47. It is stated in the passage that \_\_\_\_\_
- (A) organic foods may absorb pesticide residues from the soil.
  - (B) toxic substances are not found in organic foods.
  - (C) toxic substances are not found in fertilizers.
  - (D) bone meal and seafood contain oxalic acid and nitrite compounds.

For many years, sociologists and historians have referred to the United States as a cultural "melting pot" in order to suggest the successful integration into American society of the massive waves of immigration which have marked American history. This term has been primarily a complimentary one, implying that immigrants invariably embrace not only American ideals, but a **pervasive** "American" culture. Also, the term suggests that American immigrants successfully leave behind the turmoil of their home countries which has caused them to come to the United States, thus "melting" into American society. However, in recent years, this term has lost much of its popularity, primarily because of an increasing emphasis on diversity among ethnic groups. Ironically, this emphasis springs from another American ideal, strong individuality. Instead, many prefer to refer to the United States as a "salad bowl," viewing each of the many ethnic groups in America as a component of a salad, thus preserving its own identity in the salad, but, at the same time, interacting with the other vegetables to create a delightful mix and variety. Certainly the term makes a great deal of sense with regard to geography, as ethnic distribution in the United States is hardly uniform. New York, with its Chinatown and Little Italy, is an excellent example of this separation. However, the term is primarily used with reference to the various cultures and sensibilities of ethnic groups in the United States.

48. Which of the following best describes the organization of the passage?
- (A) It mainly focuses on America's role as a "melting pot".
  - (B) It contrasts a traditional view of American society with a newer view.
  - (C) It gives an overview of the various segments of American society.
  - (D) It is a harsh critique of American society.
49. Some people favor describing America as a "salad bowl" instead of as a "melting pot" because the term "salad bowl" better expresses the idea of \_\_\_\_\_.
- (A) self-involvement
  - (B) diversity
  - (C) homosexuality
  - (D) power
50. The word "pervasive" in line 4 is closest in meaning to \_\_\_\_\_.
- (A) prevalent
  - (B) aged
  - (C) outgoing
  - (D) intelligent

51. The author mentions New York's Chinatown as an example of \_\_\_\_\_.  
(A) Chinese influence worldwide  
(B) the best American travel destinations  
(C) uneven ethnic distribution in the United States  
(D) how immigrant communities are smoothly integrated into the American "melting pot"

As heart disease continues to be the number-one killer in the United States, researchers have become increasingly interested in identifying the potential risk factors that trigger heart attacks. High-fat diets and "life in the fast lane" have long been known to contribute to the high incidence of heart failure. But according to new studies, the list of risk factors may be significantly longer and quite surprising.

Heart failure, for example, appears to have seasonal and temporal patterns. A higher percentage of heart attacks occur in cold weather, and more people experience heart failure on Monday than on any other day of the week. In addition, people are more susceptible to heart attacks in the first few hours after waking. Cardiologists first observed this morning phenomenon in the mid-1980s and have since discovered a number of possible causes. An early morning rise in blood pressure, heart rate, and concentration of heart-stimulating hormones, plus a reduction of blood flow to the heart, may all contribute to the higher incidence of heart attacks between the hours of 8 a.m. and 10 a.m. In other words, both birthdays and bachelorhood have been implicated as risk factors. Statistics reveal that heart attack rates increase significantly for both females and males in the few days immediately preceding and following their birthdays. And unmarried men are more at risk for heart attacks than their married counterparts. Though stress is thought to be linked in some way to all of the aforementioned risk factors, intense research continues in the hope of further comprehending way and how heart failure is triggered.

52. What does the passage mainly discuss?  
(A) Risk factors in heart attacks. (B) Seasonal and temporal patterns of heart attacks.  
(C) Cardiology in the 1980s. (D) Diet and stress as factors in heart attacks.
53. What does the second paragraph of the passage mainly discuss?  
(A) The link between heart attacks and marriage. (B) Unusual risk factors in heart attacks.  
(C) Age and gender factors in heart attacks. (D) Myths about lifestyle and heart attacks.
54. According to the passage, which of the following is NOT a possible cause of many heart attacks?  
(A) Decreased blood flow to the heart. (B) Increased blood pressure.  
(C) Lower heart rate. (D) Increase in hormones.
55. Which of the following is inferred in the passage?  
(A) We now fully understand how risk factors trigger heart attacks.  
(B) We recently began to study how risk factors trigger heart attacks.  
(C) We have not identified many risk factors associated with heart attacks.  
(D) We do not fully understand how risk factors trigger heart attacks.

**PART V. Composition. 20 points**

**Please write an essay on the following topic in 200 words. Your essay must have a good organization with an introduction, a body, and a conclusion.**

Go uphill, go downhill



高雄醫學大學九十二學年度學士後醫學系招生考試試題

科目:微積分

考試時間: 80 分鐘

共 三 頁

說明:一.選擇題用 2B 鉛筆在「答案卡」上作答,修正時應以橡皮擦拭,切勿使用修正液(帶),未遵照正確作答方法而致無法判讀者,考生自行負責。  
二.試卷必須繳回,不得攜出試場。

(一) 是非題: 20%。(是,請在答案卡(A)欄位劃記;非,請在答案卡(B)欄位劃記。在其它欄位劃記者,不予計分。每題 2 分,答錯不倒扣。)

1. If  $f(x) > 1$  for all  $x$  and  $\lim_{x \rightarrow 0} f(x)$  exists, then  $\lim_{x \rightarrow 0} f(x) > 1$ .
2. If  $\sum a_n$  is divergent, then  $\sum |a_n|$  is divergent.
3.  $\int_{-1}^1 \int_0^1 e^{x^2+y^2} \sin y \, dx \, dy = 0$ .
4. Let  $f: [a, b] \rightarrow [a, b]$  be a continuous function, then there exists  $x \in [a, b]$  such that  $f(x) = x$ .
5. If  $\lim_{x \rightarrow a} \frac{f'(x)}{g'(x)}$  doesn't exist, then  $\lim_{x \rightarrow a} \frac{f(x)}{g(x)}$  doesn't exist too.
6.  $\frac{b-a}{1+b^2} < \tan^{-1} b - \tan^{-1} a < \frac{b-a}{1+a^2}$  for  $0 \leq a < b$ .
7. Suppose  $f$  is integrable on  $[a, b]$ , define  $F(x) = \int_a^x f(t) dt$ , then  $F$  is differentiable on  $(a, b)$ .
8. Let  $f$  be a continuous function defined on a closed interval  $[1, 3]$  and  $f(x) \leq 3$  for all  $x \in [1, 3]$ . Define  $F(x) = \int_1^x t^2 f(t) dt$  for  $x \in [1, 3]$ , then  $F(3) \leq 26$ .
9. Let  $f$  be a function defined on the set  $D = \{(x, y) \mid -1 \leq x \leq 1, -1 \leq y \leq 1\}$ . If  $\frac{\partial f}{\partial x}(0,0)$  and  $\frac{\partial f}{\partial y}(0,0)$  exist, then  $f$  is differentiable at  $(0,0)$ .
10. Let  $f$  be a continuous function defined on the bounded interval  $(a, b)$ , then there exist a point  $x_0 \in (a, b)$  such that  $f(x) \leq f(x_0)$  for all  $x \in (a, b)$ .

(二) 選擇題: 80%。(單選題,每題 5 分,答錯一題倒扣 1.25 分,倒扣至本大題零分為止,未作答者不給分亦不扣分。)

11.  $\int_{-1}^3 \frac{6x-7}{3x+5} dx =$  \_\_\_\_\_.  
 (A)  $8 - \frac{17}{3} \ln 14$       (B)  $8 - \frac{17}{3} \ln 7$       (C)  $8 - \frac{\ln 17}{3}$       (D)  $4 - \frac{17}{3} \ln 14$       (E)  $4 - \frac{17}{3} \ln 7$
12. The area between the curve  $y = x\sqrt{3x+1}$  and the lines  $y = 0$ ,  $x = 0$  and  $x = 1$  is \_\_\_\_\_.  
 (A)  $\frac{116}{135}$       (B)  $\frac{116}{125}$       (C)  $\frac{106}{135}$       (D)  $\frac{4}{135}$       (E)  $\frac{4}{125}$

13. Find the equation of the curve that satisfies the differential equation  $yy' + 2x = 0$  and that passes through the point  $(3, -1)$ .
- (A)  $-x^2 + 9 = \ln|y|$  (B)  $\frac{y^2}{2} = -x^2 + \frac{11}{2}$  (C)  $y^2 + 2x^2 = 19$  (D)  $2x^2 - y^2 = 18$  (E)  $y^2 - 2x^2 + 17 = 0$
14. If  $f(u, v, w)$  is differentiable and  $u = x - y$ ,  $v = y - z$  and  $w = z - x$ , then  $\frac{\partial f}{\partial x} + \frac{\partial f}{\partial y} + \frac{\partial f}{\partial z} = ?$
- (A)  $-3$  (B)  $0$  (C)  $3$  (D)  $-\frac{\partial f}{\partial u} + \frac{\partial f}{\partial v} - \frac{\partial f}{\partial w}$  (E)  $x \frac{\partial f}{\partial x} + y \frac{\partial f}{\partial y} + z \frac{\partial f}{\partial z}$
15. If  $f(x, y) = xe^y$ , then the rate of change of  $f$  at the point  $P(2, 0)$  in the direction from  $P$  to  $Q(\frac{1}{2}, 2)$  is:
- (A)  $-\frac{11}{2}$  (B)  $-\frac{5}{2}$  (C)  $1$  (D)  $\frac{5}{2}$  (E)  $\frac{11}{2}$
16. Let  $f(x) = \left[ \frac{(x+1)^4(x-5)^2}{x-1} \right]^{\frac{1}{3}}$ , then  $f'(2) = \underline{\hspace{2cm}}$ .
- (A)  $1$  (B)  $2$  (C)  $3$  (D)  $-1$  (E)  $-2$
17. Suppose  $a, b > 0$ , then  $\lim_{n \rightarrow \infty} \sum_{k=1}^n \frac{1}{an + bk} = \underline{\hspace{2cm}}$ .
- (A)  $\frac{1}{a} \ln \frac{a+b}{a}$  (B)  $\frac{1}{b} \ln \frac{a+b}{a}$  (C)  $\frac{1}{a} \ln \frac{a+b}{b}$  (D)  $\frac{1}{b} \ln \frac{a+b}{b}$  (E)  $\ln \frac{b}{a}$
18.  $\int_0^{\frac{\pi}{3}} |\sin x - \cos x| dx = \underline{\hspace{2cm}}$
- (A)  $\frac{\sqrt{3}-1}{2}$  (B)  $\frac{\sqrt{3}+1}{2}$  (C)  $2\sqrt{2} - \frac{3+\sqrt{3}}{2}$  (D)  $2\sqrt{2} - \frac{1+\sqrt{3}}{2}$  (E)  $\frac{1-\sqrt{2}+\sqrt{3}}{2}$
19. Let  $f(x) = xe^{-x}$  and  $p(x) = a_0 + a_1x + a_2x^2 + \dots + a_nx^n + \dots$  be the Maclaurin series of  $f(x)$ , then  $a_4 = \underline{\hspace{2cm}}$ .
- (A)  $\frac{1}{3!}$  (B)  $\frac{-1}{3!}$  (C)  $\frac{1}{4!}$  (D)  $\frac{-1}{4!}$  (E)  $\frac{1}{5!}$
20. The slope of the tangent line to the polar curve  $r = \frac{\sqrt{2}}{2} + \cos \theta$  at the point  $(r, \theta) = (\sqrt{2}, \frac{\pi}{4})$  is:
- (A)  $-1$  (B)  $-\frac{1}{2}$  (C)  $-\frac{1}{3}$  (D)  $-\frac{2}{3}$  (E)  $-\frac{3}{2}$
21. The volume of the solid bounded by  $z = 2 - x^2 - y^2$  and  $z = x^2 + y^2$  is:
- (A)  $\frac{2}{3}\pi$  (B)  $\frac{3}{2}\pi$  (C)  $\frac{3}{4}\pi$  (D)  $\frac{4}{3}\pi$  (E)  $\pi$
22. Let  $\frac{\sin 2x}{x} \leq f(x) \leq \frac{e^{2x}-1}{x}$  for  $x \in (0, 0.5)$ , then  $\lim_{x \rightarrow 0^+} (2f(x))^{f(x)} = \underline{\hspace{2cm}}$ .
- (A)  $1$  (B)  $2$  (C)  $4$  (D)  $16$  (E)  $e^1$
23. Define the function  $f$  by  $f(x) = \int_0^x (t-t^3)e^t dt$ . Which of the following statement is correct?
- (A) Function  $f$  derives its absolute maximum at point  $x = -1$   
 (B) Function  $f$  derives its absolute maximum at point  $x = 0$   
 (C) Function  $f$  derives its absolute maximum at point  $x = 1$   
 (D) Function  $f$  derives its absolute minimum at point  $x = -1$   
 (E) Function  $f$  does not have absolute maximum or minimum value

24. Define  $f(x) = \int_0^x (\cos t)^4 dt$ . Which of the following statement is *false*?

- (A)  $f$  is a strictly increasing function
- (B)  $f'(x) = (\cos x)^4$
- (C)  $f(x+2\pi) - f(x)$  is constant
- (D)  $f(x) \geq 0$  for all real number  $x$
- (E)  $f(0) = 0$

25. Let  $D = \{(x, y) \mid 0 \leq x \leq \frac{\pi}{2}, 1 \leq y \leq 2\}$ , then  $\iint_D x \cos(xy) dA =$  \_\_\_\_\_.

- (A)  $-\frac{\pi}{2}$
- (B)  $-1$
- (C)  $0$
- (D)  $\frac{\pi}{2}$
- (E)  $1$

26.  $\int_1^e x(\ln x)^2 dx =$  \_\_\_\_\_.

- (A)  $-\frac{1}{4}(e^2 + 1)$
- (B)  $\frac{1}{4}(e^2 - 1)$
- (C)  $\frac{1}{4}(1 - e^2)$
- (D)  $\frac{1}{4}(e^2 + 1)$
- (E)  $-\frac{1}{4}(e + 1)$

高雄醫學大學九十二年  
年度招生委員會

# 高雄醫學大學九十二學年度學士後醫學系招生考試試題

科目：普通生物學

考試時間：80 分鐘

共 五 頁

說明：一. 選擇題用 2B 鉛筆在「答案卡」上作答，修正時應以橡皮擦拭，切勿使用修正液（帶），未遵照正確作答方法而致無法判讀者，考生自行負責。  
二. 試卷必須繳回，不得攜出試場。

1. 單選題：1-30 題，每題 1 分。30%。答錯一題倒扣 0.25 分，倒扣至本大題零分為止，未作答者，不給分亦不扣分。

- Why is meiosis impossible in the bananas we buy in the supermarket?  
(A) Bananas have been genetically engineered to stop meiosis.  
(B) They are polyploid and have three sets of chromosomes.  
(C) Their genome is too large to undergo meiosis.  
(D) They have too many transposable elements.  
(E) They are blocked in the G1 phase by chemicals.
- All reptiles reproduce sexually by  
(A) external fertilization in which eggs are fertilized in water.  
(B) external fertilization in which eggs are fertilized in a moist terrestrial environment.  
(C) internal fertilization only.  
(D) both internal and external fertilization.  
(E) external fertilization in which the male deposits a spermatophore outside the body.
- Carbon fixation requires the expenditure of ATP molecules. This ATP is generated by  
(A) the Calvin cycle. (B) replenishment of the photosynthetic pigment.  
(C) the light reactions. (D) the oxidative phosphorylation in mitochondria.  
(E) the substrate level phosphorylation in cytosol.
- Animal cells do not have cell walls, but plant cells do. What osmotic environment is the best to them?  
(A) animal cells: isosmotic; plant cells: hyperosmotic  
(B) animal cells: hyperosmotic; plant cells: hyperosmotic  
(C) animal cells: hyperosmotic; plant cells: isosmotic  
(D) animal cells: isosmotic; plant cells: hypoosmotic  
(E) animal cells: hypoosmotic; plant cells: hypoosmotic
- Which of the following structure—function pairs is **mismatched**?  
(A) nucleolus—ribosome production (B) lysosome—intracellular digestion  
(C) ribosome—protein synthesis (D) microtubules—muscle contraction  
(E) Golgi—secretion of cell products
- Evolutionary biologists generally agree that the primary mechanism responsible for evolution is  
(A) speciation. (B) adaptive radiation. (C) ecological niche. (D) natural selection. (E) microevolution.
- Which of the following factors would tend to increase membrane fluidity?  
(A) a greater proportion of unsaturated phospholipids  
(B) a lower temperature  
(C) a relatively high protein content in the membrane  
(D) a greater proportion of relatively large glycolipids compared to lipids having smaller molecular weights  
(E) a high membrane potential
- Brian was found to be heterozygous (Ss) for sickle-cell trait. The alleles represented by the letters S and s are  
(A) linked. (B) on the same chromosome but far apart. (C) on the X and Y chromosomes.  
(D) on the homologous chromosomes. (E) both present in each of Brian's sperm cells.
- Which colors are absorbed by chlorophyll?  
(A) violet, blue and red (B) violet, green and red (C) blue, yellow and red (D) violet, blue and orange  
(E) blue, green and red
- The sodium-potassium pump is termed electrogenic because  
(A) it hydrolyzes ATP.  
(B) it pumps positive charges out of the cell and negative charges into the cell.  
(C) it pumps three positive charges out of the cell for every two positive charges it pumps into the cell.  
(D) it pumps  $H^+$  out of the cell along with  $Na^+$ .  
(E) it pumps electrons into the cell.

11. Most of the zygotic segmentation genes code for  
 (A) special transfer RNA. (B) enzyme. (C) transcription factors.  
 (D) histones. (E) transport proteins.
12. Most CO<sub>2</sub> from catabolism is released during  
 (A) glycolysis. (B) lactate fermentation. (C) the Krebs cycle.  
 (D) electron transport. (E) oxidative phosphorylation.
13. The only taxon that actually exists as a natural unit is the  
 (A) class. (B) family. (C) genus. (D) phylum. (E) species.
14. The organisms in your backyard include trees, shrubs, grass, ants, mushrooms, birds, spiders, beetles, flies, and bacteria. Together, all these organisms make up  
 (A) an ecosystem. (B) a community. (C) a population. (D) an ecosociety.  
 (E) an experimental group.
15. The main contributing factor to the release of CFC's is  
 (A) decomposition in land fills. (B) acid rain. (C) emission from feedlots.  
 (D) leaking refrigerators and air conditioners. (E) burning of tropical forests.
16. Lipids are absorbed by the \_\_\_ system.  
 (A) urinary (B) blood vascular (C) reproductive (D) respiratory (E) lymphatic
17. The diploid sporophyte stage is dominant in the life cycles of all of the following **except**  
 (A) a fern. (B) a moss. (C) a pine tree. (D) a dandelion. (E) a rose bush.
18. Which of the following is **not** a part of lichens?  
 (A) fungi (B) green algae (C) brown algae (D) cyanobacteria (E) both C and D
19. Mark found an organism in a pond, and he thinks it's a freshwater sponge. His friend Ralph thinks it looks more like an aquatic fungus. How can they decide whether it is an animal or a fungus?  
 (A) See if it can swim. (B) See if it is a eukaryote or a prokaryote.  
 (C) Look for cell walls under a microscope. (D) Determine whether it is unicellular or multicellular.  
 (E) Figure out whether it is autotrophic or heterotrophic.
20. DNA replication occurs in  
 (A) meiosis. (B) mitosis. (C) G1 phase. (D) G2 phase. (E) S phase.
21. A major difference in the mechanism of action between steroid and peptide hormones is that  
 (A) steroid hormones mainly affect the synthesis of proteins, whereas peptide hormones mainly affect the activity of proteins already in the cell.  
 (B) target cells react more rapidly to steroid hormones than they do to peptide hormones.  
 (C) steroid hormones enter the nucleus, whereas peptide hormones stay in the cytoplasm.  
 (D) steroid hormones bind to a receptor protein, whereas peptide hormones bind to G protein.  
 (E) steroid hormones affect metabolism, whereas peptide hormones affect membrane permeability.
22. Which of the following pairs of body systems primarily regulates the activities of the other systems?  
 (A) nervous and endocrine systems (B) endocrine and lymphatic systems  
 (C) circulatory and muscular systems (D) integumentary and nervous systems  
 (E) lymphatic and integumentary systems
23. Which of the following is **not** directly associated with photosystem II?  
 (A) photophosphorylation (B) splitting water (C) release of oxygen  
 (D) harvesting light energy by chlorophyll (E) P680
24. A man who carries an X-linked allele will pass it on to  
 (A) all of his sons. (B) half of his sons. (C) all of his daughters. (D) half of his daughters.  
 (E) all of his children.
25. Which of the following best illustrates homeostasis?  
 (A) All the cells of the body are about the same size.  
 (B) Most adult human beings are between 5 and 6 feet tall.  
 (C) The lungs and intestines have large surface areas for exchange.  
 (D) When oxygen in the blood decreases, you may feel light-headed.  
 (E) When blood salt concentration goes up, the kidney expels more salt.
26. A technique used in molecular systematics relies on the comparison of cytochrome *c* in different animals. This technique is referred to as  
 (A) DNA-DNA hybridization. (B) protein comparison. (C) restriction mapping.  
 (D) electron transport. (E) gene cloning.

27. Countercurrent exchange in the gills of a fish  
 (A) maintains a gradient that enhances diffusion.  
 (B) speeds up the flow of water through the gills.  
 (C) interferes with the efficient absorption of oxygen.  
 (D) means that blood and water flow in the same direction.  
 (E) enables the fish to obtain oxygen while swimming backward.
28. Which of the following is a characteristic of all organisms, but **not** of viruses?  
 (A) genetic information stored as nucleic acid (B) ability to control metabolism  
 (C) ability to reproduce (D) structure includes proteins  
 (E) plasma membrane
29. Researchers suspect that cytotoxic T cells are usually able to find and attack cancer cells because  
 (A) B cells help them. (B) cancer is induced by bacteria.  
 (C) cancer is an autoimmune disease. (D) cancer cells release antibodies into the blood.  
 (E) cancer changes the surfaces of cancerous cells.
30. Which of the following statements is **not true**?  
 (A) Chloroplast and mitochondria generate ATP by the same mechanism: chemiosmosis (a  $H^+$  gradient across the membrane).  
 (B) The inner membrane of the mitochondria translocate  $H^+$  from the intermembrane space to the matrix.  
 (C) Phosphorylation of ADP occurs as the  $H^+$  flow back across the membrane through the ATP synthase.  
 (D) ATP is made on the matrix side of the mitochondrial membrane.  
 (E) When ATP synthesis in chloroplast, things occur in the stroma is similar to that occurs in the matrix of mitochondria.

單選題：31-65 題，每題 2 分。70%。答錯一題倒扣 0.5 分，倒扣至本大題零分為止，未作答者，不給分亦不扣分。

31. The extinction of plants has severe consequences because:  
 (A) plants do not have the extensive ranges that animals do.  
 (B) plants require more nutrients than animals.  
 (C) plants require longer periods of time to reproduce than animals.  
 (D) plants are more susceptible to environmental changes than animals.  
 (E) plants are bases of foundations of food webs.
32. A woman had several miscarriages. Her doctor suspected that a hormonal insufficiency was causing the lining of the uterus to break down, as it does during menstruation, terminating her pregnancies. Treatment with which of the following might help her remain pregnant?  
 (A) prolactin (B) oxytocin (C) testosterone (D) luteinizing hormone  
 (E) follicle-stimulating hormone
33. In eukaryotes, what is the active transcription generally associated with?  
 (A) Euchromatin only (B) Heterochromatin only (C) Highly methylated DNA only  
 (D) Very tightly packed DNA only (E) Both euchromatin and highly methylated DNA
34. Which of the following can be used as a cloning vector?  
 (A) *E. coli* (B) Eco RI (C) lambda phage (D) bacterial plasmid  
 (E) Both C and D are correct
35. Which of the following is **not true** of a codon?  
 (A) It consists of three nucleotides. (B) It may code for the amino acid as another codon does.  
 (C) It never codes for more than one amino acid. (D) It extends from one end of a tRNA molecule.  
 (E) It is the basic unit of the genetic code.
36. The theory that suggests that eukaryotic organelles such as mitochondria and chloroplasts may have originated from a mutualistic relationship between two prokaryotes is referred to as  
 (A) eukaryotic symbiosis. (B) eukaryotic germ theory.  
 (C) eukaryotic coevolution. (D) eukaryotic microevolution.  
 (E) endosymbiotic theory.
37. What percentage of the DNA in a typical eukaryotic cell is expressed at any given time?  
 (A) 3-5% (B) 5-20% (C) 20-40% (D) 40-60% (E) 60-90%
38. What hormone is essential for a tadpole to develop into an adult frog?  
 (A) growth hormone (B) insulin (C) calcitonin (D) glucagons (E) thyroxine

39. Three kinds of selection occur that cause changes in the normal distribution of phenotypes in a population. They are  
 (A) directional selection, disruptive selection, and stabilizing selection.  
 (B) natural selection, artificial selection, and environmental selection.  
 (C) natural selection, genetic drift, and stabilizing selection.  
 (D) microevolution, macroevolution and natural selection.  
 (E) natural selection, artificial selection, and differential selection.
40. In a population that is in Hardy-Weinberg equilibrium, the frequency of the allele *a* is 0.2. What is the percentage of the population that is heterozygous for this allele?  
 (A) 2 (B) 4 (C) 16 (D) 8 (E) 32
41. Yeast is a member of which division?  
 (A) Ascomycota (B) Zygomycota (C) Basidiomycota (D) Deuteromycota (E) Chytridiomycota
42. What is the important component that retains the violet dye in the Gram-positive bacteria cell wall?  
 (A) peptidoglycan (B) lipopolysaccharide (C) phospholipids (D) fibers (E) chitin
43. Among the invertebrates, arthropods are unique in possessing  
 (A) a notochord. (B) open circulation. (C) segmented bodies. (D) ventral nerve cords.  
 (E) jointed appendages.
44. Important terrestrial adaptations that evolved exclusively in seed plants include all of the following **except**  
 (A) pollination by wind or animal instead of fertilization by swimming sperm.  
 (B) transport of water through vascular tissue.  
 (C) retention of the gametophyte plant within the sporophyte.  
 (D) dispersal of new plants by seed.  
 (E) protection and nourishment of the embryo within the seed.
45. Which of the following enzymes has the lowest pH optimum?  
 (A) lipase (B) pepsin (C) trypsin (D) sucrase (E) amylase
46. Which of the following definitions of "Animal" is **not true**?  
 (A) Animals are multicellular eukaryotes distinguished by a specific type of heterotrophy called ingestion.  
 (B) In most animals, cells are successively organized into tissues, organs, and organ systems.  
 (C) Animal cells lack cell walls and store carbohydrate reserves as starch.  
 (D) Animal reproduction is primarily sexual; asexual budding or regeneration occurs in some species.  
 (E) Muscles and nerves, which control active behavior, are unique to animals.
47. Transport in plants include all of the following **except**  
 (A) absorption of water and minerals from the soil by cells of a root.  
 (B) that transpiration creates a force within leaves that pulls xylem sap upward.  
 (C) leaves exchange gases through stomata, taking in the CO<sub>2</sub> that provides carbon for photosynthesis and expelling O<sub>2</sub>.  
 (D) active transport of sugar from one sieve-tube to the next.  
 (E) that potassium is uptaken by guard cells during stomatal opening.
48. A hummingbird with a beak that is too short to pollinate a flower is an example of  
 (A) behavioral isolation. (B) temporal isolation. (C) gametic isolation. (D) mechanical isolation.  
 (E) postzygotic isolation.
49. Antibodies of the different classes IgM, IgG, IgA, IgD and IgE differ from each other in  
 (A) the way they are produced. (B) the type of cell that produces them.  
 (C) the way they interact with the antigen. (D) the antigenic determinants that they recognize.  
 (E) the number of carbohydrate subunits they have.
50. Which of the following signal transduction molecules is not bound to the plasma membrane?  
 (A) G proteins (B) Phospholipase C (C) Adenylyl cyclase (D) Second messengers  
 (E) Receptors for peptide hormones
51. Reabsorption of useful components of glomerular filtrate occurs in  
 (A) Bowman's capsule. (B) proximal convoluted tubule.  
 (C) distal convoluted tubule. (D) collecting duct. (E) gall bladder.
52. Which of the following is true?  
 (A) The leaves of both angiosperms and gymnosperms are covered by a waxy cuticle that helps to protect the leaves from desiccation.  
 (B) Both angiosperms and gymnosperms produce ovules in a specialized structure called an ovary.  
 (C) "Double fertilization" to produce a fertilized egg and a triploid endosperm is characteristic of both angiosperms and gymnosperms.  
 (D) The gametophyte is the dominant generation in both the angiosperms and gymnosperms.  
 (E) All of the statements are true.

53. Two animal species live in the same biome but on different continents. Although these two are not closely related, they may appear quite similar as a result of  
 (A) gene flow. (B) parallel evolution. (C) convergent evolution.  
 (D) divergent evolution. (E) allopatric speciation.
54. Suppose a mutation occurred in *Drosophila* in the region of DNA that codes for the protein called bicoid. What is most likely to happen during development?  
 (A) The fertilized egg will be bipolar.  
 (B) The embryos will express their father's genotype.  
 (C) The polarity of the fertilized egg will be disrupted.  
 (D) The transcription of developmental genes will stop.  
 (E) Two sets of limbs will form in a mirror-image arrangement.
55. What is the basis for the difference in the synthesis of the leading and lagging strands of DNA molecules?  
 (A) The origins of replication occur only at the 5' end of the molecule.  
 (B) Helicases and single-strand binding proteins work at the 5' end.  
 (C) DNA polymerase can join new nucleotides only to the 3' end of the growing strand.  
 (D) DNA ligase works only in the 3' → 5' direction.  
 (E) Polymerase can only work on one strand at a time.
56. Which of the following statements about photosynthesis is **not true**?  
 (A) Photosynthesis is a redox process in which water is oxidized and carbon dioxide is reduced.  
 (B) There are two linked stages of photosynthesis: the light reaction and the Calvin cycle.  
 (C) The light reaction occurs in stroma, and the Calvin cycle occurs in grana.  
 (D) The Calvin cycle uses ATP for energy and NADPH for reducing power to form sugar from CO<sub>2</sub>.  
 (E) The flow of electron during photosynthesis is H<sub>2</sub>O → NADPH → Calvin cycle.
57. The Genetic Code is almost universal, that is, it is the same in all living systems. What is the exception?  
 (A) fungi (B) virus (C) plants (D) prokaryotes (E) mitochondria
58. The direct energy source that drives ATP synthesis during oxidative phosphorylation is  
 (A) the oxidation of glucose and other organic compounds.  
 (B) the endergonic flow of electrons down the electron transport chain.  
 (C) the affinity of oxygen for electrons.  
 (D) a difference of H<sup>+</sup> concentration on opposite sides of the inner mitochondrial membrane.  
 (E) the transfer of phosphate from Krebs cycle intermediates to ATP.
59. Which of the following statements is a **correct** distinction between autotrophs and heterotrophs?  
 (A) Only heterotrophs need to acquire chemical compounds from the environment.  
 (B) Cellular respiration is unique to heterotrophs.  
 (C) Only heterotrophs have mitochondria.  
 (D) Autotrophs, but not heterotrophs, can nourish themselves beginning with nutrients that are entirely inorganic.  
 (E) Only heterotrophs require oxygen.
60. A \_\_\_\_\_ is a membrane-enclosed bag of hydrolytic enzymes that the cell uses to digest macromolecules.  
 (A) lysosome (B) ribosome (C) macrosome (D) hydrosome (E) peroxisome
61. Which of the following pieces of evidence most directly contradicted the hypothesis that viruses were some kind of cell?  
 (A) Organisms could develop immunity to virus. (B) Viruses could pass through fine filters.  
 (C) Viruses can form crystals. (D) Viruses contain proteins.  
 (E) Viruses cause disease.
62. Nitrogen fixation involves the conversion of gaseous nitrogen to  
 (A) ammonia. (B) nitrite. (C) nitrate. (D) amine. (E) amino acid.
63. Of the plant hormones, which one most directly stimulates cell division and delays senescence?  
 (A) auxin (B) ethylene (C) cytokinin (D) gibberellin (E) abscisic acid
64. Eukaryotic promoters usually have a nucleotide sequence about 25 nucleotides upstream from the transcriptional start point. The nucleotide sequence is called  
 (A) ATAT box. (B) TATA box. (C) promoter sequence. (D) TAATTAT sequence.  
 (E) Shine-Dalgarno sequence.
65. What part of the brain affects the emotional aspects of behaviors?  
 (A) reticular activating system (B) limbic system  
 (C) parasympathetic system (D) peripheral nervous system  
 (E) cerebellum



高雄醫學大學九十二學年度學士後醫學系招生考試試題

科目:化學

考試時間: 80 分鐘

共七頁

說明:一. 選擇題用 2B 鉛筆在「答案卡」上作答, 修正時應以橡皮擦拭, 切勿使用修正液(帶), 未遵照正確作答方法而致無法判讀者, 考生自行負責。

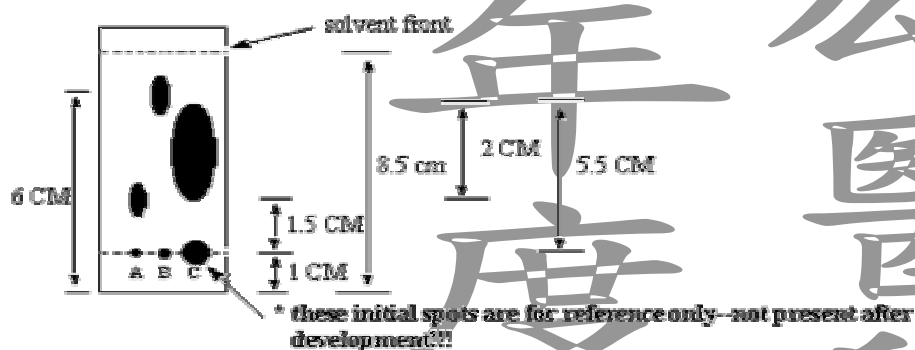
二. 試卷必須繳回, 不得攜出試場。

I. Choose one correct answer for the following questions, 60%.

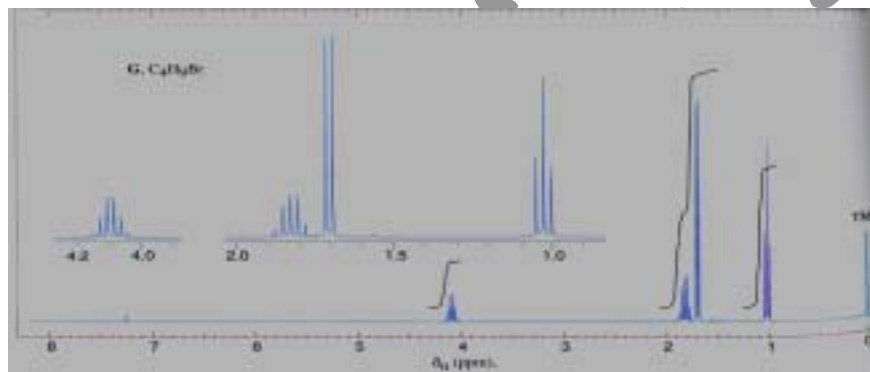
每題 1 分, 答錯一題倒扣 0.25 分, 倒扣至本大題零分為止, 未作答, 不給分亦不扣分。

- The most widely used mobile phase for supercritical-fluid chromatography is  
(A) helium (B) nitrogen (C) argon (D) carbon dioxide (E) air
- What is the color change of the end point in the iodometry using starch as an indicator?  
(A) colorless to blue (B) colorless to violet (C) blue to red (D) blue to colorless (E) brown to blue
- Which one can be used as a spectroscopic source in the UV region?  
(A) D<sub>2</sub> lamp (B) Tungsten lamp (C) Nernst glower (D) Globalar (E) Nichrome wire
- Which of the following detectors for gas chromatography has the lowest detection limit?  
(A) flame ionization (B) thermionic (C) electron capture (D) mass spectrometer (E) photoionization
- Which of the following detector has the lowest detection limit for liquid chromatography?  
(A) absorbance (B) fluorescence (C) electrochemical (D) refractive index (E) mass spectrometry
- The end point in the Volhard Method is when  
(A) the solution turns red (B) the red precipitate forms (C) the precipitate turns red  
(D) the solution turns blue (E) the white precipitate forms
- Dimethylglyoxime is a specific precipitating reagent for  
(A) Ni<sup>2+</sup> (B) Pb<sup>2+</sup> (C) Cu<sup>2+</sup> (D) Cd<sup>2+</sup> (E) Mg<sup>2+</sup>
- Karl Fischer titration method is based on a/an ( ) reaction that is relatively specific for water.  
(A) neutralization (B) precipitation (C) oxidation-reduction (D) complexation (E) substitution
- The property of fluorescence of following compounds: A, fluorobenzene; B, chlorobenzene; C, bromobenzene; and D, iodobenzene.  
(A) A > B > C > D (B) D > C > B > A (C) B > C > D > A (D) D > B > C > A (E) A = B = C = D
- What is the unit of absorptivity in Beer's law when the path length is given in cm and the concentration is expressed in parts per million?  
(A) ppm<sup>-1</sup> L cm<sup>-1</sup> (B) ppm<sup>-1</sup> cm<sup>-1</sup> (C) cm ppm<sup>-1</sup> (D) ppm cm<sup>-1</sup> (E) cm ppm
- The difference between spectrophotometer and photometer is in the  
(A) source (B) wavelength selector (C) sample container (D) detector (E) signal processor and readout
- How many moles of Br<sub>2</sub> will be produced when 1 mole of potassium bromate is used as a source of bromine?  
(A) 1 (B) 1.5 (C) 2 (D) 2.5 (E) 3
- Which of the following methods is applicable to nonvolatile and thermally unstable compounds that contain no chromophoric functional groups?  
(A) capillary electrophoresis (B) supercritical-fluid chromatography (C) gas chromatography  
(D) thin-layer chromatography (E) high-performance liquid chromatography
- The order of the end point sharpness for titration of 50-mL of I<sup>-</sup>, BrO<sub>3</sub><sup>-</sup>, Br<sup>-</sup> and Cl<sup>-</sup> with AgNO<sub>3</sub> in the same concentration is  
(A) I<sup>-</sup> > BrO<sub>3</sub><sup>-</sup> > Br<sup>-</sup> > Cl<sup>-</sup> (B) I<sup>-</sup> > Br<sup>-</sup> > BrO<sub>3</sub><sup>-</sup> > Cl<sup>-</sup> (C) I<sup>-</sup> > Br<sup>-</sup> > Cl<sup>-</sup> > BrO<sub>3</sub><sup>-</sup> (D) BrO<sub>3</sub><sup>-</sup> > I<sup>-</sup> > Br<sup>-</sup> > Cl<sup>-</sup>  
(E) BrO<sub>3</sub><sup>-</sup> > Cl<sup>-</sup> > I<sup>-</sup> > Br<sup>-</sup>
- Which one is not correct about standard electrode potential, E<sup>0</sup>?  
(A) E<sup>0</sup> is a relative reduction potential  
(B) The reactants and products are at unit activity  
(C) E<sup>0</sup> is dependent of the number of moles of reactant and product shown in the balanced half-reaction  
(D) A positive electrode potential indicates that the half-reaction is spontaneous with respect to the standard hydrogen electrode half-reaction  
(E) E<sup>0</sup> is temperature dependent

16. Calculate the volume of 0.0500 M EDTA needed to titrate the Ca in 0.2000 g of  $\text{CaCO}_3$  (100.1 g/mol)  
 (A) 20 mL (B) 25 mL (C) 30 mL (D) 35 mL (E) 40 mL
17. What is the maximum  $K_{sp}$  of  $\text{AgX}$  needed for quantitative titration of  $\text{X}^-$  with  $\text{AgNO}_3$  at 0.1 M level sample?  
 (A)  $10^{-7}$  (B)  $10^{-8}$  (C)  $10^{-9}$  (D)  $10^{-10}$  (E)  $10^{-11}$
18. Select a suitable acid/base pair to prepare a buffer with a pH of 3.5.  
 (A)  $\text{NH}_4\text{Cl}/\text{NH}_3$  ( $K_a = 5.7 \times 10^{-10}$ ) (B) Malic acid/Na hydrogen malate ( $K_a = 3.48 \times 10^{-4}$ )  
 (C) Salicylic acid /Na salicylate ( $K_a = 1.06 \times 10^{-3}$ ) (D) HAc/NaAc ( $K_a = 1.75 \times 10^{-5}$ )  
 (E) Benzoic acid/ Na benzoate ( $K_a = 6.28 \times 10^{-5}$ )
19. Select the correct expression.  
 (A)  $1 \text{ pg} = 10^{-15} \text{ g}$  (B)  $1 \text{ fg} = 10^{-18} \text{ g}$  (C)  $1 \text{ ag} = 10^{-12} \text{ g}$  (D)  $1 \text{ ng} = 10^{-6} \text{ mg}$  (E)  $1 \text{ mg} = 10^{-4} \text{ g}$
20. What is the ionic strength of a 0.1 M  $\text{Na}_3\text{PO}_4$  solution?  
 (A) 0.1 M (B) 0.2 M (C) 0.3 M (D) 0.4 M (E) 0.6 M
21. Calculate the  $R_f$  values for C on the following TLC plate:



22. Choose the structure consistent with the  $^1\text{H}$  NMR spectrum shown below.



- (A) CCCCBr (B) CC(Br)CC (C) CC(C)CCBr (D) CC(Br)C (E) C1CC1Br

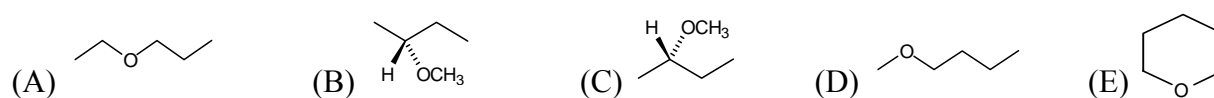
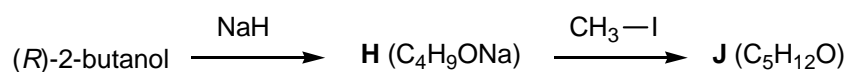
23. Carbon monoxide is toxic because it binds much more strongly to the iron in hemoglobin than  $\text{O}_2$  does. The equilibrium constant for the binding of CO is about 200 times that for the binding of  $\text{O}_2$ . That is, for the reactions



$K_{\text{CO}}/K_{\text{O}_2} = 2.1 \times 10^2$ . Calculate the difference in  $G^\circ$  for the binding of CO and  $\text{O}_2$  to hemoglobin at 25  $^\circ\text{C}$ .

- (A)  $-6.5 \text{ kJ/mol}$  (B)  $-13 \text{ kJ/mol}$  (C)  $-19.5 \text{ kJ/mol}$  (D)  $-26 \text{ kJ/mol}$  (E)  $-39 \text{ kJ/mol}$
24. Caffeine consists of carbon, hydrogen, oxygen, and nitrogen. When 0.1920 g of caffeine is burned in an excess of oxygen, 0.3482 g of carbon dioxide and 0.0891 g water are formed. Caffeine is 28.84% nitrogen by mass. Its molar mass is between 190 and 200 g/mol. What is the formula for caffeine?  
 (A)  $\text{C}_4\text{H}_5\text{N}_2\text{O}$  (B)  $\text{C}_3\text{H}_2\text{N}_2\text{O}_2$  (C)  $\text{C}_6\text{H}_4\text{N}_4\text{O}_4$  (D)  $\text{C}_8\text{H}_{10}\text{N}_4\text{O}_2$  (E) none of these
25. When  $\text{C}_4\text{H}_8$  is treated with water,  $\text{H}_2\text{SO}_4$  a tertiary alcohol is produced. Which of the following structures could represent  $\text{C}_4\text{H}_8$  in the reaction?  
 (A)  $\text{CH}_3\text{CH}=\text{CHCH}_3$  (B)  $\text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2$  (C)  $\text{H}_3\text{C}-\text{C}(\text{CH}_3)=\text{CH}_2$   
 (D)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$  (E) none of these

26. Choose the structure J produced in the following reaction sequence.

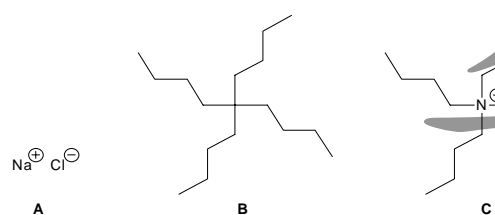


27. Choose the structure consistent with the following data.

$\text{C}_4\text{H}_8\text{O}$  :  $^1\text{H NMR}$  spectrum,  $\delta$  1.05 (t, 3H), 2.13 (s, 3H), 2.47 (q, 2H)  
IR spectrum (strong peak near  $1720\text{ cm}^{-1}$ )

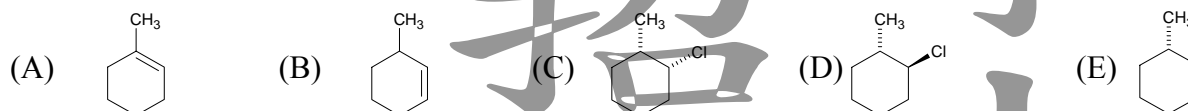
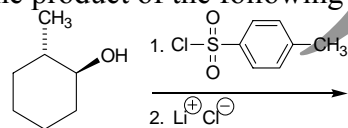


28. Choose the correct order of molecular structures with respect to their ease for passing into the lipid bi-layer of a cell membrane. (the most difficult one is on the right)

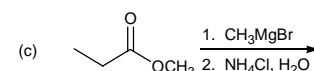
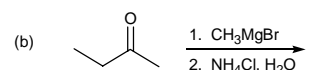
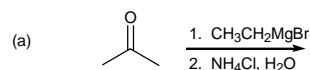


(A)  $\text{A} > \text{B} > \text{C}$  (B)  $\text{B} > \text{A} > \text{C}$  (C)  $\text{B} > \text{C} > \text{A}$  (D)  $\text{C} > \text{B} > \text{A}$  (E)  $\text{C} > \text{A} > \text{B}$

29. Choose the product of the following reaction.

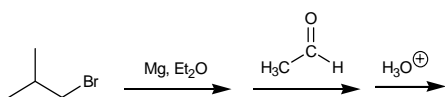


30. Choose those reactants and reagents that would produce 2-methyl-2-butanol as the major product.

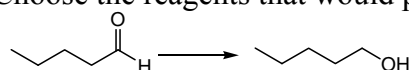


(A) (a) + (b) + (c) (B) (a) + (b) (C) (a) + (c) (D) (a) (E) (c)

31. Choose the major product formed in the following reaction.

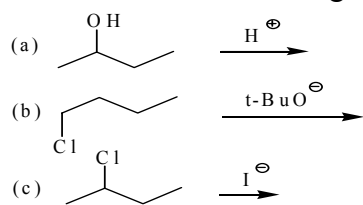


32. Choose the reagents that would perform the following transformation.



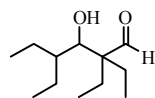
(A) PCC (B) 1.  $\text{LiAlH}_4/\text{Et}_2\text{O}$ , 2.  $\text{H}_2\text{O}/\text{H}_2\text{SO}_4$  (C)  $\text{LiCu}(\text{CH}_3)_2$  (D)  $\text{CH}_3\text{MgBr}$  (E)  $\text{H}_3\text{PO}_4$

33. Choose the reactants and reagents that would produce 1-butene as the major product.



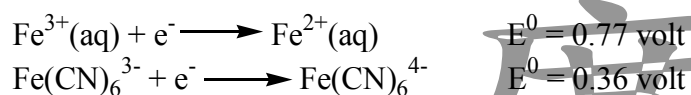
- (A) (a) + (b) (B) (b) (C) (a) (D) (c) (E) (a) + (c)

34. Normally, heating an initial aldol product (the  $\beta$ -hydroxyaldehyde) causes dehydration. However, heating the compound below with base does not cause dehydration, but rather, decomposition to form 2-ethylbutanal. This is because:



- (A) There are no protons  $\alpha$  to the carbonyl.  
 (B) There are no protons adjacent to the OH, and the dehydration reaction requires E1 conditions.  
 (C) There are no protons  $\alpha$  to the carbonyl, and aldol condensations are reversible.  
 (D) Heating any organic compound above room temperature causes decomposition.  
 (E) None of these is true.

35. Choose the correct statement given the following information:



- (A)  $Fe^{2+}(aq)$  is more likely to be oxidized than  $Fe^{2+}$  complexed to  $CN^-$ .  
 (B)  $Fe^{3+}(aq)$  is more likely to be reduced than  $Fe^{3+}$  complexed to  $CN^-$ .  
 (C) Both A and B are true.  
 (D) Complexation of Fe ion with  $CN^-$  has no effect on their tendencies to become oxidized or reduced.  
 (E) None of these is true.

36. Which of the following additions to 2-methylpropene occurs with anti-Markovnikov orientation?

- (A) Catalytic hydrogenation ( $H_2/Pt$ ) (B) Addition of  $HOBr$  (C) Addition of  $HI$   
 (D) Addition of  $HBr$  in the presence of  $ROOR$  (E) Oxymercuration-Demercuration

37. Which of the following alcohols will react most rapidly with the Lucas reagent?

- (A)  $(CH_3)_3COH$  (B)  $CH_3CH_2CH_2CH_2OH$  (C)  $CH_3CH(OH)CH_2CH_3$   
 (D)  $(CH_3)_2CHCH_2OH$  (E)  $(CH_3)_3CCH_2OH$

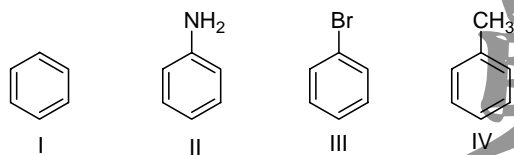
38. Which of the following dienes would undergo a Diels-Alder reaction?

- (A) 3-methylenecyclohexene (B) 3-methyl-1,4-cyclohexadiene (C) 2-methyl-1,3-cyclohexadiene  
 (D) 1,4-cyclohexadiene (E) 4-methylenecyclohexene

39. Which of the following is the strongest acid?

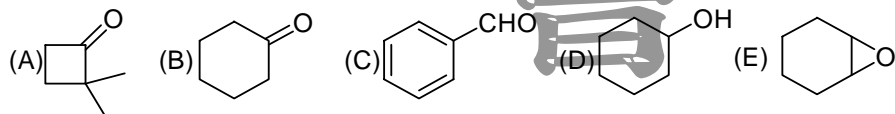
- (A) 1-pentene (B) 2-pentene (C) 1,4-pentadiene (D) cyclopentadiene (E) cycloheptatriene

40. The correct decreasing order of reactivity with  $X^+$  is



- (A)  $IV > III > II > I$  (B)  $II > IV > III > I$  (C)  $III > I > IV > II$  (D)  $II > IV > I > III$  (E)  $III > I > II > IV$

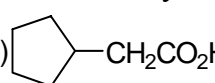
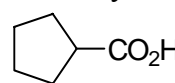
41. Which compound would be expected to show intense IR absorption at  $1780 \text{ cm}^{-1}$ ?

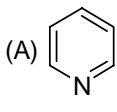
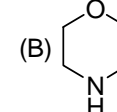
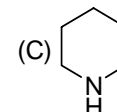
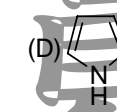
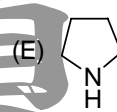
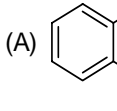
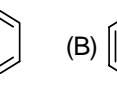
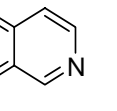
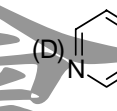





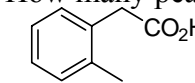


42. Which compound would be expected to show an intense peak in the mass spectrum at  $m/z$  58?

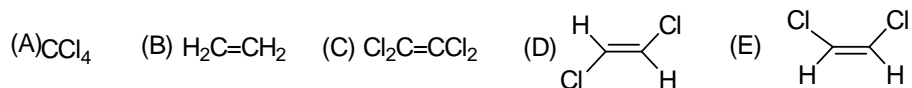
- (A)  $CH_3C(O)CH_2CH_2CH_3$  (B)  $CH_3CH_2C(O)CH_2CH_3$  (C)  $(CH_3)_3CCHO$   
 (D)  $(CH_3)_2CHC(O)CH_3$  (E)  $(CH_3)_2CHCH_2CHO$

43. The acid which could not be prepared by the reaction of an organic halide with cyanide ion followed by acid hydrolysis of the nitrite.

- (A)  $CH_3CH_2CO_2H$  (B)  $PhCH_2CO_2H$  (C)  $(CH_3)_3CCO_2H$  (D)  (E) 

44. The conversion of butanoic acid to 2-pentanone is best accomplished with  
 (A) 1. thionyl chloride; 2. methyl magnesium bromide (B) 1. methyllithium; 2.  $\text{H}_3\text{O}^+$   
 (C) 1.  $\text{CH}_3\text{OH}$ ,  $\text{H}_2\text{SO}_4$ ; 2. methyllithium (D) 1. thionyl chloride; 2. methanol  
 (E) 1. diazomethane; 2.  $\text{H}_3\text{O}^+$
45. The conversion of 2-butanone to propanoic acid is best accomplished with  
 (A) 1. ozone; 2. hydrogen peroxide (B) sodium hydroxide, iodine (C) silver oxide, bromine  
 (D) lithium aluminum hydride (E)  $\text{CO}_2$ ,  $\text{H}_3\text{O}^+$
46. For the following compounds the correct order for decreasing reactivity toward nucleophilic acyl substitution is  
 $\text{CH}_3\text{C}(\text{O})\text{N}(\text{CH}_3)_2$      $\text{CH}_3\text{C}(\text{O})\text{Cl}$      $(\text{CH}_3\text{C}(\text{O}))_2\text{O}$      $\text{CH}_3\text{CO}_2\text{CH}_3$   
 I                      II                      III                      IV  
 (A) II > III > IV > I    (B) I > IV > II > III    (C) III > II > I > IV    (D) I > IV > III > II    (E) IV > III > II > I
47. The expected product of the reaction below.  
 $\text{CH}_3\text{CH}_2\text{C}(\text{O})\text{OCHO} + \text{CH}_3\text{NH}_2 \longrightarrow$   
 (A)  $\text{CH}_3\text{NHCHO}$     (B)  $\text{CH}_3\text{CN}$     (C)  $\text{CH}_3\text{NHC}(\text{O})\text{CH}_2\text{CH}_3$     (D)  $\text{CH}_3\text{C}(\text{O})\text{NH}_2$     (E)  $\text{CH}_3\text{CH}_2\text{C}(\text{O})\text{OC}(\text{O})\text{NH}_2$
48. The conversion of acetaldehyde to 2-hydroxypropanoic acid is best accomplished with  
 (A) 1.  $\text{CH}_3\text{Li}$ ; 2.  $\text{CrO}_3$ ,  $\text{H}_2\text{SO}_4$     (B) 1.  $\text{NaCN}$ ; 2.  $\text{H}_3\text{O}^+$ , heat    (C) 1.  $\text{SOCl}_2$ ; 2. Mg, ether; 3.  $\text{CO}_2$   
 (D) 1.  $\text{Br}_2$ ,  $\text{PBr}_3$ ; 2.  $\text{NaOH}$     (E) 1. diazomethane; 2.  $\text{H}_3\text{O}^+$
49. The conversion of benzoic acid to phenylacetic acid is best accomplished with  
 (A) 1.  $\text{LiAlH}_4$ ; 2.  $\text{TsCl}$ ; 3.  $\text{NaCN}$ ; 4.  $\text{H}_3\text{O}^+$ , heat    (B) 1.  $\text{LiAlH}_4$ ; 2.  $\text{TsCl}$ ; 3. Mg, ether; 4.  $\text{CO}_2$   
 (C) 1.  $\text{SOCl}_2$ ; 2.  $\text{Li}(\text{CH}_3)_2\text{Cu}$     (D) 1.  $\text{SOCl}_2$ ; 2.  $\text{NH}_3$ ; 3.  $\text{Br}_2$ ,  $\text{NaOH}$   
 (E) 1. diazomethane; 2.  $\text{H}_3\text{O}^+$
50. The aldehyde which would not undergo a Cannizzaro reaction is  
 (A)  $\text{PhCHO}$     (B)  $\text{CH}_3\text{CH}_2\text{CHO}$     (C)  $\text{CH}_2\text{O}$     (D)  $(\text{CH}_3)_3\text{CCHO}$     (E) none of the above
51. Addition of alanine to distilled water will produce  
 (A) a slightly basic solution    (B) denaturation    (C) a neutral solution  
 (D) a slightly acidic solution    (E) precipitation
52. Amino acid N-terminal analysis of peptides is often done with  
 (A) carboxypeptidase    (B) phenylisothiocyanate    (C) dicyclohexylcarbodiimide  
 (D) ethyl chloroformate    (E) none of them
53. Which of the following arrangements is usually not found in the secondary structure of proteins?  
 (A)  $\alpha$ -helix    (B) double helix    (C) random coil  
 (D) pleated sheet    (E) all of the above arrangements can be found in the secondary structure of proteins
54. The standard amino acids are stereochemically related to  
 (A) D-glucose    (B) L-glyceraldehyde    (C) D-glyceraldehyde    (D) glycine    (E) L-alanine
55. The best reagent to distinguish between  $\text{CH}_3(\text{CH}_2)_{10}\text{CO}_2\text{H}$  and  $\text{CH}_3(\text{CH}_2)_4\text{CH}=\text{CH}(\text{CH}_2)_4\text{CO}_2\text{H}$  is  
 (A)  $\text{NaOH}$ ,  $\text{H}_2\text{O}$     (B) Tollen's reagent    (C)  $\text{H}_2\text{Cr}_2\text{O}_7$     (D)  $\text{Li}$ ,  $\text{NH}_3$     (E)  $\text{Br}_2/\text{CCl}_4$
56. Which of the following is piperidine?  
 (A)     (B)     (C)     (D)     (E) 
57. Which of the following is indole?  
 (A)     (B)     (C)     (D)     (E) 
58. Which of the following is oxetane?  
 (A)     (B)     (C)     (D)     (E) 
59. How many peaks will you expect from  $^{13}\text{C}$  NMR spectrum of  
  
 (A) 5    (B) 6    (C) 7    (D) 8    (E) 9

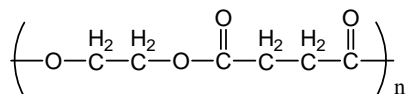
60. Which of the following molecules will have a net dipole moment?



**II. Choose one correct answer for the following questions, 40%.**

每題 2 分，答錯一題倒扣 0.5 分，倒扣至本大題零分為止，未作答，不給分亦不扣分。

61. What monomer(s) is (are) needed to make the polymer shown below?

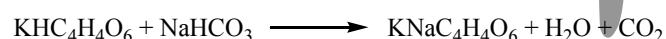


I.  $\text{HOCH}_2\text{CH}_2\text{OH}$  II.  $\text{HOOCCH}_2\text{CH}_2\text{COOH}$  III.  $\text{HOCH}_2\text{CH}_2\text{COOH}$

IV.  $\text{HOCH}=\text{CHOH}$  V.  $\text{HOOCCH}=\text{CHCOOH}$

(A) II (B) III (C) I and II (D) IV and V (E) II and III

62. Baking powder, a mixture of cream of tartar ( $\text{KHC}_4\text{H}_4\text{O}_6$ , molar mass 188 g/mol) and baking soda ( $\text{NaHCO}_3$ , molar mass 84.0 g/mol), undergoes the following reaction at baking temperature:



(The  $\text{CO}_2$  makes the cake rise.) A recipe calls for two level teaspoons (a total of 8.0g) of cream of tartar. How much baking soda must be added for both materials to react completely?

(A) 0.45 g (B) 1.8g (C) 3.6g (D) 8.0 g (E) none of these

63. Which of the following is not an oxidation-reduction reaction?

- (A) A precipitation reaction. (B) A reaction in which a metal reacts with a nonmetal.  
(C) A combustion reaction. (D) A metal reacting with an acid.  
(E) All of the above are oxidation-reduction reactions.

64. Aqueous solution of sodium sulfide and copper(II) chloride are mixed together. Which statement is correct?

- (A) Both  $\text{NaCl}$  and  $\text{CuS}$  precipitate from solution. (B) No precipitate forms.  
(C)  $\text{CuS}$  will precipitate from solution (D)  $\text{NaCl}$  will precipitate from solution.  
(E) No reaction will occur.

65. Body temperature is about 308 K. On a cold day, what volume of air at 273 K must a person with a lung capacity of 2.00 L breathe in to fill up the lungs?

(A) 1.13 L (B) 1.77 L (C) 2.26 L (D) 3.08 L (E) 3.54 L

66. Calculate the temperature at which the average kinetic energy of  $\text{O}_2$  gas is twice that of He gas at 10 .

(A) 2.50 (B) 10.0 (C) 20.0 (D) 160 (E) 293

67. The sodium salt,  $\text{NaA}$ , of a weak acid is dissolved in water; no other substance is added. Which of the statements (to a close approximation) is true?

(A)  $[\text{H}^+] = [\text{A}^-]$  (B)  $[\text{H}^+] = [\text{OH}^-]$  (C)  $[\text{A}^-] = [\text{OH}^-]$  (D)  $[\text{HA}] = [\text{OH}^-]$  (E) none of these

68. Arrange following 0.10 M solutions from lowest to highest pH:  $\text{NaF}$ ,  $\text{NaC}_2\text{H}_3\text{O}_2$ ,  $\text{C}_5\text{H}_5\text{NHCl}$ ,  $\text{KOH}$ ,  $\text{HCN}$ . ( $K_a$  for  $\text{HCN}$  is  $6.2 \times 10^{-10}$ ;  $K_a$  for  $\text{HF}$  is  $7.2 \times 10^{-4}$ ;  $K_a$  for  $\text{HC}_2\text{H}_3\text{O}_2$  is  $1.8 \times 10^{-5}$ ;  $K_b$  for  $\text{C}_5\text{H}_5\text{N}$  is  $1.7 \times 10^{-9}$ )

- (A)  $\text{HCN}$ ,  $\text{C}_5\text{H}_5\text{NHCl}$ ,  $\text{NaF}$ ,  $\text{NaC}_2\text{H}_3\text{O}_2$ ,  $\text{KOH}$  (B)  $\text{C}_5\text{H}_5\text{NHCl}$ ,  $\text{HCN}$ ,  $\text{NaF}$ ,  $\text{NaC}_2\text{H}_3\text{O}_2$ ,  $\text{KOH}$   
(C)  $\text{NaF}$ ,  $\text{NaC}_2\text{H}_3\text{O}_2$ ,  $\text{HCN}$ ,  $\text{C}_5\text{H}_5\text{NHCl}$ ,  $\text{KOH}$  (D)  $\text{KOH}$ ,  $\text{NaC}_2\text{H}_3\text{O}_2$ ,  $\text{NaF}$ ,  $\text{HCN}$ ,  $\text{C}_5\text{H}_5\text{NHCl}$   
(E) None of these

69. In the titration of a weak acid  $\text{HA}$  with 0.100 M  $\text{NaOH}$ , the stoichiometric point is known to occur at a pH value of approximately 11. Which of the following indicators would be best to use to mark the endpoint of this titration?

- (A) an indicator with  $K_a = 10^{-10}$  (B) an indicator with  $K_a = 10^{-8}$  (C) an indicator with  $K_a = 10^{-14}$   
(D) an indicator with  $K_a = 10^{-11}$  (E) an indicator with  $K_a = 10^{-12}$

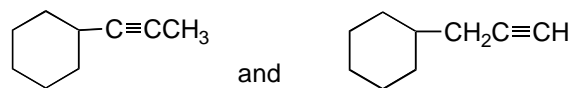
70. Silver acetate ( $\text{AgC}_2\text{H}_3\text{O}_3$ ) is a sparingly soluble salt with  $K_{sp} = 1.9 \times 10^{-3}$ . Consider a saturated solution in equilibrium with the solid salt. Compare the effects on the solubility of adding to the solution either the acid  $\text{HNO}_3$  or the base  $\text{NH}_3$ .

- (A) Either substance would decrease the solubility.  
(B) Either substance would increase the solubility.  
(C)  $\text{NH}_3$  would increase the solubility, but  $\text{HNO}_3$  would decrease it.  
(D)  $\text{NH}_3$  would increase the solubility, but  $\text{HNO}_3$  would have virtually no effect.  
(E)  $\text{NH}_3$  would decrease the solubility, but  $\text{HNO}_3$  would increase it.

71. Rank the following solvent in order of decreasing polarity:

- A. Ethyl acetate    B. Methanol    C. Methylene Chloride    D. Hexane    E. Acetone  
(A) B>E>A>C>D    (B) B>A>E>C>D    (C) B>A>C>E>D    (D) B>C>E>A>D    (E) B>A>C>D>E

72. The two compounds below can be differentiated with :



- (A)  $\text{Ag}(\text{NH}_3)_2^+\text{OH}^-$     (B)  $\text{Br}_2/\text{CCl}_4$     (C)  $\text{H}_2\text{CrO}_4$     (D)  $\text{KMnO}_4$     (E) Tollens reagent

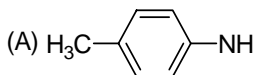
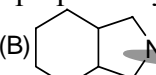
73. Which compound would be expected to show intense IR absorption at  $3300\text{ cm}^{-1}$  ?

- (A) butane    (B) 1-butene    (C) 2-butene    (D) 1-butyne    (E) 2-butyne

74. Which compound would be expected to show IR absorption at  $2250\text{ cm}^{-1}$  ?

- (A)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CO}_2\text{H}$     (B)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$     (C)  $\text{CH}_3\text{C}(\text{O})\text{O}(\text{O})\text{CCH}_3$   
(D)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{C}(\text{O})\text{NH}_2$     (E)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CN}$

75. The amine which can be prepared by a Gabriel synthesis is

- (A)     (B) -NH    (C)  $(\text{CH}_3)_3\text{CNH}_2$     (D)  $\text{CH}_3\text{CH}_2\text{NHCH}_2\text{CH}_3$     (E)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$

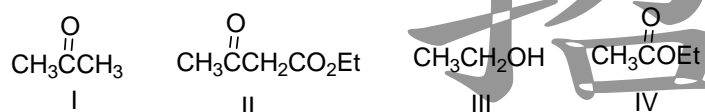
76. Penicillins contain

- (A) a  $\beta$ -lactam ring    (B) a  $\beta$ -lactone ring    (C) a thioester group    (D) a  $\alpha$ -lactam ring    (E) a  $\alpha$ -lactone ring

77. Which of the following alcohols would undergo dehydration most rapidly ?

- (A)  $\text{CH}_3\text{CH}_2\text{CH}(\text{OH})\text{CH}_3$     (B)  $(\text{CH}_3)_2\text{C}(\text{OH})\text{CH}_2\text{CH}_3$     (C)  $(\text{CH}_3)_2\text{CHCH}_2\text{OH}$   
(D)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$     (E)  $\text{PhCH}_2\text{CH}_2\text{OH}$

78. The correct order of decreasing acidity of the following compounds.

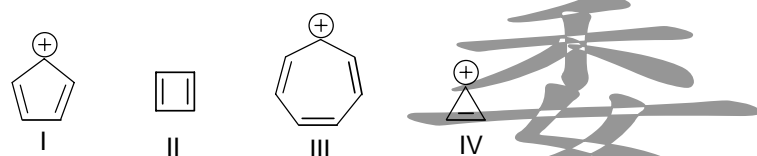


- (A) III > I > IV > II    (B) II > III > I > IV    (C) IV > I > III > II    (D) III > II > I > IV    (E) II > IV > I > III

79. The conversion of  $\text{CH}_3(\text{CH}_2)_7\text{CH}=\text{CH}(\text{CH}_2)_7\text{CO}_2\text{H}$  to  $\text{CH}_3(\text{CH}_2)_{16}\text{CO}_2\text{H}$  is best accomplished with

- (A)  $\text{H}_2, \text{Ni}$     (B)  $\text{Li}, \text{NH}_3$     (C)  $\text{B}_2\text{H}_6$     (D)  $\text{LiAlH}_4$     (E)  $\text{NaBH}_4$

80. Which of the structures below would be aromatic?



- (A) I and II    (B) I, III and IV    (C) III and IV    (D) II and III    (E) none of them

高雄醫學大學九十二學年度學士後醫學系招生考試試題

科目：普通物理學

考試時間：80 分鐘

共 三 頁

說明：一. 選擇題用 2B 鉛筆在「答案卡」上作答，修正時應以橡皮擦拭，切勿使用修正液（帶），未遵照正確作答方法而致無法判讀者，考生自行負責。  
二. 試卷必須繳回，不得攜出試場。

[單選題] 每題 4 分，共計 100 分。答錯一題倒扣 1 分，倒扣至零分為止，未作答者，不給分亦不扣分。

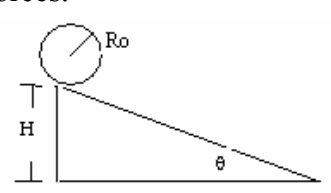
1. The current amplitude in an inductor in a radio receiver is to be  $250 \mu\text{A}$  when the voltage amplitude is  $3.60 \text{ V}$  at a frequency of  $1.60 \text{ MHz}$ . What is the inductance?  
 (A)  $13.4 \text{ mH}$  (B)  $2.78 \text{ mH}$  (C)  $10.8 \text{ mH}$   
 (D)  $1.43 \text{ mH}$  (E)  $4.01 \text{ mH}$
  2. A conducting wire has a  $1.0 \text{ mm}$  diameter, a  $2.0 \text{ m}$  length, and a  $50 \text{ m}\Omega$  resistance. What is the resistivity of the material?  
 (A)  $1.96 \times 10^{-8} \Omega \cdot \text{m}$  (B)  $9.8 \times 10^{-7} \Omega \cdot \text{m}$  (C)  $1.0 \times 10^{-7} \Omega \cdot \text{m}$   
 (D)  $3.5 \times 10^{-5} \Omega \cdot \text{m}$  (E)  $6.8 \times 10^{-8} \Omega \cdot \text{m}$
  3. A uniform rod of mass  $m$  and length  $L$  is freely pivoted at one end. What is the period of its oscillation? ( $I_{\text{system}} = 1/3 mL^2$ )  
 (A)  $2\pi(L/g)^{1/2}$  (B)  $2\pi(2L/3g)^{1/2}$  (C)  $2\pi(L/3g)^{3/2}$   
 (D)  $2\pi(L/3g)^{1/2}$  (E)  $2\pi(3L/g)^{1/2}$
  4. A hollow sphere of inner radius  $8.0 \text{ cm}$  and outer radius  $9.0 \text{ cm}$  floats half submerged in a liquid of specific gravity  $0.80$ . Find the density of the material of which the sphere is made.  
 (A)  $2.1 \times 10^3 \text{ kg/m}^3$  (B)  $1.3 \times 10^3 \text{ kg/m}^3$  (C)  $1.5 \times 10^3 \text{ kg/m}^3$   
 (D)  $1.7 \times 10^3 \text{ kg/m}^3$  (E)  $1.9 \times 10^3 \text{ kg/m}^3$
  5. What will be the speed of a solid sphere of mass  $M$  and radius  $R_0$  when it reaches the bottom of an incline if it starts from rest at a vertical height  $H$  and rolls without slipping? See Fig.5. Ignore losses due to dissipative forces.  
 (A)  $\sqrt{gH}$  (B)  $\sqrt{\frac{4}{3}gH}$   
 (C)  $\sqrt{\frac{10}{7}gH}$  (D)  $\sqrt{2gH}$   
 (E)  $\sqrt{2gH \sin \theta}$
- 

Fig 5
6. Each of four particles move along an  $x$  axis. Their coordinates (in meters) as functions of time (in seconds) are given by  
 Particle 1:  $x(t) = 2.5 - 3.0t^3$   
 Particle 2:  $x(t) = 2.5 + 3.0t^3$   
 Particle 3:  $x(t) = 2.5 + 3.0t^2$   
 Particle 4:  $x(t) = 2.5 - 1.5t - 3.0t^2$   
 Which of these particles have (has) constant acceleration?  
 (A) Only 1 and 2 (B) Only 2 and 3 (C) Only 1 and 3  
 (D) Only 3 and 4 (E) Only 4
  7. The potential energy of a body of mass  $m$  is given by  $U(x) = -ax/(b^2 - x^2)$ , where  $a$  and  $b$  are constants. The corresponding force is :  
 (A)  $\frac{-a(b^2 + x^2)}{(b^2 - x^2)}$  (B)  $\frac{-a(b^2 + x^2)}{(b^2 - x^2)^2}$  (C)  $\frac{a(b^2 + x^2)}{(b^2 - x^2)^2}$   
 (D)  $\int \frac{-ax}{(b^2 - x^2)} dx$  (E)  $\int \frac{ax}{(b^2 - x^2)} dx$



8. An infinite cylinder of radius  $R$  has a hole of radius  $a$  along its central axis. The rest of the cylinder has a uniform charge density  $\rho$   $C/m^3$ . Determine the electric field in the region  $a < r < R$

- (A)  $\frac{\rho}{2\epsilon_0} \left( r - \frac{a^2}{r} \right)$  (B)  $\frac{\rho}{2\epsilon_0} \left( \frac{R^2 - a^2}{r} \right)$  (C)  $\frac{\rho}{2\epsilon_0} \frac{a^2}{r}$   
 (D)  $\frac{\rho}{2\epsilon_0} \left( \frac{a^2}{r - a} \right)$  (E)  $\frac{\rho}{2\epsilon_0} \left( \frac{R^2}{r - a} \right)$

9. A small satellite is in elliptical orbit around Earth as shown in Fig.9. If  $L$  denotes the magnitude of its angular momentum and  $K$  denotes kinetic energy, then

- (A)  $L_2 > L_1$  and  $K_2 > K_1$  (B)  $L_2 > L_1$  and  $K_2 = K_1$   
 (C)  $L_2 = L_1$  and  $K_2 = K_1$  (D)  $L_2 < L_1$  and  $K_2 = K_1$   
 (E)  $L_2 = L_1$  and  $K_2 > K_1$

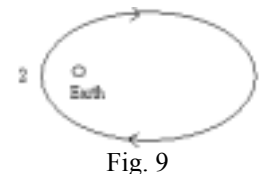


Fig. 9

10. A man launches a boat at a bridge and rows upstream a distance of 1 km where he drops a bottle in the water. He then continues to row upstream for an additional 10 min. At that point he turns around and rows downstream, arriving at the bridge at the same time as the bottle. What is the speed of the water in the river? Assume that the man rows at the same speed relative to the water at all times.

- (A) 0.83 m/sec (B) 0.79 m/sec (C) 1.20 m/sec  
 (D) 1.50 m/sec (E) 0.90 m/sec

11. A transverse wave on a string is given by  $y = (2.0 \text{ cm}) \times \sin \pi[(200/\text{s})t - (0.8/\text{cm})x]$ . What is the maximum particle speed?

- (A)  $200\pi$  cm/sec (B)  $370\pi$  cm/sec (C)  $400\pi$  cm/sec  
 (D)  $350\pi$  cm/sec (E)  $450\pi$  cm/sec

12. White light reflected at perpendicular incidence from a soap film has, in the visible spectrum, an interference maximum at  $6000 \text{ \AA}$  and a minimum at  $4500 \text{ \AA}$ , with no minimum in between. If  $n = 1.33$  for the film, what is the film thickness, assumed uniform?

- (A)  $1450 \text{ \AA}$  (B)  $2670 \text{ \AA}$  (C)  $3534 \text{ \AA}$   
 (D)  $3380 \text{ \AA}$  (E)  $5120 \text{ \AA}$

13. One mole of an ideal gas expands slowly and isothermally at temperature  $T$  until its volume is doubled. The change of entropy of this gas for this process is:

- (A)  $R \ln 2$  (B)  $\ln 2/T$  (C) 0  
 (D)  $RT \ln 2$  (E)  $2R$

14. An electron moves through a uniform magnetic field given by  $\vec{B} = B_x \hat{i} + 3B_x \hat{j}$ . At a particular instant, the electron has the velocity  $\vec{v} = (2.0\hat{i} + 4.0\hat{j}) \text{ m/s}$  and the magnetic force acting on it is  $(6.4 \times 10^{-19} \text{ N}) \hat{k}$ . Find  $B_x$ .

- (A)  $-2.0 \text{ T}$  (B)  $-0.29 \text{ T}$  (C)  $0.29 \text{ T}$   
 (D)  $0.5 \text{ T}$  (E)  $2.0 \text{ T}$

15. Imagine an aluminum cup of 0.10 liter capacity filled with glycerin at  $22^\circ \text{C}$ . How much glycerin will spill out of the cup if the temperature of the cup and glycerin is raised to  $28^\circ \text{C}$ ? (The coefficient of volume expansion of glycerin is  $5.1 \times 10^{-4} / ^\circ \text{C}$ , the coefficient of linear expansion of aluminum is  $2.3 \times 10^{-5} / ^\circ \text{C}$ )

- (A)  $292.2 \text{ mm}^3$  (B)  $264.6 \text{ mm}^3$  (C)  $26.6 \text{ mm}^3$   
 (D)  $345.1 \text{ mm}^3$  (E)  $487.4 \text{ mm}^3$

16. A spy satellite in orbit at an altitude of 200 Km has a mirror of diameter 50 cm. Assuming that it is limited only by diffraction, what is the closest distance between two bodies on the earth's surface for them to be resolved? Take  $\lambda = 400 \text{ nm}$

- (A) 19.5 cm (B) 21.2 cm (C) 18.0 cm  
 (D) 10.3 cm (E) 2.8 cm

17. Four circuits have the form shown in Fig.17. The capacitor is initially uncharged and the switch S is open. The values of the emf E, resistance R, and capacitance C for each of the circuits are

Circuit 1:  $E=24\text{V}$ ,  $R=4\Omega$ ,  $C=1\mu\text{F}$

Circuit 2:  $E=18\text{V}$ ,  $R=6\Omega$ ,  $C=9\mu\text{F}$

Circuit 3:  $E=12\text{V}$ ,  $R=1\Omega$ ,  $C=6\mu\text{F}$

Circuit 4:  $E=10\text{V}$ ,  $R=5\Omega$ ,  $C=5\mu\text{F}$

Rank the circuits according to the current just after switch S is closed least to greatest.

- (A) 1, 4, 3, 2 (B) 3, 1, 4, 2 (C) 4, 3, 2, 1  
(D) 4, 2, 1, 3 (E) 3, 1, 2, 4

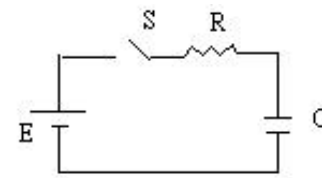


Fig. 17

18. A cyclotron used to accelerate  $\alpha$  particles ( $m = 6.65 \times 10^{-27}$  kg;  $q = 3.2 \times 10^{-19}$  Coul) has a radius of 0.50 m and a magnetic field of 1.8 T. What is the period of revolution of the  $\alpha$  particles?

- (A)  $8.3 \times 10^{-9}$  sec (B)  $7.3 \times 10^{-8}$  sec (C)  $6.3 \times 10^{-7}$  sec  
(D)  $5.3 \times 10^{-6}$  sec (E)  $4.3 \times 10^{-5}$  sec

19. A harmonic oscillator consists of a 0.015-kg mass on a spring. Its frequency is 2.0 Hz, and the mass has a speed of 0.40 m/sec as it passes the equilibrium position. What is the value of the quantum number n for its energy state? ( $h=6.626 \times 10^{-34}$  J S)

- (A)  $8.6 \times 10^{26}$  (B)  $3.4 \times 10^{19}$  (C)  $9.1 \times 10^{29}$   
(D)  $5.0 \times 10^{28}$  (E)  $7.6 \times 10^{31}$

20. Singly ionized chlorine atoms of 35 amu and 37 amu, traveling with speed  $2.0 \times 10^5$  m/sec, enter perpendicularly a uniform magnetic field of 0.50 tesla. After bending through  $180^\circ$  the atoms strike a photographic film. What is the separation distance between the two spots on the film? ( $1.00 \text{ amu} = 1.67 \times 10^{-27}$  kg)

- (A) 2.1 cm (B) 3.7 cm (C) 1.7 cm  
(D) 4.5 cm (E) 5.8 cm

21. The escape velocity at the surface of Earth is approximately 10 km/s. What is the escape velocity for a planet whose radius is 4 times and whose mass is 100 times that of Earth?

- (A) 0.4 km/s (B) 2 km/s (C) 50 km/s  
(D) 250 km/s (E) 4000 km/s

22. A nucleus with mass number A and atomic number Z undergoes  $\beta^+$  decay. The mass number and atomic number, respectively, of the daughter nucleus are :

- (A) A-1, Z-1 (B) A-1, Z+1 (C) A+1, Z-1  
(D) A, Z+1 (E) A, Z-1

23. One quarter of a circular loop of wire carries a current I as shown in Fig.23. The current I enters and leaves on straight segments of wire. The straight wires are along the radial direction from the center C of the circular portion. The length of each straight segment is h. Find the magnetic field at C.

- (A) 0 (B)  $\mu_0 I \left( \frac{\pi R}{2} \right)$  (C)  $\mu_0 I \left( \frac{\pi R}{2} + 2h \right)$

- (D)  $\frac{\mu_0 I}{8R}$  (E)  $\frac{\mu_0 I}{8R + 2h}$

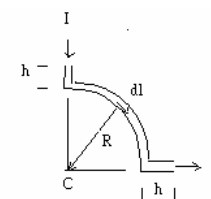


Fig. 23

24. A particle moving along the x axis is acted upon by a single force  $F=F_0 e^{-kx}$ , where  $F_0$  and k are constants. The particle is released from rest at  $x=0$ . It will attain a maximum kinetic energy of :

- (A)  $F_0/k$  (B)  $F_0/e^k$  (C)  $kF_0$

- (D)  $\frac{1}{2} (kF_0)^2$  (E)  $k e^k F_0$

25. A Carnot engine operates between a hot reservoir at  $320^\circ\text{K}$  and a cold reservoir at  $260^\circ\text{K}$ . If it absorbs 500 j of heat at the hot reservoir, how much work does it deliver?

- (A) 34 j (B) 57 j (C) 94 j  
(D) 73 j (E) 109 j

科目	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40				
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