大仁科技大学 102 学年度藥學系全校轉系考試試題

考試科目：化學

准考證號碼：

注意：一、本試題共 45 題，每題 分，共計 100 分。
事項：二、請依序將答案寫於答題卷，作答時請標明題號。

一、單選題，答對每題 2 分，答錯每題倒扣 1 分；未答則不給分亦不扣分
1. 下列那個化合物的沸點最高？ (A)甲醇 CH₃OH (B)氨 NH₃ (C)水 H₂O (D)苯 C₆H₆
2. 反應速率常數 k 與下列那個因素無關？
   (A)分子碰撞方向 (B)反應級數 (C)溫度 (D)活化能
3. H₂S 分子中 S 原子的成核軌域是？ (A)sp (B)sp² (C)sp³ (D)sp³
4. 下列敘述何者正確？ (A)H₂O 的鍵角為 109.5° (B)雙原子分子 Cl₂是極性分子 (C)LiF 的
   鍵結比 F₂有更高的共價鍵特性 (D)I₃是直線型分子
5. 下列那一元素的電子組態正確？ (A)Bi: [Xe]6s²4f¹⁴5d¹⁰6p³ (B)Br: [Kr]3d¹⁰4s²4p⁷
   (C)Ca: [Ar]4s²3d¹⁰ (D)Mo: [Kr]5s²4d⁵
6. 進行三十次檢驗，檢驗結果離散。結果顯示為何？ (A)不精密，無法確認準確程度
   (B)不準確，無法確認精密程度 (C)不精不準 (D)無法判定
7. 0.0154 kg ÷ 88.3 mL = 
   (A) 0.00017 kg/mL (B) 0.000174 kg/mL (C) 0.0001744 kg/mL (D) 0.00017440 kg/mL
8. 下列何者為極性物質？ (A)PCl₅ (B)BF₃ (C)CH₄ (D)SF₄
9. 有一化合物經元素分析知：2.82 g 鈉(Na=23)·4.35 g 氯(Cl=35)與 7.83 g 氧(O=16)，此物為？
   (A)sodium perchlorate (B)sodium chlorate (C)sodium chloride (D)sodium chloride
10. 酒精測試器利用的原理：
   a CH₃CH₂OH + b K₂Cr₂O₇ + c H₂SO₄ → d CH₃COOH + e Cr₂(SO₄)_3 + f K₂SO₄ + g H₂O ?
   (A)a=2 (B)b=3 (C)c=8 (D)b=4
11. 下列化合物何者非鏡向異構物？
   (A)2-氯戊烷 (B)3-氯戊烷 (C)3-氯-1-戊烯 (D)2-氯-1-丁醇
12. 在 1.6×10⁻³ M 二氧化氮溶液中氯化銀之溶解度？(AgCl之Ksp值為 1.6×10⁻¹⁰,分子量=143.3)
   (A)4.3×10⁻⁵ g/L (B)3.6×10⁻⁶ g/L (C)4.3×10⁻⁴ g/L (D)4.9×10⁻⁴ g/L
13. 下列(a)Cl₂、(b)K₂SO₄、(c)P₄、(d)NaBr、(e)Hg、(f)CO₂等物質何者在室温下為固態？
14. 下列分子或離子比較大小，何者正確？
   (A)O²⁻ < F⁻ (B)Sr²⁺ < Ca²⁺ (C)Fe³⁺ > Fe²⁺ (D)N³⁻ > F⁻
15. 下列何者溶於水將導致溫度下降？(A)酒精 (B)硫酸 (C)硝酸銨 (D)葡萄糖
16. 14 公克的氨與 12 公克的氫反應生成氨，下列何者錯誤？(A)生成 17 公克的氨 (B)氫是
   這個反應的限制試劑(Limiting Reagent) (C)形成 6×10⁻²³ 個氨分子 (D)氫消耗掉 6 公克
17. 氮氧化氮(nitrogen dioxide)與水反應會產生？
   (A)HNO₃ (B)HNO₂ (C)HNO₃與 NO (D)NH₃與 O₂
18. 下列何者於標準狀態下可將 Br⁺(aq)轉變成 Br₂(l)？
   (A)I⁻(aq) (B)NO₃⁻(aq) (C)Ag⁺(aq) (D)Au³⁺(aq)
19. 於水溶液中，下列何者不可能存在？ (A) HSO₄⁻  (B) HClO₄  (C) CH₃COOH  (D) H₂CO₃
20. Co(NH₃)₆³⁺的中心離子為何種混成軌域？ (A) sp³  (B) dsp²  (C) sp³d  (D) d²sp³
21. 某離子化合物由一個 SO₄²⁻和兩個陽離子組成，下列何者可能是這個陽離子？
   (A) Ba²⁺  (B) Fe³⁺  (C) Li⁺  (D) Ca²⁺
22. 黃銅含 72%銅，其餘是鋅。若黃銅塊中含 14 kg 鋅，黃銅的質量為多少？
   (A) 50 kg  (B) 42 kg  (C) 28 kg  (D) 25 kg
23. K、Se、Al 和 Br 四個元素中，那些是金屬？Al 和 Br 形成的化合物之化學式是？
   (A) K, Se / Al₃Br₅  (B) K, Al / AlBr₃  (C) K, Se, Al / AlBr₂  (D) K / Al₃Br₂
24. 如果 NH₃ 有 0.9%解離，則 1.50 M 的 NH₃ 溶液中，其 OH⁻ 的濃度為何？
   (A) 0.00135 M  (B) 0.0135 M  (C) 0.135 M  (D) 1.35 M
25. 下列電磁波中，何者能量最高？ (A) 紅外光  (B) 微波  (C) 可見光  (D) 紫外光
二、填充題，每題 2 分
26. 將 Rb、F、O 依電負度由小到大排列？
27. 計算 0.5 M 的 NH₄Cl 水溶液的 pH 值(NH₃ 的 K_b = 1.8×10⁻⁵)？
28. 計算 1.0 M 的 H₂A 的 pH 值(K_{a1} = 1.0×10⁻³; K_{a2} = 1.0×10⁻⁴)？
29. 將 0.01 M 之 KOH, HNO₃, NH₃, HNO₂ 及 HCHO₂ 水溶液，由小至大排列其 pH 值？
30. 某液體在 17°C 時壓力為 684 torr，體積為 25.5 L，若壓力變為 1.80 atm，溫度升高至 348 K，則氣體體積為若干？
31. N₂O(g) → N₂(g) + O₂(g), 當 N₂O(g) 濃度為 0.04 M 時，瞬間速度為 3×10⁻¹³ MS⁻¹，計算其 k 值？
32. 27°C 時純水的蒸氣壓為 23.76 mmHg，尿素溶液為 22.98 mmHg，計算該溶液濃度 (molality)？
33. 將 500 g 水由 0°C 加熱到 200°C，水的比熱為 4.0 J/g°C，水蒸氣比熱為 2.0 J/g°C，水的莫耳蒸發熱為 40 KJ/mole，計算所需熱量？
34. 某營養標示為每 100 公克中含蛋白質 3.5 g，脂肪 23.5 g，碳水化合物 65.5 g 及鈉 954 mg 的餅乾，請問 100 公克的熱量為？
35. 以 0.100 M 硝酸銀溶液滴定 5.00 mL 的氰酸根離子 (cyanide ion)，終點時消耗 20.00 mL 的硝酸銀溶液，請問原來氰酸根離子之濃度？
36. 將下列物質(a)KF、(b)HF、(c)HCl、(d)F₂的熔點由小到大排列？
37. 125 mL 的量瓶，空瓶的質量為 32.5 g，裝滿某液體時，質量變為 145.0 g，此液體的密度？
38. NaOH 溶液的重量百分濃度為 10%，此溶液是由多少莫耳的 NaOH 溶在 100 克的溶液中？
39. 當化合物 N₂O₃ 及 BaO 溶解在水中時，會形成酸式或鹼式，請寫出所形成的酸或鹼的化學式？
三、填充題，每個答案 1 分
40. Br、I、Se 及 Te 四元素中：(1)何者的半徑最小？(2)何者的第一離解能最低？(3)何者的電子親和力最大？(4)何者最容易形成正離子？
41. 魯他命 C 的分子式為 C₆H₈O₆，(1)其分子量為多少 amu？(2)在 0.550 mol 的魯他命 C 中，含多少 mol 碳？(3)相當於幾克？(4)碳的重量百分率是多少？(5)此分子的實驗式為何？
42. 細胞內著結構決定(1) BF₂Cl₂；(2) N₂O (N 為中心原子)；(3) ClO₃⁻ 之幾何結構。
43. 繼出畫線之原子的氧化數：(1) H₃PO₄，(2) H₃C₂O₄，(3) CaC₂O₄，(4) KMnO₄。
44. 繼出下列化合物的實驗式：(1) 碳化鋁；(2) 過錳酸鎂；(3) 氧化鉻(VI)。
45. 繼出下列化合物的共軛酸：(1) HPO₄²⁻；(2) O²⁻；(3) NH₂CH₃。
從1-20題中，請選出最適合的答案

1. It is widely understood that advertising ____ not only to promote sales but also to upgrade a company's image.
   (A) helps (B) to help (C) helping (D) help

2. The CEO ____ us to work at our own pace, so we can leave the office anytime we want to during the day.
   (A) lets (B) allows (C) makes (D) has

3. Obviously it is hard work that ____ John's success today.
   (A) results from (B) abides by (C) accounts for (D) runs after

4. Environmentalists ____ to the construction of another nuclear power plant in Taiwan.
   (A) object (B) oppose (C) subject (D) offend

5. We regret ____ you that we do not accept credit card purchases for our line of products; however, we do accept bank drafts drawn on a recognized bank.
   (A) to inform (B) informing (C) to have informed (D) having informed

6. I was about to leave ____ John, an old friend of mine I hadn’t seen in ages, called.
   (A) that (B) when (C) then (D) while

7. I can tell ____ the sound of those footsteps that John is coming.
   (A) on (B) for (C) with (D) by

8. It is reported that many people in that area have died from drinking ____ water.
   (A) contaminated (B) numerous (C) visible (D) recognized

9. ____ you have been promoted to manager, you’ll be much busier than before.
   (A) In case (B) Now that (C) By the time (D) As a result of

10. Vaccination is an important method of controlling the spreading of many ____ diseases.
    (A) fictitious (B) infectious (C) impotent (D) melancholy

11. It was in 1492 ____ Christopher Columbus discovered America.
    (A) that (B) when (C) which (D) where
12. The airplane crashed soon after it took off, causing heavy _____.
   (A) casualties  (B) furnishings  (C) delegations  (D) relics

13. The first settlement ____ Maryland was started in the year of 1634, and soon became a bastion of religious freedom in the new America.
   (A) founded in  (B) that founded in (C) was founded in (D) to found

14. The house was to be _____. Tom told his wife, and insisted that she move with him to the countryside.
   (A) torn down  (B) torn up  (C) torn apart  (D) torn off

15. Cooks, waiters, and other restaurant help must be _____; without them, a restaurant cannot function.
   (A) rational  (B) reliable  (C) tolerable  (D) edible

16. The survey indicated that profits are up by 20 percent the first two quarters of this year; business _______.
   (A) is being good  (B) were good  (C) good  (D) has been good

17. Fortunately, his response ___ the board members, and the meeting was finally adjourned.
   (A) satisfaction  (B) satisfactory  (C) satisfied  (D) satisfactorily

18. As one of our new recruits, you will be required to ___ in an orientation session that is scheduled to start this coming Thursday.
   (A) investigate  (B) participate  (C) candidate  (D) subordinate

19. In ___ of emergency, all hotel guests are reminded to use the emergency stairs rather than the elevator.
   (A) case  (B) event  (C) situation  (D) condition

20. If you ___ an error in reviewing the proposal, please bring it to my attention.
   (A) come on  (B) come across  (C) look to  (D) get in

第21-37題為克漏字填充題，請選出正確的字詞或文法

People’s reactions to pain vary. Different people have different ___21___ levels. What seems intolerable to one person may not bother ___22___, even though both feel pain. And while pain causes anguish, depression, nausea, and tears in some people, others exhibit no such effects. Even in the same person, tolerance of pain may vary ___23___ circumstances and psychological states. If you should stub your toe ___24___ running from a fierce dog or an armed robber, it probably would not hurt at all. In hospitals, medical personnel have discovered that preoperative psychological preparation seems to help ___25___ postoperative pain: patients who are told in advance how much pain to expect and just how they are likely to feel for how long, generally ___26___ fewer painkillers after surgery than do unprepared patients. Therefore, the ___27___ of any physical pain is more or less determined by psychological factors.

21. (A) entrance  (B) tolerance  (C) benevolence  (D) succulence
22. (A) another  (B) the other  (C) others  (D) the others
23. (A) from  (B) in  (C) under  (D) with
24. (A) before  (B) while  (C) though  (D) because
25. (A) deduce  (B) reduce  (C) induce  (D) produce
26. (A) needing (B) they need (C) need (D) and need
27. (A) tension (B) altitude (C) sensitivity (D) intensity

Many people are fascinated by Egypt because of its ancient culture and mysterious pyramids. Egypt is a country in North Africa and it has the longest river in the world, the Nile. People like to travel to this beautiful and exotic land because they want to see the tombs of the ancient Egyptian kings. Many scientists and have tried to discover the secrets of the pyramids but so far no one has been successful. The most famous one is the Pyramids of Giza.

The ancient Egyptians had a special style of writing called hieroglyphics. We learn about their culture from the messages they . Nowadays, explorers search the desert sands to find an undiscovered tomb with gold and treasures.

28. (A) inhabited (B) located (C) resided (D) lied
29. (A) explorers (B) peddlers (C) customers (D) missionaries
30. (A) longed for (B) left behind (C) looked after (D) backed up
31. (A) in hope (B) hoped (C) hope (D) hoping
32. (A) infected (B) charged (C) filled (D) attached

People have always been obsessed with their appearance. But with the of plastic surgery, we are now able to change almost any part of our bodies. However, this has a need for perfection. Over the past 20 years, many women breast implants. After a few years, some of the implants leaked, leading to numerous health problems. Furthermore, countless lawsuits have been filed around the world doctors who have made mistakes during operations. matters worse, a new television program in the US, called “Ultimate Makeover,” is giving real people free plastic surgery. The results are incredible. But, while only a dozen people get a new look, the rest of the world is only wishing they, too, could be more beautiful.

33. (A) automation (B) introduction (C) reservation (D) seduction
34. (A) coincided with (B) gotten rid of (C) backed up (D) resulted in
35. (A) have received (B) received (C) had received (D) receiving
36. (A) for (B) against (C) with (D) to
37. (A) Making (B) Make (C) To make (D) In making

第38-40題為閱讀測驗，請依題義選出正確答案

Bored of lying on the beach for those precious two weeks of summer vacation your company gives you every summer? Buy the summer vacation that will give you more. The Computer Training Center offers summer intensive seminars in this summer and create or enhance your computer skills. The Summer CTC seminars are every two weeks from June 1st through September 1st. For a list of courses, call 585-2880, or stop by our new beautiful new school at 4375 Marine View, with a spectacular view of the Bay.

For June and July, we are offering Special Grand Opening Rates of 5% off the usual price. Don’t miss this chance to improve your prospects in two short intensive weeks. Go back to work with new skills, not just a tan.
38. Who is this advertisement intended for?
   (A) Someone who wants to learn water sports during their vacation
   (B) People who want to have a view of the ocean
   (C) Anyone interested in improving their computer skills
   (D) Anyone who needs a discount on the price of their summer vacation

39. How often are the seminars offered?
   (A) Once a month          (C) Every week
   (B) Twice a month         (D) Every three weeks

40. What can you pick up if you stop by their new building?
   (A) A 5% Grand Opening Discount
   (B) A view of the Bay
   (C) A schedule of classes
   (D) A test of your computer skills