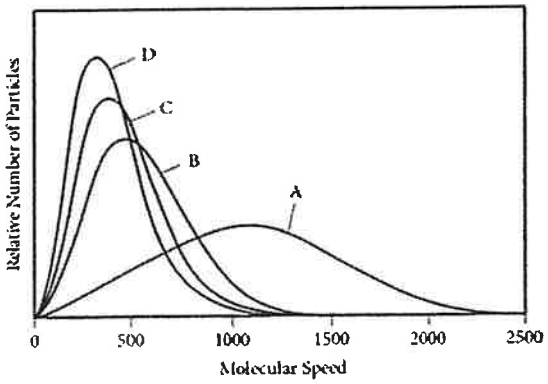
1. Which of the following statements is FALSE?
A) Halogens are very reactive elements. B) The alkali metals are fairly unreactive. C) Sulfur is a main group element. D) Noble gases do not usually form ions. E) Zn is a transition metal.

2. Write the name for $Sn(SO_4)_2$. Remember that Sn forms several ions.
A) tin (I) sulfite B) tin (IV) sulfate C) tin sulfide D) tin (II) sulfite E) tin (I) sulfate

3. What is the chemical formula for magnesium hydride?
A) MgH_2 B) MgOH C) MgH D) $MgOH_2$ E) $Mg(OH)_2$

4. Which of the following compounds is soluble in water?
A) CaS B) $MgCO_3$ C) $PbCl_2$ D) $BaSO_4$ E) None of these compounds is soluble in water.

5. Which of the gases in the graph below has the largest molar mass?



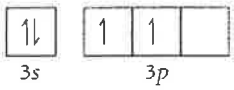
A) A B) B C) C D) D E) There is not enough information to determine.

6. Which of the following statement is TRUE?
A) State functions do not depend on the path taken to arrive at a particular state.
B) DErxn can be determined using constant volume calorimetry.
C) Energy is neither created nor destroyed, excluding nuclear reactions.
D) ΔHrxn can be determined using constant pressure calorimetry.
E) All of the above are true.

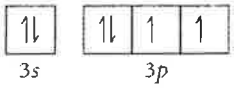
7. Which of the following statement is TRUE?
A) We can sometimes know the exact location and speed of an electron at the same time.
B) All orbitals in a given atom are roughly the same size.
C) Since electrons have mass, we must always consider them to have particle properties and never wavelike properties.
D) Atoms are roughly spherical because when all of the different shaped orbitals are overlapped, they take on a spherical shape.
E) All of the above are true.

8. Choose the valence orbital diagram that represents the Si.

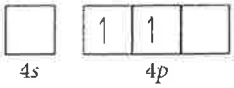
A)



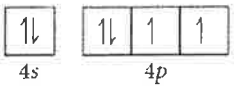
B)



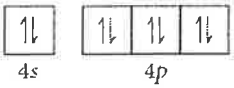
C)



D)



E)



9. Predict the charge for the most stable ion of nitrogen

A) -3 B) -2 C) 1 D) 0 E) +3

10. Choose the compound below that should have the highest melting point according to the ionic bonding model.

A) SrI_2 B) MgF_2 C) $CaCl_2$ D) SrF_2 E) $SrBr_2$

11. Draw the Lewis structure for NO_2^- including any valid resonance structures. Which of the following statements is TRUE?

A) The nitrite ion contains one N-O single bond and one N=O double bond.
B) The nitrite ion contains two N-O bonds that are equivalent to 1.5 bonds.
C) The nitrite ion contains two N=O double bonds.
D) The nitrite ion contains two N-O single bonds.
E) None of the above are true.

12. Place the following in order of **decreasing** X-A-X bond angle, where A represents the central atom and X represents the outer atoms in each molecule.

N_2O NCl_3 NO_2^-

A) $NCl_3 > NO_2^- > N_2O$
B) $NO_2^- > N_2O > NCl_3$
C) $N_2O > NO_2^- > NCl_3$
D) $NCl_3 > N_2O > NO_2^-$
E) $N_2O > NCl_3 > NO_2^-$

13. Draw the Lewis structure for BrF_4^-. What is the hybridization on the Br atom?
A) sp^3d^2 B) sp^3d C) sp^3 D) sp^2 E) sp

14. Using the VSEPR model, the molecular geometry of the central atom in SO_2 is _____.
A) linear B) trigonal planar C) tetrahedral D) bent E) trigonal pyramidal

15. Place the following substances in order of **increasing** vapor pressure at a given temperature.

NF_3 NH_3 BCl_3

A) $NH_3 < NF_3 < BCl_3$
B) $NF_3 < NH_3 < BCl_3$
C) $BCl_3 < NF_3 < NH_3$
D) $NH_3 < BCl_3 < NF_3$
E) $BCl_3 < NH_3 < NF_3$

16. Which of the following compounds exhibits only dispersion and dipole-dipole intermolecular interactions?

A) H_2 B) HI C) CO_2 D) CH_3NH_2 E) CH_3OH

17. Which of the following statements is TRUE?
A) The solubility of a solid is not dependent on either temperature or pressure.
B) The solubility of a solid is highly dependent on pressure.
C) The solubility of a solid is highly dependent on both pressure and temperature.
D) The solubility of a solid is highly dependent on temperature.
E) None of the above.

18. Consider the following reaction at equilibrium. What will happen if we add more SO_3 in the system?

$$SO_2(g) + NO_2(g) \rightleftharpoons SO_3(g) + NO(g)$$

A) The reaction will shift in the direction of products.
B) The reaction will shift to decrease the pressure.
C) No change will occur since SO_3 is not included in the equilibrium expression.
D) The reaction will shift in the direction of reactants.
E) The equilibrium constant will decrease.

19. Which Brønsted-Lowry acid is not considered to be a strong acid in water?
A) HI B) HBr C) H_2SO_3 D) HNO_3 E) HCl

20. Which of the following is a Lewis acid?
A) BCl_3
B) CH_4
C) NH_3
D) $CHCl_3$
E) None of the above are Lewis acids.

背面有題，請繼續作答。

21. When titrating a weak monoprotic acid with NaOH at 25°C, the
A) pH will be less than 7 at the equivalence point.
B) pH will be equal to 7 at the equivalence point.
C) pH will be greater than 7 at the equivalence point.
D) titration will require more moles of base than acid to reach the equivalence point.
E) titration will require more moles of acid than base to reach the equivalence point.

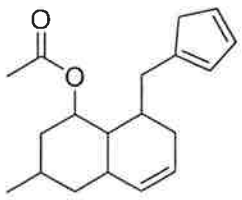
22. Which of the following statements is TRUE?
A) Entropy is not a state function.
B) Endothermic processes decrease the entropy of the surroundings, at constant T and P.
C) Endothermic processes are never spontaneous.
D) Exothermic processes are always spontaneous.
E) None of the above are true.

23. What statement is NOT true about standard electrode potentials?
A) E°cell is positive for spontaneous reactions.
B) Electrons will flow from more negative electrode to more positive electrode.
C) The electrode potential of the standard hydrogen electrode is exactly zero.
D) E°cell is the difference in voltage between the anode and the cathode.
E) The electrode in any half-cell with a greater tendency to undergo reduction is positively charged relative to the standard hydrogen electrode and therefore has a positive E°.

24. What will happen during gamma ray emission.
A) The mass number and atomic number decrease.
B) The mass number and atomic number increase.
C) The mass number is unchanged and the atomic number decreases.
D) The mass number is unchanged and the atomic number increases.
E) The mass number and atomic number do not change.

25. Identify the element that is not used as a radioactive tracer.
A) iron-59
B) phosphorus-32
C) thallium-201
D) iodine-131
E) carbon-13

26. How many chiral centers are there in the following molecule?

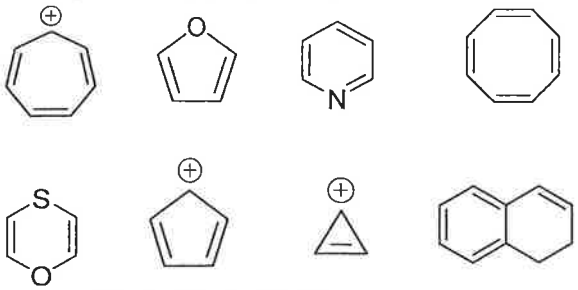


(A) 4 (B) 5 (C) 6 (D) 7

27. Which of compounds can be reduced by sodium borohydride ?

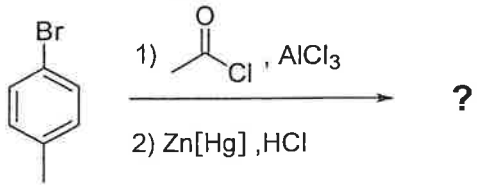
(A) 2-butanol
(B) butyric acid
(C) 2-butene
(D) 3-pentanone

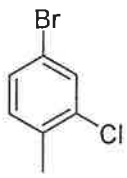
28. Among the following compounds, how many are aromatic?

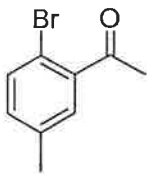


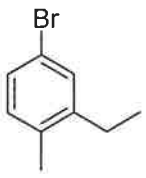
(A) 4 (B) 5 (C) 6 (D) 7

29. Predict the major product of the following reaction:



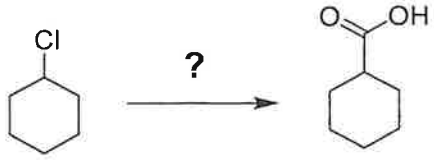
(A) 

(B) 

(C) 

(D) 

30. Which reagent(s) are necessary to carry out the following reaction ?



(A)

1) Mg, Et_2O
2) CO_2
3) H_3O^+

(B)

1) PCC
2) CO_2

(C)

1) H_2, Pt
2) CO_2

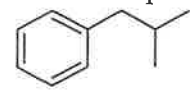
(D)

1) BH_3, THF
2) H_2O_2, OH^-

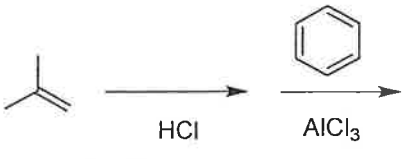
31. Which of the following reagents would convert 2-butanol into 2-bromobutane ?

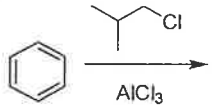
(A) Br_2/CCl_4
(B) Br_2/light; heat
(C) PBr_3/pyridine
(D) $CuBr_2$/MeOH

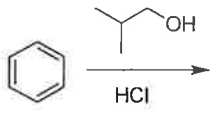
32. Choose the possible process to produce Isobutylbenzene.

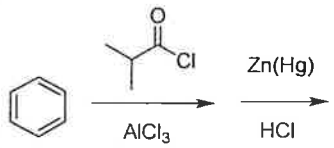


Isobutylbenzene

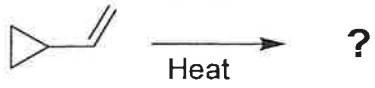
(A) 

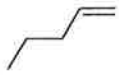
(B) 

(C) 

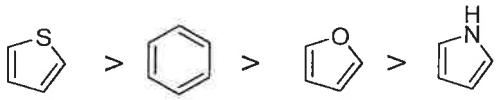
(D) 

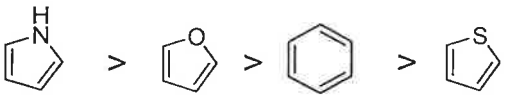
33. Which is major product of following reaction?

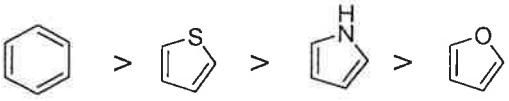


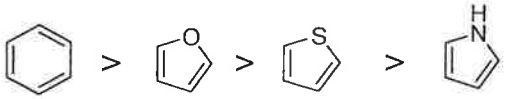
(A)  (B)  (C)  (D) all of above is incorrect

34. Please order following compounds with aromaticity.

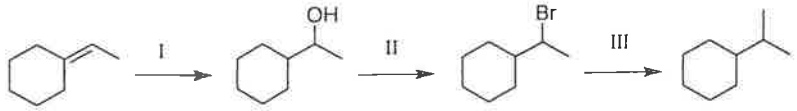
(A) 

(B) 

(C) 

(D) 

35. Which process of following reaction is incorrect ?



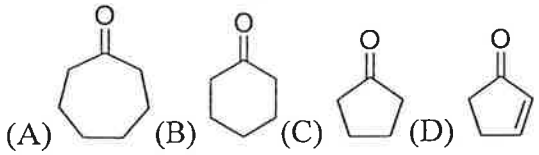
(A) I should be $\xrightarrow[2.CsOH]{1.LAH}$

(B) II should be $\xrightarrow{PBr_3}$

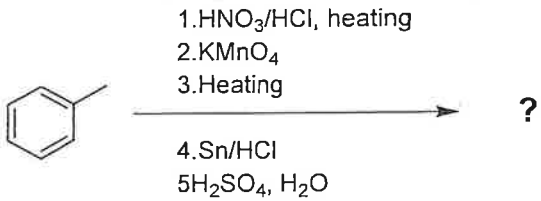
(C) III should be $\xrightarrow{(CH_3)_2CuLi}$

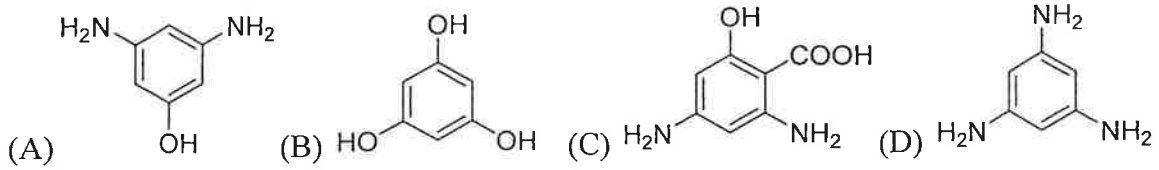
(D) all of above is correct

36. There is a IR absorption at 1747 cm^{-1}, what structure would you expect?

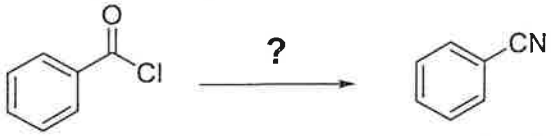


37. Which is major product of following reaction ?



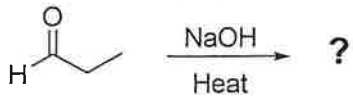


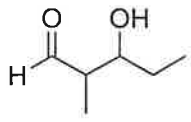
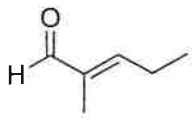
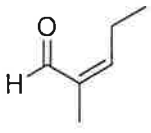
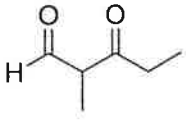
38. Identify the reagents of the following transformation:



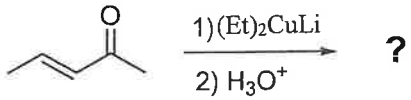
(A) 1) Excess NH_3 2) LAH 3) H_2O (B) 1) Excess NH_3 2) NaOH, heat 3) H_3O^+
(C) 1) Excess NH_3 2) $SOCl_2$ (D) 1) NaCN 2) LAH 3) H_2O

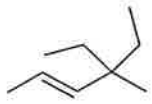
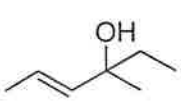
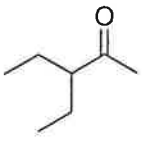
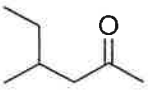
39. Predict the major product of the following reaction:



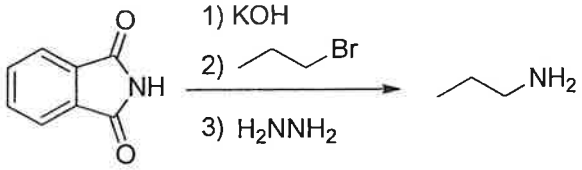
(A) 
(B) 
(C) 
(D) 

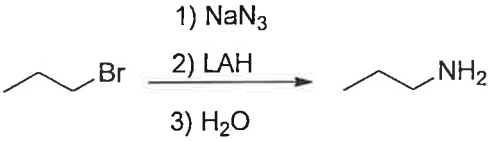
40. Predict the major product of the following reaction:

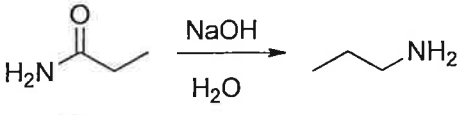


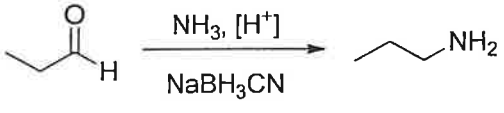
(A) 
(B) 
(C) 
(D) 

41. Which of the following reactions is not correct ?

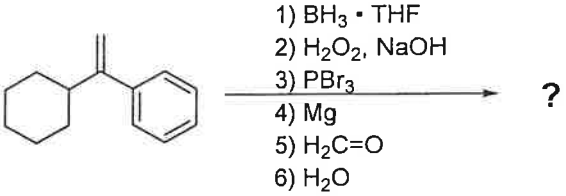
(A) 

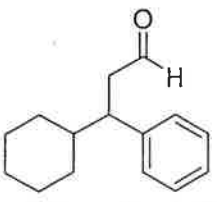
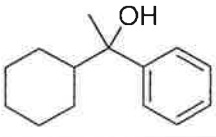
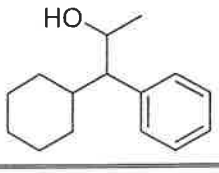
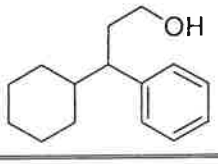
(B) 

(C) 

(D) 

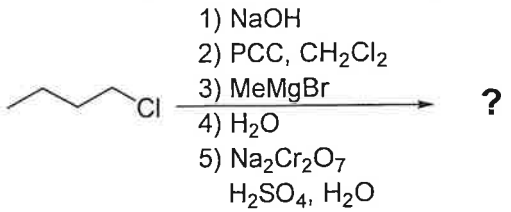
42. Predict the product of the following reaction:

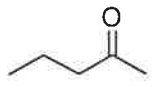
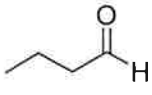
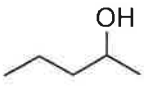
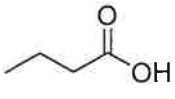


(A) 
(B) 
(C) 
(D) 

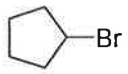
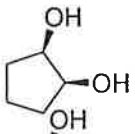
　背面有題，請繼續作答。

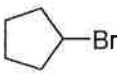
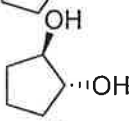
43. Predict the product of the following reaction:

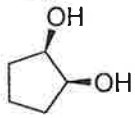


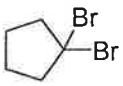
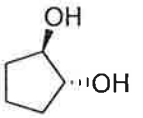
(A)  (B)  (C)  (D) 

44. Identify the reagents and products of the following transformation:

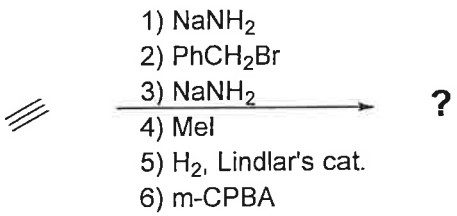
(A) **A** =  **B** = H_2SO_4 **C** = 1) OsO_4 2) $NaHSO_3$, H_2O **D** = 

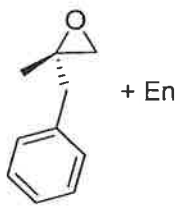
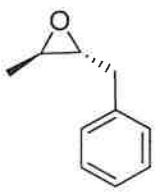
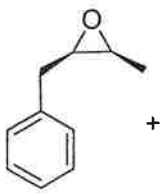
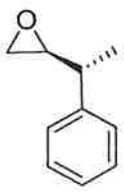
(B) **A** =  **B** = NaOEt **C** = m-CPBA **D** =  + En

(C) **A** =  **B** = NaOEt **C** = m-CPBA **D** = 

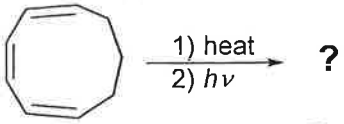
(D) **A** =  **B** = H_2SO_4 **C** = 1) OsO_4 2) $NaHSO_3$, H_2O **D** =  + En

45. Predict the products of the following reaction:



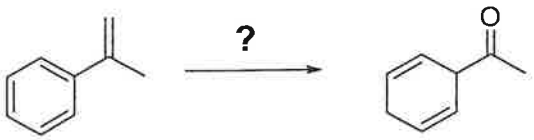
(A)  + En (B)  + En (C)  + En (D)  + En

46. Predict the product of the following reaction:



(A) 
(B) 
(C) 
(D) 

47. Identify the reagents of the following transformation:



(A)
1) O_3
2) DMS
3) Na, NH_3
MeOH

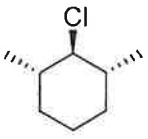
(B)
1) OsO_4
2) $NaHSO_3$, H_2O
3) O_3
4) DMS

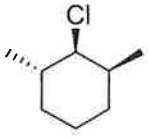
(C)
1) HBr
2) H_2SO_4
3) O_3
4) DMS

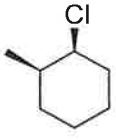
(D)
1) 9-BBN
2) H_2O_2, NaOH
3) Na, NH_3
MeOH

48. Which compound can not undergo an E2 reaction ?

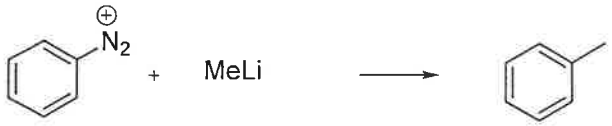
(A) 

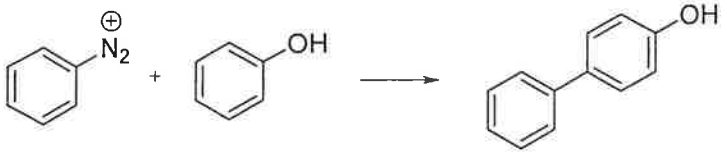
(B) 

(C) 

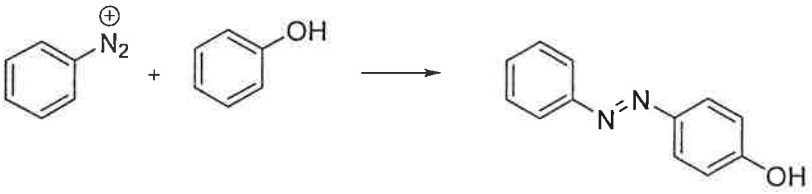
(D) 

49. Which of the following reactions is correct ?

1 

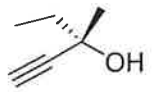
2 

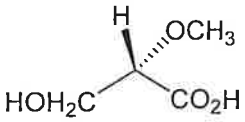
3 

4 

(A) **1**、**2** (B) **1**、**4** (C) **3**、**4** (D) **2**、**3**

50. Assign R or S configuration in the following molecules.

A = 

B = 

(A) **A** = R ; **B** = S
(B) **A** = S ; **B** = S
(C) **A** = S ; **B** = R
(D) **A** = R ; **B** = R

國立中興大學111學年度
醫學院學士後醫學系招生考試選擇題參考答案

科目：英文

題號	答案	題號	答案	題號	答案	題號	答案	題號	答案
1.	**D**	**2.**	**C**	**3.**	**E**	**4.**	**E**	**5.**	**A**
6.	**B**	**7.**	**C**	**8.**	**B**	**9.**	**B**	**10.**	**C**
11.	**C**	**12.**	**A**	**13.**	**E**	**14.**	**C**	**15.**	**A**
16.	**D**	**17.**	**A**	**18.**	**E**	**19.**	**C**	**20.**	**A**
21.	**A**	**22.**	**C**	**23.**	**A**	**24.**	**B**	**25.**	**A**
26.	**D**	**27.**	**C**	**28.**	**C**	**29.**	**D**	**30.**	**A**
31.	**C**	**32.**	**D**	**33.**	**D**	**34.**	**A**	**35.**	**C**
36.	**D**	**37.**	**C**	**38.**	**E**	**39.**	**E**	**40.**	**E**
41.	**C**	**42.**	**B**	**43.**	**E**	**44.**	**C**	**45.**	**C**
46.	**B**	**47.**	**D**	**48.**	**D**	**49.**	**B**	**50.**	**D**
51.	**E**	**52.**	**C**	**53.**	**B**	**54.**	**B**	**55.**	**B**
56.	**E**	**57.**	**C**	**58.**	**B**	59.		60.	

科目：物理

題號	答案	題號	答案	題號	答案	題號	答案	題號	答案
1.	E	2.	B	3.	B	4.	B	5.	E
6.	B	7.	D	8.	C	9.	B	10.	D
11.	D	12.	C	13.	B	14.	B	15.	C
16.	B	17.	D	18.	C	19.	D	20.	B
21.	B	22.	C	23.	D	24.	E	25.	A
26.	C	27.	D	28.	A	29.	D	30.	B
31.	A	32.	D	33.	A	34.	A	35.	C
36.	A	37.	C	38.	A	39.	C	40.	D
41.	B	42.	D	43.	B	44.	C	45.	A
46.	D	47.	A	48.	D	49.	D	50.	A

科目：化學

題號	答案	題號	答案	題號	答案	題號	答案	題號	答案
1.	B	2.	B	3.	A	4.	A	5.	D
6.	E	7.	D	8.	A	9.	A	10.	B
11.	B	12.	C	13.	A	14.	D	15	A
16.	B	17.	D	18.	D	19.	C	20.	A
21.	C	22.	B	23.	D	24.	E	25	E
26.	B	27.	D	28.	B	29.	C	30.	A
31.	C	32.	D	33.	C	34.	C	35.	A
36.	C	37.	B	38.	C	39.	B	40.	D
41.	C	42.	D	43.	A	44.	B	45.	C
46.	D	47.	A	48.	B	49.	B	50.	B

科目：普通生物及生化概論

題號	答案	題號	答案	題號	答案	題號	答案	題號	答案
1.	A	2.	B	3.	A	4.	E	5.	D
6.	C	7.	E	8.	D	9.	E	10.	C
11.	A	12.	B	13.	E	14.	C	15	B
16.	C	17.	D	18.	E	19.	C	20.	A
21.	C	22.	E	23.	D	24.	B	25	B
26.	A	27.	B	28.	D	29.	D	30.	A
31.	C	32.	B	33.	C	34.	B	35.	E
36.	D	37.	A	38.	D	39.	A	40.	A
41.	B	42.	E	43.	E	44.	C	45.	D
46.	D	47.	A	48.	C	49.	D	50.	B
51.	B	52.	C	53.	A	54.	B	55.	C
56.	C	57.	D	58.	D	59.	C	60.	D
61.	B	62.	D	63.	A	64.	A	65.	A
66.	C	67.	B	68.	C	69.	C	70.	C

國立中興大學 111 學年度學士後醫學系招生考試試題參考答案疑義釋疑公告

科目	題號	疑義答覆	釋疑結果
英文	15	1. 本題題幹第一句提到「科學家已指出飢餓不僅僅是某種狀況」（“Scientists have shown that hunger isn't just something _____.”）。句中「飢餓不僅僅是…」一語透露下一句關於飢餓狀況的訊息，將與第一句相對。針對飢餓狀況，題幹第二句進一步指出「童年時期經歷之飢餓狀況具有連漪效應，我們也才正開始理解。」（“Hunger during childhood can have a ripple effect that we are only just beginning to understand.”），句中「連漪效應」正是與第一句意思相對的主要關鍵訊息。「連漪效應」（a ripple effect）意指“a spreading, pervasive, and usually unintentional effect or influence”，亦即童年時期經歷之飢餓狀況會延伸、擴大。透過第二句回頭理解第一句，顯示飢餓狀況不僅僅是短暫的、一時的。 2. 本題為單選選擇題，作答者需按題幹文意，從選項中挑出最適切者，（A）transient 為其中最適切選項。 本題及公布之答案均無誤，維持原公布之答案。	維持原答案(A)
	49	本題為考卷印製問題，無法判斷此題答案，本題送分。	本題送分
	56	根據閱讀測驗 Passage C 第二段敘述：The most famous feat was that he was willing to cut partial skin of his wife (neé Marjorie Learner 連瑪玉), another missionary to Taiwan, under her suggestion, to graft onto an adolescent patient Chou Chin-Yao to prevent his skin ulcers around his knee from deterioration and eventual amputation.文中 under her suggestion 文意乃連接 he was willing to cut partial skin of his wife 而來，即 he was willing to cut partial skin of his wife under her suggestion；意指蘭醫師為進行該次手術，割下其妻連瑪玉皮膚，乃經連瑪玉建議，但此建議僅針對該手術。文章他處並未提及連瑪玉鼓勵蘭醫師從事異體移植手術。 本題及公布之答案均無誤，維持原公布之答案。	維持原答案(E)

科目	題號	疑義答覆	釋疑結果
物理	16	本題因題目數字誤植，故沒有答案，本題送分。	本題送分
	21	本題雖可以理解題意來計算，但為顧及考試公平性，本題送分。	本題送分
	30	本題為正確答案誤植，答案更正為(D)。	答案更正為(D)
	35	本題因正確答案不在選項中，本題送分。	本題送分

科目	題號	疑義答覆	釋疑結果
化學	5	確實在題意上及圖形上可能造成誤解，雖然在假設一定情況下，正確答案應為(D)。不過此題答(D)或(E)可給分。	答案更改為(D)或(E)
	4	此題目主要是判斷何者化合物可以溶於水(soluble)，$PbCl_2$ 在加熱狀態下雖然可部分溶於水，但在加熱狀態下許多化合物皆可部分溶於水，所以此題維持答案(A) CaS 可完全溶於水	維持原答案(A)
	6	此題因為(B)選項打字錯誤，可能造成無法判斷，因此此題送分。	本題送分
	10	由於考生是根據實際熔點去做答案判斷，但此題目是詢問若根據離子鍵理論(離子之間作用力越強則有較高熔點及沸點)何者應有較高熔點？則 MgF_2 應為正確答案，因此決定此題目答案可以為(B)或(D)。	答案更改為(B)或(D)
	15	若是從沸點思考確實答案應為(E)，不過若是從分子間作用力思考，NH3 還是有氫鍵作用力，在某個溫度下可能蒸氣壓會比 BCl_3 高，因此決定此題目答案可以為(A)或(E)。	答案更改為(A)或(E)
	23	氫標準電極確實是在定義上為零，故本題答案(C)也算對，因此答案更改為(C)或(D)	答案更改為(C)或(D)
	28	因最右下第 8 個化合物答案上可能有所爭議，故決定答案(A)(4 個)或(B)(5 個)皆給對。	答案更改為(A)或(B)
	37	因第 5 個步驟之反應得到的產物可能為(A)或(B)，但因爭議較大，經討論過後此題送分。	本題送分

科目	題號	疑義答覆	釋疑結果
普通生物及生化概論	8	因為 glyceraldehyde-3-phosphate/ dihydroxyacetone phosphate 可藉 isomerase 轉換所以選項(A)亦可。	答案更改為(A)或(D)
	10	此題依據期刊論文提出 Vitiman B6 亦有抗氧化之功能，惟該期刊結果乃依據老鼠之動物實驗結果所下之結論，因此 Vitiman B6 於抗氧化之功能仍有待最後確認，基於此一疑義，因此本題送分。	本題送分
	13	本題為正確答案誤植，答案更正為(B)。	答案更正為(B)
	18	此題釋疑點在於"change of a single base in the non-coding region of a gene "是否符合 silent mutation 的定義。但實際上還是必須確保產生的蛋白質沒有產生改變，例如 splicing site 的 mutation 是有可能發生 exon skipping 和氨基酸序列缺失。	維持原答案(E)
	22	此題依據 Principles of Biochemistry Leininger 8 edition 內容，認為 Crispr/Cas9 利用 single strand break (SSB)引起 Homologous recombination (HR)來進行基因編輯。該課本的圖以及文字描述省略了細節部分，實際上利用修改過 Cas9 蛋白(Cas9 Nickase) 能夠產生 single strand break，但必須**利用 2 個在不同鏈且距離不能太遠**的 SSB 來引起 Double strand break (DSB)。SSB 一般是無法引發 HR 的。因此，即使是利用 Cas9 nickase 依然是透過 DSB 所引起 NHEJ 或是 HR 來進行基因組編輯。	維持原答案(E)
	27	此題釋疑點在於 lactose 不會直接與 lac repressor 結合，必須先轉換為 allolactose，是否能夠認為是 allosteric regulator。本題出題老師採用對 regulator 的廣義解釋：lactose 具有對 lac repressor 進行 allosteric regulation 能力，亦可視為 regulator。採用狹義解釋 regulator 專指結合在蛋白上的分子，在本題中不會產生答案，且針對該分子的名稱並不統一(modulator, effector, regulator)，因此維持原答案	維持原答案(B)
	28	此題釋疑點在於 RNA interference 是不是 epigenetic regulation Epigenetic regulation 是指 DNA 序列不變的情況下調控基因表現，但基因表現指的是從 DNA 到 RNA 過程。RNA interference 則是利用影響 RNA 來調控蛋白質或是 RNA 其他 RNA 功能。容易產生誤解的地方在於有一小部分 non-coding	維持原答案(D)

		RNA 被認為具有調控基因表現的能力，但一般不會認為是 RNA interference。	
	30	本題為正確答案誤植，答案更正為(D)。	答案更正為(D)
	39	本題為正確答案誤植，答案更正為(E)。	答案更正為(E)
	40	步驟 V 為 translocation step to start a new fatty acid synthesis cycle. 因此(A)是本題適合的答案。	維持原答案(A)
	42	在 urea cycle 中並無 Gln 直接參與。	維持原答案(E)
	65	ψp + ψs = -0. 3 MPa -0.5 MPa (ψs) + (ψp) = -0. 3 MPa ψp = +0.2 MPa 調整答案為(B)	答案更正為(B)
	66	減少中間宿主 Freshwater snail 的數量，可有效降低 blood flukes 的感染率 調整答案為(B)	答案更正為(B)