

臺北醫學大學 八十九 學年度第 一 學期期末考試命(試)題紙

系級	科目	授課教師	考試日期	學號	姓名
醫一	普通化學	賴精二	89年1月11日第2節		

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②每張試題卷務必填寫(學號)、(姓名)。

- I. Select the best answer : $(v = \frac{1}{2\pi} \sqrt{\frac{K_b}{m}} ; \lambda = \frac{h}{mu} ; A = -\log T = acf)$
- () Electron spin resonance (ESP) is related with which of the followings?
 (a) x-ray (b) UV (c) IR (d) microwave
- () We know about moving bodies of any mass can emit energy wave. If the speed of a α -particle having mass 6.6×10^{-27} kg is 1.5×10^7 m/s, the expected wavelength of emission would be (a) 4.3 (b) 6.7 (c) 7.9 (d) 9.1 $\times 10^{-6}$ nm. ($h = 6.626 \times 10^{-34}$ Js)
- () According to VSEPR theory the geometry of the atoms in the carbonate ion, CO_3^{2-} is
 (a) square planar (b) tetrahedral (c) pyramidal (d) trigonal planar (e) octahedral
- () The type of hybridization for the P atom in PF_6^- is
 (a) sp (b) sp^2 (c) sp^3 (d) sp^3d (e) sp^3d^2
- () Which of the following species is paramagnetic(順磁性)?
 (a) ${}_{29}\text{Cu}^{+2}$ (b) ${}_{9}\text{F}^-$ (c) ${}_{13}\text{Al}^{+3}$ (d) ${}_{30}\text{Zn}$
- () Which of the following sets of elements is in the correct order of atomic radius?(smallest one first, etc.)
 (a) Ga < Ge < As (b) B < Al < Ga (c) I < Br < Cl (d) As < S < P (e) P < S < C
- () Rank the elements C, O, Na, Al in order of decreasing ionization energy (IE) ?
 (a) C > O > Na > Al (b) O > Na > C > Al (c) O > C > Al > Na (d) Al > Na > O > C
- () Which of the following is not true ?
 (a) Nonmetallic oxide will react with water to produce acids .
 (b) When metallic oxide react with water, they typically form bases .
 (c) Nonmetallic oxides can react directly with bases in neutralization.
 (d) Metallic oxide can not react directly with acids in neutralization.
- () Which of the following oxides do exhibit the most acidic behavior ?
 (a) Cl_2O_7 (b) SiO_2 (c) Al_2O_3 (d) SO_3 (e) P_4O_{10}
- () Which of the following statements regarding to x-ray spectrometry is not true?
 (a) The excitation medium is electron beam.
 (b) x-ray spectra result from the most inner electrons transition in the atom.
 (c) The short-wavelength limit for x-ray depends upon the voltage in the following:

$$\lambda_0 = \frac{hc}{eV} = \frac{12400}{V}$$
 (d) x-ray emitted from cathode(陰極) in x-ray tube.
- () The corresponding atomic number to 2.289×10^{-8} cm of K_{α} line of x-ray is
 (a) 12, Mg (b) 13, Al (c) 19, K (d) 25, Mn (e) 26, Fe
 (Moseleys' constant $a = 2.5 \times 10^{15}$, $\sigma = 1$)
- () Which of the following is the radiation source of atomic absorption spectrometer?
 (a) hollow cathode or metal analyte (金屬分析極體) (b) flame
 (c) microwave radiation (d) tungsten (W) lamp
- () $\pi \rightarrow \pi^*$ electron transition is associated with the absorption of
 (a) microwave (b) IR (c) visible (d) UV (e) x-ray
- () Which of the following compounds presents the longest λ_{\max} of UV?
 (a) benzene (b) naphthalene (c) anthracene (d) naphthacene (e) pentacene
- () The most proper absorbance in UV or visible spectrometry is
 (a) 0.01 ~ 0.1 (b) 0.2 ~ 0.8 (c) 0.8 ~ 1.5 (d) 0 ~ 2
- () Calculate the absorptivity(a) based on the following data : $\lambda_{\max} = 265\text{nm}$; transmittance (T) = 10% ; $c = 1.0\text{mg}/100\text{ml}$; cuvette length(l) = 1.00 cm
 (a) 1 (b) 10 (c) 100 (d) 1000
- () The number of fundamental vibration of CH_4 molecule is
 (a) 3 (b) 5 (c) 7 (d) 9 (e) 10
- () The fingerprint region(指紋帶) of IR(紅外線吸收光譜) is
 (a) $700\text{nm} \sim 3.0\mu\text{m}$ (b) $3.0\mu\text{m} \sim 8.0\mu\text{m}$ (c) $8.0\mu\text{m} \sim 15.0\mu\text{m}$ (d) $15.0\mu\text{m} \sim 40.0\mu\text{m}$

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 臺北醫學大學 八十九 學年度第 一 學期期末考試命(試)題紙

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- 務務處 行政學用
- () Which of the following statements on molecular vibration is incorrect ?
 (a) Stretching - Alternating interatomic distance.
 (b) Bending - Change in bond angle between bonds with a common atom.
 (c) Rocking is a kind of in-plane bending vibration.
 (d) Wagging is a kind of out - of - plane bending vibration..
 (e) Twisting is a kind of in- plane bending vibration
- () An alternative process of energy state transition in fluorescence radiation that the molecule undergoes collisions with other molecules and drops to vibrational levels within the same electronic state is called
 (a) Internal quenching (b) collisional quenching (c) vibrational relaxation
 (d) intersystem crossing
- () Which of the following substituents decreases the fluorescence ?
 (a) -NO₂ (b) -NH₂ (c) -OH (d) -F (e) -OCH₃
- () Which of the following lamps will be the line source of spectrofluorometers ?
 1. Mercury lamp 2. Tungsten lamp 3. Xenon lamp(高壓氙燈)
 (a) 1,2 (b) 1,3 (c) 2,3 (d) all of the above
- () Which of the following will determine the magnetic field of atomic nuclei spin and the chemical shift (化學位移) in NMR spectra (核磁共振圖譜) ?
 (a) electron (b) neutron (c) proton (d) the other atomic nuclei
- () How many different "kinds" of H atoms(or NMR absorption peaks,δ) are there in the following molecule ?
 (a) 2 (b) 3 (c) 4 (d) 5 (e) 6
- () To predict the splitting of signal pattern of CH₃ - in the following molecule: $\begin{matrix} \text{O} \\ || \\ \text{CH}_3\text{CCH}_2\text{CH}_3 \end{matrix}$
 (a) siglet (unsplit) (b) doublet (split in two)
 (c) Triplet (split in three) (d) quartet (split in four)

II. Complete and balance the following equations If no reaction occurs, so state .

- (a) $\text{Cl}_{2(aq)} + \text{Br}^-_{(aq)} \rightarrow$ _____
 (b) $\text{Br}_{2(l)} + \text{I}^-_{(aq)} \rightarrow$ _____
 (c) $\text{N}_2\text{O}_{5(a)} + \text{H}_2\text{O}_{(l)} \rightarrow$ _____
 (d) $\text{Al}_2\text{O}_{3(a)} + \text{H}^+_{(aq)} \rightarrow$ _____
 (e) $\text{Ca}_{(s)} + \text{H}^+_{(aq)} \rightarrow$ _____

III. Consider the molecule BrF₃

- (a) Draw all possible geometric arrangement of bonding and lonepairs.
 (b) Tabulate the different kinds of repulsions where angles are approximately 90°C.
 (c) Predict the correct molecular shape.

IV. Complete the molecular orbital energy diagram for CH₄. (詳細畫出原子及分子能階圖)

臺北醫學大學 八十九 學年度第 一 學期期末考試命(試)題紙

系 級	科 目	授課教師	考 試 日 期	學 號	姓 名
醫一	普通化學	張怡怡	89年1月11日第2節		

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 ②每張試題卷務必填寫(學號)、(姓名)。

1. 如何改善檢測過程中各種系統誤差?(9%)

請勿翻印或帶出

2. 未知樣品檢測時，在選擇方法上應考量哪些因素?(8%)

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3. Estimate the absolute deviation and the coefficient of variation for the results of the following calculations. Round each result to include only significant figures. The numbers in parentheses are absolute standard deviations. (9%)

(a) $143(\pm 6) - 64(\pm 3)$

$$y = \frac{143(\pm 6) - 64(\pm 3)}{1249(\pm 1) + 77(\pm 8)} = 5.9578 \times 10^{-2} \pm ?$$

$$1249(\pm 1) + 77(\pm 8)$$

(b) $y = \log[2.00(\pm 0.03) \times 10^{-4}] = -3.69897 \pm ?$

(c) $y = [4.73(\pm 0.03) \times 10^{-4}]^3 = 105.8238 \pm ?$

4. The homogeneity of a standard chloride sample was tested by analyzing portions of the material from the top and the bottom of the container, with the following results: (8%)

% Chloride

Top	Bottom
26.32	26.28
26.33	26.25
26.38	26.38
26.39	

Is nonhomogeneity indicated at the 95% confidence level? (8%)

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5. A method for the analysis of codeine in prescription drugs yielded the following results when applied to a codeine-free blank: 0.1, -0.2, 0.3, 0.2, 0.0, -0.1 mg codeine. Calculate the detection limit (in terms of milligrams of codeine) at the 99% confidence level, based upon the mean of four analyses. (8%)

6. Students measured the concentration of HCl in a solution by titrations using different indicators to find the end point.

Indicator	Mean HCl concentration (M) (\pm) standard deviation	Number of measurements
Bromothymol blue	0.09565 \pm 0.00225	28
Methyl red	0.08686 \pm 0.00098	18

Is the difference between indicators 1 and 2 significant at the 95% confidence level? (8%)

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醫一	普通化學	張怡怡	89年1月11日第2節		

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Table Values of t for Various Levels of Probability

Degrees of Freedom	Factor for Confidence Interval				
	80%	90%	95%	99%	99.9%
1	3.08	6.31	12.7	63.7	637
2	1.89	2.92	4.30	9.92	31.6
3	1.64	2.35	3.18	5.84	12.9
4	1.53	2.13	2.78	4.60	8.60
5	1.48	2.02	2.57	4.03	6.86
6	1.44	1.94	2.45	3.71	5.96
7	1.42	1.90	2.36	3.50	5.40
8	1.40	1.86	2.31	3.36	5.04
9	1.38	1.83	2.26	3.25	4.78
10	1.37	1.81	2.23	3.17	4.59
11	1.36	1.80	2.20	3.11	4.44
12	1.36	1.78	2.18	3.06	4.32
13	1.35	1.77	2.16	3.01	4.22
14	1.34	1.76	2.14	2.98	4.14
∞	1.29	1.64	1.96	2.58	3.29

Table Confidence Levels for Various Values of z

Confidence Levels, %	z
50	0.67
68	1.00
80	1.29
90	1.64
95	1.96
96	2.00
99	2.58
99.7	3.00
99.9	3.29

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 試題卷
 否則
 取消
 考試
 資格

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 私立臺北醫學院 八十九 學年度第 一 學期 期中 考試 (命試) 題紙

系 級	科 目	授 課 教 師	考 試 日 期	學 號	姓 名
醫一	微積分	潘力誠	____年____月____日第____節		

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 專用

- (20%) 1. Determine the length of the curve given by the graph of $y = \sqrt{x} = x^{1/2}$ between $a = 5/9$ and $b = 21/9$ and partition size $n=8$.
- (20%) 2. Suppose that a quantity X is normally distributed with mean 3 and standard deviation 2. Find the fraction of the population that falls into the intervals:
 10%(1) $P(X=[2, 5])$ 5%(2) $P(X < 2)$ 5%(3) $P(X > 5)$
- (20%) 3. A screening test for a disease show a positive test result in 90% of all cases when the disease is actually present and in 15% of all cases when it is not. Assume that the prevalence of the disease is 1 in 100. If the test is administered to a randomly chosen individual, what is the probability that the result is negative?
- (20%) 4. Assume a 1:1 sex ratio. A woman who is a carrier of hemophilia has four children with a man who is not hemophilic. What is the probability that she has one daughter who is not a carrier, one daughter who is a carrier, one son who is, and one son who is not hemophilic?
- (20%) 5. A class of 28 people collected the following data, which represents their heights x and arm spans y (rounded to nearest inch).
 (60,61), (65,65), (68,67), (72,73), (61,62), (63,63), (70,71), (75,74), (71,72),
 (62,60), (65,65), (66,68), (62,62), (72,73), (70,70), (69,68), (69,70), (60,61),
 (63,63), (64,64), (71,71), (68,67), (69,70), (70,72), (65,65), (64,63), (71,70),
 (67,67)
 Find a linear model to represent these data and estimate the error.

私立臺北醫學院 111 學年度第 一 學期 期中 考試 (試) 命題紙

系級	科	目	授課教師	考試日期	學號	姓名
醫一	微積分	潘力誠		____年____月____日第____節		

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不可使用計算機

務務處
 專用

B TABLE OF THE STANDARD NORMAL DISTRIBUTION

Areas under the Standard Normal Curve from $-\infty$ to z (see Figure B.1)

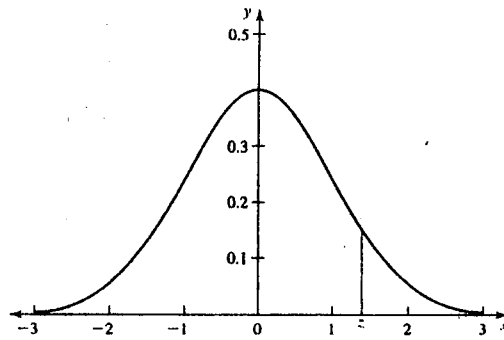


Figure B.1

z	0	1	2	3	4	5	6	7	8	9
0.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
0.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5754
0.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
0.3	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517
0.4	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879
0.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
0.6	.7258	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7518	.7549
0.7	.7580	.7612	.7642	.7673	.7704	.7734	.7764	.7794	.7823	.7852
0.8	.7881	.7910	.7939	.7967	.7996	.8023	.8051	.8078	.8106	.8133
0.9	.8159	.8186	.8212	.8238	.8264	.8289	.8315	.8340	.8365	.8389
1.0	.8413	.8438	.8461	.8485	.8508	.8531	.8554	.8577	.8599	.8621
1.1	.8643	.8665	.8686	.8708	.8729	.8749	.8770	.8790	.8810	.8830
1.2	.8849	.8869	.8888	.8907	.8925	.8944	.8962	.8980	.8997	.9015
1.3	.9032	.9049	.9066	.9082	.9099	.9115	.9131	.9147	.9162	.9177
1.4	.9192	.9207	.9222	.9236	.9251	.9265	.9279	.9292	.9306	.9319
1.5	.9332	.9345	.9357	.9370	.9382	.9394	.9406	.9418	.9429	.9441
1.6	.9452	.9463	.9474	.9484	.9495	.9505	.9515	.9525	.9535	.9545
1.7	.9554	.9564	.9573	.9582	.9591	.9599	.9608	.9616	.9625	.9633
1.8	.9641	.9649	.9656	.9664	.9671	.9678	.9686	.9693	.9699	.9706
1.9	.9713	.9719	.9726	.9732	.9738	.9744	.9750	.9756	.9761	.9767
2.0	.9772	.9778	.9783	.9788	.9793	.9798	.9803	.9808	.9812	.9817
2.1	.9821	.9826	.9830	.9834	.9838	.9842	.9846	.9850	.9854	.9857
2.2	.9861	.9864	.9868	.9871	.9875	.9878	.9881	.9884	.9887	.9890
2.3	.9893	.9896	.9898	.9901	.9904	.9906	.9909	.9911	.9913	.9916
2.4	.9918	.9920	.9922	.9925	.9927	.9929	.9931	.9932	.9934	.9936
2.5	.9938	.9940	.9941	.9943	.9945	.9946	.9948	.9949	.9951	.9952
2.6	.9953	.9955	.9956	.9957	.9959	.9960	.9961	.9962	.9963	.9964
2.7	.9965	.9966	.9967	.9968	.9969	.9970	.9971	.9972	.9973	.9974
2.8	.9974	.9975	.9976	.9977	.9977	.9978	.9979	.9979	.9980	.9981
2.9	.9981	.9982	.9982	.9983	.9984	.9984	.9985	.9985	.9986	.9986