注意：考試開始鈴響前，不得翻閱試題，

並不得書寫、畫記、作答。

國立清華大學 111 學年度學士後醫學系單招試題

系所班組別：學士後醫學系
智慧資訊科技組

科目代碼：0203

考試科目：資訊科學

－作答注意事項－

1. 請核對答案卷（卡）上之准考證號、科目名稱是否正確。
2. 作答中如有發現試題印刷不清，得舉手請監試人員處理，但不得要求解釋題意。
3. 考生限在答案卷上標記「由此開始作答」區內作答，且不可書寫姓名、准考證號或與作答無關之其他文字或符號。
4. 答案卷用盡不得要求加頁。
5. 答案卷可用任何書寫工具作答，惟為方便閱卷辨識，請儘量使用藍色或黑色書寫；答案卡限用 2B 鉛筆畫記；如畫記不清（含未依範例畫記）致光學閱讀機無法辨識答案者，其後果一律由考生自行負責。
6. 其他應考規則、違規處理及扣分方式，請自行詳閱准考證明上「**國立清華大學試場規則及違規處理辦法**」，無法因本試題封面作答注意事項中未列明而稱未知悉。

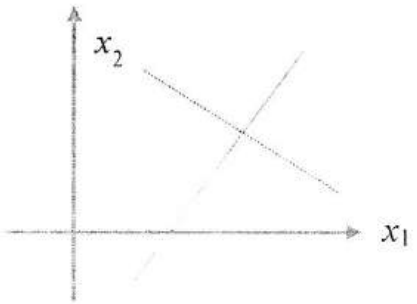
國立清華大學 111 學年度學士後醫學系單獨招生試題

考試科目：資訊科學

【單選題】

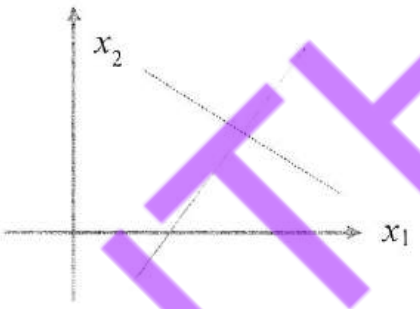
****** 答錯一題倒扣 1.25 分 **** 未作答，不給分亦不扣分。**

1. (5%) Let $\begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} b_1 \\ b_2 \end{bmatrix}$ be a linear system, whose representation in the coordinate plane is shown as follows:

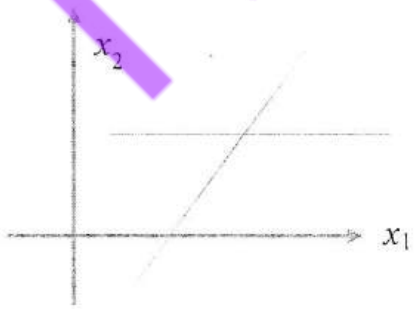


After one step of Gaussian elimination without pivoting, what the representation in the coordinate plane is?

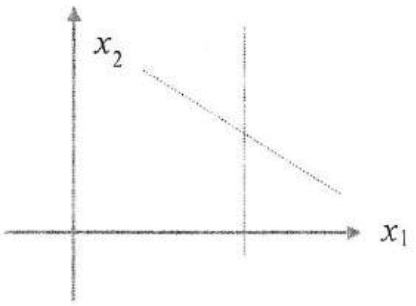
(A)



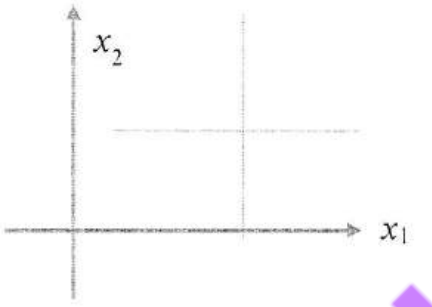
(B)



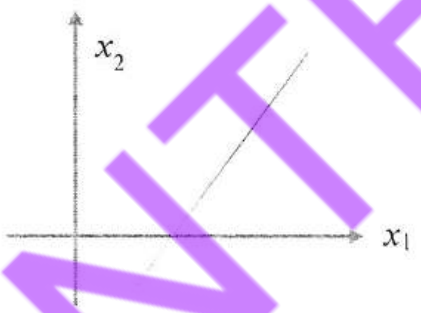
(C)



(D)



(E)



2. (5%) Let A, B, C, D be four n by n nonsingular matrices. What is the determinant of $\begin{bmatrix} A & B \\ C & D \end{bmatrix}$?

(A) $\det(A)\det(B)\det(DB^{-1} - CA^{-1})$

(B) $\det(A)\det(D)\det(C^{-1})\det(B^{-1})$

(C) $\det(C)\det(D - CA^{-1}B)$

(D) $\det(C) - \det(D - CA^{-1}B)$

(E) none of the above

3. (5%) Let D be the differentiation operator on P^3, the set of real polynomials whose degree is less than 3. Which statement is FALSE?

(A) D is a linear transformation from P^3 to P^2

(B) The kernel of D is P^1

(C) The range of D is P^2

(D) The transition matrix from basis $[1, x, x^2]$ to basis $[1, 2x, 4x^2 - 2]$ is $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ -2 & 0 & 4 \end{bmatrix}$

(E) The matrix representation of D with respect to the basis $[1, 2x, 4x^2 - 2]$ is $\begin{bmatrix} 0 & 2 & 0 \\ 0 & 0 & 4 \end{bmatrix}$

4. (5%) Let A be an m by n matrix. Which statement is TRUE?

(A) The null space of A is a subspace of the column space of A^T

(B) The dimension of the null space of A plus the dimension of the row space of A is m

(C) The null space of A^T equals column space of A

(D) The column space of A is orthogonal to the row space of A^T

(E) The direct sum of the row space of A and the null space of A^T is R^m

5. (5%) Suppose $A = \begin{bmatrix} 1 & -2 & 3 \\ -2 & 4 & 2 \\ 3 & -6 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} -2 & 4 & 7 \\ 0 & 3 & -6 \\ 0 & 0 & 0 \end{bmatrix}$. Define

$S_1 = \{\boldsymbol{x} \in \mathbb{R}^3 \mid A\boldsymbol{x} = B\begin{bmatrix} 2 \\ 1 \\ 0 \end{bmatrix}\}$;

$S_2 = \{\boldsymbol{x} \in \mathbb{R}^3 \mid B\boldsymbol{x} = A\begin{bmatrix} 2 \\ 1 \\ 0 \end{bmatrix}\}$;

$S_3 = \{\boldsymbol{x} \in \mathbb{R}^3 \mid A\boldsymbol{x} = 2\boldsymbol{x}\}$;

$S_4 = \{\boldsymbol{x} \in \mathbb{R}^3 \mid B\boldsymbol{x} = 3\boldsymbol{x}\}$;

$S_5 = \{\boldsymbol{x} \in \mathbb{R}^3 \mid A\boldsymbol{x} = B\boldsymbol{x}\}$.

How many of S_1, S_2, S_3, S_4, S_5 are subspaces of $\mathbb{R}^3$?

(A) 1

(B) 2

(C) 3

(D) 4

(E) 5

6. (5%) Let $\boldsymbol{b}_1 = (1,0,-1,0,0), \boldsymbol{b}_2 = (1,1,1,1,1), \boldsymbol{b}_3 = (1,0,1,2,1)$ in $\mathbb{R}^5$ and $W = \text{span}\{\boldsymbol{b}_1, \boldsymbol{b}_2, \boldsymbol{b}_3\}$. Suppose $\boldsymbol{c} = (0,-6,-2,0,-2)$. Then what is the minimum value of $\|\boldsymbol{c} - \boldsymbol{v}\|$ for all possible choices of $\boldsymbol{v} \in W$?

(A) $\sqrt{2}$

(B) $\sqrt{3}$

(C) $\sqrt{5}$

(D) 2

(E) 3

7. (5%) Suppose $A = \begin{bmatrix} 1 & 2 \\ -2 & 1 \\ 2 & 0 \end{bmatrix}$ and $b = \begin{bmatrix} 1 \\ 8 \\ 3 \end{bmatrix}$. What is the minimum value of $||Ax - b||$ for all $x \in \mathbb{R}^2$?

(A) $2\sqrt{10}$

(B) 7

(C) $4\sqrt{3}$

(D) $3\sqrt{5}$

(E) $5\sqrt{2}$

8. (5%) Suppose $A = \begin{pmatrix} 1 & 2 & 0 & 0 & 3 \\ b & a & 2b & c & 2 \\ 1 & -1 & 5 & c & -5 \\ a & 2b & 1 & 3 & 4 \end{pmatrix}$ and $\begin{pmatrix} 1 & 2 & 0 & 0 & 3 \\ 0 & a & b & 3 & 2 \\ 0 & 0 & 2 & -4 & -2 \\ 0 & 0 & 0 & b & 0 \end{pmatrix}$ are row equivalent and a, b, c are 3 nonzero numbers. What is $a + b$?

(A) 0

(B) 2

(C) 3

(D) 4

(E) 5

9. (5%) Find the largest singular value of the matrix $M = \begin{pmatrix} 4 & 11 & 14 \\ 8 & 7 & -2 \end{pmatrix}$.

(A) 600

(B) 360

(C) $10\sqrt{6}$

(D) $6\sqrt{10}$

(E) $3\sqrt{6}$

10. (5%) Fill in a complex number, c, such that the matrix below is unitarily diagonalizable:

$$\begin{bmatrix} i & 4 \\ c & i \end{bmatrix}$$

(A) 4

(B) -4

(C) 4 i

(D) – 4 i

(E) 0

11. (5%) Find the parabola $y = a + b\,x + c\,x^2$ that comes closest (least squares error) to the data points: (x, y) = (−2, 0), (−1, 0), (0, 1), (1, 2), and (2, 0).

(A) $a = \frac{16}{35}, b = 1, c = \frac{1}{7}$

(B) $a = \frac{17}{35}, b = 0, c = \frac{-1}{7}$

(C) $a = \frac{18}{35}, b = 1, c = \frac{2}{7}$

(D) $a = \frac{16}{35}, b = 0, c = \frac{-2}{7}$

(E) $a = \frac{17}{35}, b = 1, c = \frac{1}{7}$

12. (5%) Let S be the set of all positive real numbers. Now, we want to make S as a vector space in V by asking the following definitions for vectors, vector addition, and scalar multiplication:

• Each element of S will be considered as a "vector" in V.

• For $A, B \in S$, a "vector sum" is defined as

$$A + B \equiv A\,B,$$

where the product on the right is the usual product of two real numbers.

• For $c \in R$ (real number), and $A \in S$, a "scalar multiplication" is defined as

$$c \cdot A \equiv A^c,$$

that is the real number A raised to the c power.

Based on these, what is the zero vector in V?

(A) 0

(B) 1

(C) 2

(D) 3

(E) 4

13. (5%) Which of the functions $T: R^3 \to R^2$ is **NOT** a linear transformation?

(A) $T(x, y, z) = (2x, y + z)$

(B) $T(x, y, z) = (2x - 1, z)$

(C) $T(x, y, z) = (0, 0)$

(D) $T(x, y, z) = (x\cos\theta - y\sin\theta,\ y\cos\theta + z\cos\theta)$

(E) $T(x, y, z) = (\sqrt{2}x - y, \sqrt{3}z)$

14. (5%) Let A, $B \in R^{3\times 3}$ be square matrices. Suppose the determinants of A^2B^3 and A^3B^2 are $\det(A^2B^3) = 1125$ and $\det(A^3B^2) = -675$, respectively. What are $\det(2A)$ and $\det(\frac{1}{5}B^4)$?

(A) $\det(2A) = 6$ and $\det\left(\frac{1}{5}B^4\right) = 125$

(B) $\det(2A) = -6$ and $\det\left(\frac{1}{5}B^4\right) = 125$

(C) $\det(2A) = -24$ and $\det\left(\frac{1}{5}B^4\right) = 5$

(D) $\det(2A) = 24$ and $\det\left(\frac{1}{5}B^4\right) = 5$

(E) $\det(2A) = -24$ and $\det\left(\frac{1}{5}B^4\right) = 125$

15. (5%) For square matrices A and B, we say that B is similar to A if there exists an invertible matrix P such that $B = P^{-1}AP$.

Which of the following statements about similarity is **NOT** always correct?

(A) If A and B are similar and A is singular, then B is singular

(B) If A and B are similar and A is invertible, then B is invertible

(C) If A and B are similar, then A and B have the same range

(D) If A is invertible, then AB is similar to BA

(E) If A and B are similar, then A and B may or may not have the same eigenvalues

16. (5%) Suppose that X and Y are exponential random variables that are independent of each other. Both X and Y has mean equal to 1. Two random variables, U and V, are defined as $U = X + Y$ and $V = X/Y$. For $v \geq 0$, find $f_V(v)$, which is the marginal probability density function of V.

(A) $f_V(v) = e^{-v}, v > 0$

(B) $f_V(v) = \frac{2}{\sqrt{2\pi}} e^{-0.5v^2}, v > 0$

(C) $f_V(v) = \frac{1}{(1+v)^2}, v > 0$

(D) $f_V(v) = te^{-t}, v > 0$

(E) $f_V(v) = e^{-t}\frac{t^2}{2}, v > 0$

17. (5%) Suppose that the joint cumulative distribution function of the lifetimes of two smart watches is given below. What is the probability that the lifetime of one smart watch is at least nine times longer than the lifetime of the other?

$$F(x,y)=\begin{cases}(1-e^{-x})(1-e^{-3y}), \text{if } x\geq 0 \text{ and } y\geq 0\\ 0, \text{otherwise}\end{cases}$$

(A) $\frac{2}{7}$

(B) $\frac{1}{3}$

(C) $\frac{1}{4}$

(D) $\frac{3}{4}$

(E) $\frac{1}{28}$

18. (5%) Suppose that the random variables $X_1, X_2, \ldots$ are independent of each other. Each of these random variables is binomially distributed with parameters 12 (which is the number of Bernoulli trials) and 0.5 (which is the successful probability per Bernoulli trial). Suppose that $Y_n=\sum_{i=1}^{n}X_i$, $Z_n=\frac{Y_n-6n}{\sqrt{3n}}$, and $Z_\infty=\lim_{n\to\infty}Z_n$. Find the moment generating function of Z_∞.

(A) $\frac{1}{2}e^t+\frac{1}{2}$

(B) $\left(\frac{1}{2}e^t+\frac{1}{2}\right)^{12}$

(C) $\exp[6(e^t-1)]$

(D) $e^{\frac{1}{2}t^2}$

(E) $\frac{\frac{1}{6}}{\frac{1}{6}-t}$

19. (5%) If Y is uniformly distributed over [0, 5], what is the probability that the roots of the equation $4x^2 + 4xY + Y + 2 = 0$ are both real?

(A) 1/5

(B) 2/5

(C) 1/2

(D) 3/5

(E) 4/5

20. (5%) The moment generating function of X is given by $M_X(t) = e^{2e^t - 2}$ and that of Y by $M_Y(t) = \left(\frac{3}{4}e^t + \frac{1}{4}\right)^{10}$. If X and Y are independent, what is $P\{XY = 0\}$?

(A) $1 - e^{-2} - \left(\frac{1}{4}\right)^{10}$

(B) $e^{-2} + \left(\frac{1}{4}\right)^{10}$

(C) $e^{-2} + \left(\frac{1}{4}\right)^{10} - e^0$

(D) $e^{-2} + \left(\frac{1}{4}\right)^{10} + e^{-2}\left(\frac{1}{4}\right)^{10}$

(E) $e^{-2} + \left(\frac{1}{4}\right)^{10} - e^{-2}\left(\frac{1}{4}\right)^{10}$

21. (5%) A smooth-surface table is ruled with equidistance parallel lines, a distance D apart. A needle of length L, where $L \leq D$, is randomly dropped onto the table with all rotational angles equally probable. What is the probability that the needle will intersect one of the lines?

(A) $\frac{D}{2}$

(B) $\frac{2L}{D}$

(C) $\frac{2L}{\pi D}$

(D) $\frac{4L}{D}$

(E) $\frac{4L}{\pi D}$

22. (5%) Consider the set of all families with two children. Randomly select one family. Assume that in a two-child family all sex distributions are equally likely. In addition, assume that there are n distinct names for girls. Assume that in families with one girl, each name is equally likely to be assigned to the girl. Assume that in families with two girls, each pair of two distinct names is equally likely to be assigned to the two girls. It is known that the randomly selected family has one child called Mary. What is the probability that the other child of the family is a girl?

(A) 2/3

(B) 1/2

(C) 1/3

(D) 1/4

(E) 1/5

23. (5%) Recently, Larry taught his daughter Emily how to play a game. To encourage Emily to practice this game, Larry decides to play with her until she wins two of the recent three games. Assume that either of the two players wins and the game cannot have a tie. If the probability that Emily wins a game is 1/4 independently of all preceding and future games, find the expected number of games to be played.

(A) 121/9

(B) 130/11

(C) 203/16

(D) 89/7

(E) 55/4

24. (5%) There are 2 exams in Statistics class. The midterm score (X) is approximately normal distributed with mean 60 and standard deviation 20. The final exam score (Y) is approximately normal distributed with mean 80 and standard deviation 10. The overall score is the weighted average of two scores: $Z = X * 40\% + Y * 60\%$. Suppose that $\mathrm{cor}(X, Y) = 0.6$. Which of the following statement is FALSE?

(A) The overall score has a mean 72

(B) The overall score has a standard deviation 14

(C) Emily got 60 in the midterm. The expected score for her final exam is 80

(D) $\mathrm{cor}(Z, X) > 0.6$

(E) The overall score is approximately normally distributed

25. (5%) Suppose we are interested in the rate (p) of Cancer A in rats that have been fed with a diet consisting of high saccharin (糖精). We fed this diet to 20 rats and found that 1 rat developed cancer. The study goal is to claim that the cancer rate is higher than 5%. Which of the following statement is INCORRECT?

(A) The claim can be statistically confirmed by performing the hypothesis testing:

$$H_0: p \geq 0.05 \; v.s. \; H_1: p < 0.05$$

(B) The sample proportion $\hat{p}$ follows a normal distribution approximately

(C) Based on the sample proportion $\hat{p} = 1/20$, the hypothesis testing (with type I error 0.05) cannot conclude that the cancer rate is higher than 5%

(D) The estimation error of $\hat{p}$ for estimating p is approximately $\mathrm{se}(\hat{p}) \approx 0.05$

(E) If such an experiment can be repeated independently many times, the number of rats (out of 20) developing cancer follows a Poisson distribution approximately

26. (5%) In a statistics exam, all problems are multiple-choice with 5 possible items (5 選項之單選題), e.g., (A)(B)(C)(D)(E). Emily knew the answers to 60% of the problems, and randomly guessed the answers for the rest of the problems. What is the percentage of her score gained from guessing?

(A) 8%

(B) 12%

(C) 16%

(D) 20%

(E) unable to evaluate

27. (5%) Suppose X_i independently follows a Poisson distribution with mean 3 for i=1~1000. What is the approximate distribution of the sample mean $\bar{X}$?

(A) Exponential distribution

(B) t-distribution

(C) Gamma distribution

(D) Normal distribution

(E) χ^2 distribution

28. (5%) Suppose we want to investigate the relationship between the heights of students and the sport teams they belong to. Suppose we are considering four different teams from the school: table tennis, basketball, baseball, and volley ball teams. Linear regression model can be used to analyze the data collected for this end with dummy variables. How many dummy variables should we create for this model?

(A) 1

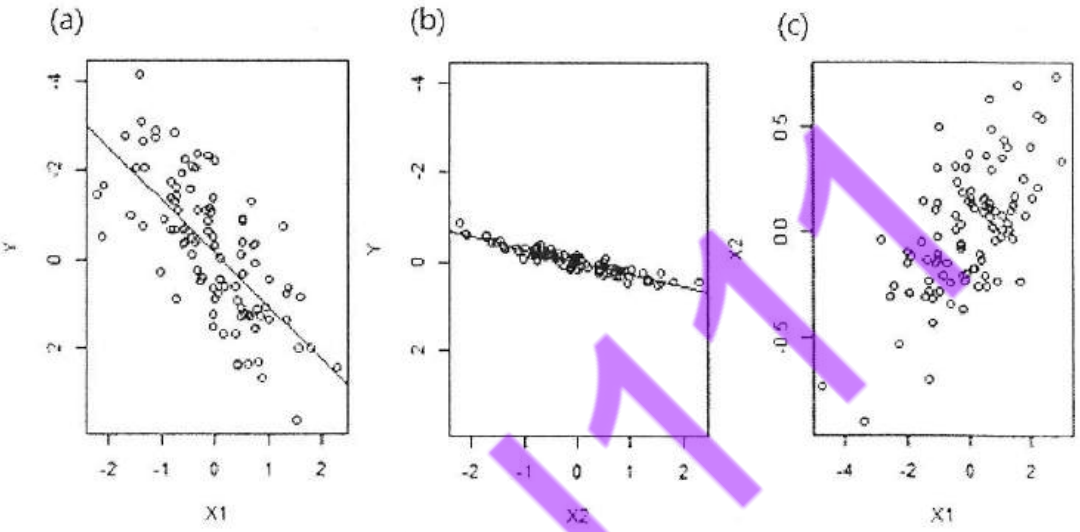
(B) 2

(C) 3

(D) 4

(E) 5

29. (5%) According to the following plots of three variables X1, X2, and Y from the data set, please select the correct statement.



(A) X1 is a better linear predictor for predicting Y than X2 since the slope is larger in (a) than in (b)

(B) X2 is a better linear predictor for predicting Y than X1 since the correlation is stronger in (b) than in (a)

(C) X1+X2 should be a better predictor than either X1 or X2 since they are positively correlated in (c)

(D) If we build a regression model with X1 and X2 to predict Y, there must be a strong interaction between X1 and X2 since they are positively correlated in (c)

(E) If we fit a multiple regression model with both X1 and X2 to predict Y, the coefficients of X1 and X2 would both be negative since both X1 and X2 are negatively correlated with Y

30. (5%) The following is a joint probability table between two categorical variables, the education level and the exercise frequency.

	0-1 day per week	2-4 days per week	5-7 days per week
High school degree	0.1	0.05	0.05
Bachelor degree	0.15	0.2	0.1
Graduate degree	0.15	0.15	0.05

Which of the following statements is correct?

(A) If the table is from a large survey and can be treated as population data, we can say that the two variables are not independent

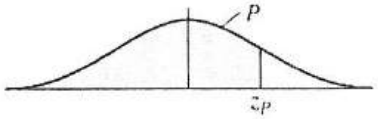
(B) If the table is derived from sample data, we can test the independence of the two variables using χ^2 test. The alternative hypothesis for the test is the independence of the two variables

(C) If the table is derived from sample data, the degree of freedom of the null distribution of the χ^2 test is 9

(D) If the table is derived from sample data, the χ^2 test statistic for testing the independence of the two variables is $\frac{(0.1-0.2\times0.4)^2}{0.2\times0.4}+\frac{(0.05-0.2\times0.4)^2}{0.2\times0.4}+\frac{(0.05-0.2\times0.2)^2}{0.2\times0.2}+\frac{(0.15-0.45\times0.4)^2}{0.45\times0.4}+\frac{(0.2-0.45\times0.4)^2}{0.45\times0.4}+\frac{(0.1-0.45\times0.2)^2}{0.45\times0.2}+\frac{(0.15-0.35\times0.4)^2}{0.35\times0.4}+\frac{(0.15-0.35\times0.4)^2}{0.35\times0.4}+\frac{(0.05-0.35\times0.2)^2}{0.35\times0.2}$

(E) The χ^2 test assumes that the samples categorized into the same cell are correlated

Cumulative Normal Distribution—Values of P Corresponding to z_p for the Normal Curve



z is the standard normal variable. The value of P for $-z_p$ equals 1 minus the value of P for $+z_p$; for example, the P for -1.62 equals $1-.9474=.0526$.

z_p	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
.3	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517
.4	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879
.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
.6	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549
.7	.7580	.7611	.7642	.7673	.7704	.7734	.7764	.7794	.7823	.7852
.8	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133
.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
3.0	.9987	.9987	.9987	.9988	.9988	.9989	.9989	.9989	.9990	.9990
3.1	.9990	.9991	.9991	.9991	.9992	.9992	.9992	.9992	.9993	.9993
3.2	.9993	.9993	.9994	.9994	.9994	.9994	.9994	.9995	.9995	.9995
3.3	.9995	.9995	.9995	.9996	.9996	.9996	.9996	.9996	.9996	.9997
3.4	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9998

國立清華大學學士後醫學系考試 各科試題參考答案

科目名稱:英文

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

科目名稱: 生物與生化

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

科目名稱：化學與物理

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

科目名稱：資訊科學

題號	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
答案	B	A	D	B	D	D	D	D	D	A	B	B	B	C	E
題號	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
答案	C	A	D	D	E	C	B	D	B	A	B	D	C	B	A