編號： 480　系所：環境醫學研究所丁組　科目：應用生物統計概論

本試題是否可以使用計算機： ☑可使用 ， □不可使用 （請命題老師勾選）

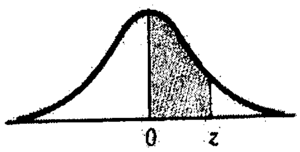
1. If a positive correlation (r=0.79, p<0.01) is observed between mortality rates for liver cancer (deaths per 100,000 per year) and myocardial infarction (deaths per 100,000 per year). What does this association between two apparently unrelated diseases imply? (6 pt) What is the assumption needed to make inference about correlation coefficient? (5 pt)
2. Please explain the following terms: (5 pt each)
   a). Odds
   b). Formula for calculating F ratio (ANOVA)
   c). The power of a statistical test
   d). Positive predictive value of a test
   e). Attributable risk
   f). SMR (standardized mortality ratio)
   g). The simplest and most common method to compare observed differences in proportions between study groups
3. If a metabolic disorder occurs in one of every 100 birth. If five infants are born in a particular hospital on a given day. What is the probability that none has this disorder? (12 pt)
4. What is coefficient variation? Please indicate its use in the laboratory quality control. (12 pt)
5. A study of 2,000 Taiwanese women, aged 25 to 65 years old, found that, of these 2,000 women, 48% worked outside their home had HDL levels that were 2.4 to 3.6 mg/dl higher than the HDL levels of stay-at-homes women. If the difference in HDL levels is normally distributed with a mean of 0 and a standard deviation of 1.2 mg/dl, what is the probability of observing a difference in the HDL levels in a single pair of women between 2.4 and 3.6 mg/dl? (12 pt)
6. A disorder occurs in one out of every 1000 children. Health insurance records indicate that 60 children have this disorder in a total of 50,000 examined. If these 50,000 children were a random samples of the records. Please show your calculation of the probability of observing 60 or more children with metabolic disorder. Would you conclude that the observation of 60 children with disorders represents a rare event? (12 pt)

（背面仍有題目,請繼續作答）

7. In order to compare the recovery time (hr) for two different surgical procedures, patients were randomly assigned and subjected to two different procedures. The length of time to recovery was recorded for each patient. The data are shown as follows:

Procedure I	Procedure II
$N_1=23$	$N_2=25$
Mean $X_1=7.5$	Mean $X_2=9.2$
$S_1^2=1.25$	$S_2^2=1.55$

Which statistical test would help you provide evidence to indicate if there is a true difference between the mean recovery times for two surgical procedures? (6 pt)



z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495	.4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	.4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990

Source: This table is abridged from Table I of *Statistical Tables and Formulas*, by A. Hald (New York: Wiley, 1952). Reproduced by permission of A. Hald and the publisher, John Wiley & Sons, Inc.

編號： 480　系所：環境醫學研究所丁組　科目：應用生物統計概論

本試題是否可以使用計算機： ☑可使用 ， □不可使用 （請命題老師勾選）

Table A-3. Percentage points or critical values for the *t* distribution corresponding to commonly used areas under the curve.[1]

Degrees of Freedom	Area in 1 Tail: 0.05	0.025	0.01	0.005	0.0005
	Area in 2 Tails: 0.10	**0.05**	**0.02**	**0.01**	**0.001**
1	6.314	12.706	31.821	63.657	636.62
2	2.920	4.303	6.965	9.925	31.598
3	2.353	3.182	4.541	5.841	12.924
4	2.132	2.776	3.747	4.604	8.610
5	2.015	2.571	3.365	4.032	6.869
6	1.943	2.447	3.143	3.707	5.959
7	1.895	2.365	2.998	3.499	5.408
8	1.860	2.306	2.896	3.355	5.041
9	1.833	2.262	2.821	3.250	4.781
10	1.812	2.228	2.764	3.169	4.587
11	1.796	2.201	2.718	3.106	4.437
12	1.782	2.179	2.681	3.056	4.318
13	1.771	2.160	2.650	3.012	4.221
14	1.761	2.145	2.624	2.977	4.140
15	1.753	2.131	2.602	2.947	4.073
16	1.746	2.120	2.583	2.921	4.015
17	1.740	2.110	2.567	2.898	3.965
18	1.734	2.101	2.552	2.878	3.922
19	1.729	2.093	2.539	2.861	3.883
20	1.725	2.086	2.528	2.845	3.850
21	1.721	2.080	2.518	2.831	3.819
22	1.717	2.074	2.508	2.819	3.792
23	1.714	2.069	2.500	2.807	3.767
24	1.711	2.064	2.492	2.797	3.745
25	1.708	2.060	2.485	2.787	3.725
26	1.706	2.056	2.479	2.779	3.707
27	1.703	2.052	2.473	2.771	3.690
28	1.701	2.048	2.467	2.763	3.674
29	1.699	2.045	2.462	2.756	3.659
30	1.697	2.042	2.457	2.750	3.646
40	1.684	2.021	2.423	2.704	3.551
60	1.671	2.000	2.390	2.660	3.460
120	1.658	1.980	2.358	2.617	3.373
∞	1.645	1.960	2.326	2.576	3.291

[1]Adapted and reproduced, with permission, from Table 12 in Pearson ES, Hartley HO (editors): *Biometrika Tables for Statisticians*, 3rd ed. Vol 1. Cambridge University Press, 1966. Used with the kind permission of the Biometrika Trustees.