SULIT

KEMENTERIAN PENDIDIKAN TINGGI
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI

BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI
KEMENTERIAN PENDIDIKAN TINGGI

JABATAN PERDAGANGAN

PEPERIKSAAN AKHIR

SESI I : 2024/2025

DPB30063: STATISTICS

TARIKH : 08 DISEMBER 2024
MASA : 8.30 PAGI – 10.30 PAGI (2 JAM)

Kertas ini mengandungi **TUJUH (7)** halaman bercetak.

Struktur (4 soalan)

Dokumen sokongan yang disertakan : Formula, Jadual t-score, Jadual z-score

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JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

SULIT

INSTRUCTION:

This section consists of **FOUR (4)** structured questions. Answers **ALL** questions.

ARAHAN:

*Bahagian ini mengandungi **EMPAT (4)** soalan struktur. Jawab **SEMUA** soalan.*

QUESTION 1

SOALAN 1

CLO 2 (a) Encik Syaqif was asked to present the performance of his Business Statistics class in the final examination. The following table summarises the test scores of his class. Find the range, number of classes and class size of the data.

Encik Syaqif diminta untuk membentangkan prestasi peperiksaan akhir bagi kelas Statistik Perniagaannya. Jadual berikut merumuskan markah ujian bagi kelasnya. Carikan julat, bilangan kelas dan saiz kelas data tersebut.

34	42	20	50	17	9	34	43
50	18	35	43	50	23	23	35
37	38	38	39	39	38	38	39
24	29	25	26	28	27	44	44
49	48	46	45	45	46	45	46

[5 marks]

[*5 markah*]

CLO 2 (b) Based on the table in (a), construct a frequency distribution table that includes class interval, frequency, class boundaries and midpoint.

Berdasarkan jadual di (a), bina jadual taburan kekerapan yang mengandungi selang kelas, kekerapan, sempadan kelas dan titik tengah.

[10 marks]

[*10 markah*]

CLO 2 (c) Draw a less-than ogive of the data in (a).

Lukis ogif kurang daripada bagi data di (a).

[10 marks]

[*10 markah*]

QUESTION 2

SOALAN 2

The table below shows the height of female students of Diploma in Business Studies.
Jadual di bawah menunjukkan ketinggian pelajar perempuan Diploma Pengajian Perniagaan.

Height *Tinggi*	Frequency *Kekerapan*
1.34 – 1.39	4
1.40 – 1.45	14
1.46 – 1.51	31
1.52 – 1.57	19
1.58 – 1.63	14
1.64 – 1.69	6

CLO 2 (a) Detail the calculation of mean and median of the data above.
Perincikan pengiraan min dan median bagi data di atas.

[12 marks]
[*12 markah*]

CLO 2 (b) Calculate the mean deviation and Pearson coefficient of skewness 2 of the data.
Kira sisihan min dan pekali kepencongan Pearson 2 bagi data tersebut.

[13 marks]
[*13 markah*]

QUESTION 3
SOALAN 3

CLO 2 (a) There are 90 candidates who sit for their driving test over one week. 30 of them are female, and only 21 of them pass the test. However, 45 male candidates fail the driving test. Convert the data in a Two-Way Table.
Terdapat 90 orang calon yang menduduki ujian memandu selama seminggu. 30 daripadanya adalah calon perempuan dan hanya 21 orang sahaja yang lulus ujian tersebut. Walau bagaimanapun, 45 orang calon lelaki gagal ujian memandu tersebut. Tukarkan data ke dalam Jadual Dua Hala.

[5 marks]
[*5 markah*]

CLO 2 (b) In a mass screening program, a new diagnostic test is being used to detect the presence or absence of a certain disease. When the person being tested has the disease, the test gives a positive result with a probability of 0.96. When the person being tested does not have the disease, the test gives a positive result with a probability of 0.01. It is known that 2% of population has the disease. The test is administered to randomly chosen members of the population.
Dalam program saringan beramai-ramai, ujian diagnostic Baharu sedang digunakan untuk mengesan kehadiran penyakit tertentu atau sebaliknya. Apabila orang yang diuji itu mempunyai penyakit, ujian itu memberikan keputusan positif dengan kebarangkalian 0.96. Apabila orang yang diuji itu tidak mempunyai penyakit, ujian memberikan kesan positif dengan kebarangkalian 0.01. Adalah diketahui bahawa 2% populasi mempunyai penyakit. Ujian diberikan kepada ahli populasi secara rawak.

i) Draw a tree diagram to illustrate all the possible outcomes and the probabilities.
Lukis gambarajah pokok untuk menggambarkan semua hasil kemungkinan dan kebarangkalian.

[10 marks]
[*10 markah*]

ii) Based on the answer in (b)(i), calculate the probability that:
Berdasarkan jawapan di (b)(i), kirakan kebarangkalian bahawa:

a. positive result is obtained.
Mendapat keputusan positif.

b. the person has disease given that a positive result is obtained.
orang itu mempunyai penyakit, diketahui bahawa keputusan positif diperolehi.

c. the person has positive results given that the person has disease.
orang itu mendapat keputusan positif, diketahui bahawa orang itu mempunyai penyakit.

[10 marks]
[*10 markah*]

QUESTION 4

SOALAN 4

CLO 2

(a) The table below shows expenditure incurred by Man & Moon Holding for the Research and Development (R&D) to produce smartphone and the total profit earned for 6 consecutive years.

Jadual di bawah menunjukkan perbelanjaan yang ditanggung oleh Man & Moon Holding untuk Penyelidikan dan Pembangunan (R&D) untuk menghasilkan telefon pintar dan jumlah keuntungan yang diperoleh selama 6 tahun berturut-turut.

Year ***Tahun***	**R&D Expenditure (RM million)** ***Perbelanjaan R&D (RM juta)*** **x**	**Total Profit (RM million)** ***Jumlah Keuntungan (RM juta)*** **y**
2018	2	20
2019	3	25
2020	5	34
2021	4	30
2022	11	40
2023	5	31

Simplify the data above by interpreting the relationship between R&D expenditure and total profit using Pearson's product moment correlation coefficient.

Permudahkan data di atas dengan mentafsirkan hubungan antara perbelanjaan R&D dan jumlah keuntungan menggunakan pekali kolerasi produk momen Pearson.

[12 marks]

[*12 markah*]

CLO1

(b) EVERYDAY is a car battery manufacturer. The company claims that the average life span of batteries is two (2) or more years. An engineer believes this value can be lessened. Using 10 samples, he measures the average life span to be 1.8 years with a standard deviation of 0.15. If the researcher uses a 1% level of significance, demonstrate **FIVE (5)** steps of hypothesis testing if there is enough evidence to decline this claim.

*EVERYDAY adalah pengeluar bateri kereta. Syarikat itu mendakwa bahawa purata jangka hayat bateri adalah dua (2) tahun atau lebih. Seorang jurutera percaya bahawa nilai ini boleh dikurangkan. Dengan menggunakan 10 sampel, jurutera mengukur jangka hayat purata menjadi 1.8 tahun dengan sisihan piawai 0.15. Jika penyelidik menggunakan aras keertian 1%, tunjukkan **LIMA (5)** langkah ujian hipotesis jika terdapat bukti yang mencukupi untuk menolak dakwaan ini.*

[13 marks]

[*13 markah*]

SOALAN TAMAT

FORMULA STATISTICS

$$k = 1 + 3.3 \log_{10} n$$

$$R = Highest\ value - Lowest\ value$$

$$c = \frac{Range}{k}$$

$$\overline{x} = \frac{\sum fx}{\sum f}$$

$$\tilde{x} = Lm + \left[\frac{\frac{\sum f}{2} - \sum fm^{-1}}{fm}\right] C$$

$$\hat{x} = Lb + \left[\frac{f_0 - f_1}{(f_0 - f_1) + (f_0 - f_2)}\right] C$$

$$\hat{x} = \overline{x} - 3(\overline{x} - \tilde{x})$$

$$MD = \frac{1}{\sum f}[\sum f(x - \overline{x})]$$

$$s^2 = \frac{1}{\sum f - 1}\left[\sum fx^2 - \frac{(\sum fx)^2}{\sum f}\right]$$

$$s = \sqrt{s^2}$$

$$cv = \frac{s}{\overline{x}} \times 100$$

$$PCS\ 1 = \frac{\overline{x} - \hat{x}}{s}$$

$$PCS\ 2 = \frac{3(\overline{x} - \tilde{x})}{s}$$

$$r = \frac{n\sum xy - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}}$$

$$\rho = 1 - \frac{6\sum d^2}{n(n^2 - 1)}$$

$$b = \frac{n\sum xy - (\sum x)(\sum y)}{n\sum x^2 - (\sum x)^2}$$

$$a = \frac{\sum y}{n} - b\frac{\sum x}{n}$$

$$y = a + bx$$

$$P(A) = \frac{n(A)}{n(S)}$$

$$P(A \cup B) = P(A) + P(B)$$

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$P(A|B) = \frac{P(A \cap B)}{P(B)}$$

$$P(B|A) = \frac{P(A \cap B)}{P(A)}$$

$$\overline{x} \pm Z_{\alpha/2}\frac{\alpha}{\sqrt{n}}$$

$$z = \frac{\overline{x} - \mu}{\frac{\sigma}{\sqrt{n}}}$$

$$t = \frac{\overline{x} - \mu}{\frac{s}{\sqrt{n}}}$$

t Table

cum. prob	$t_{.50}$	$t_{.75}$	$t_{.80}$	$t_{.85}$	$t_{.90}$	$t_{.95}$	$t_{.975}$	$t_{.99}$	$t_{.995}$	$t_{.999}$	$t_{.9995}$
one-tail	**0.50**	**0.25**	**0.20**	**0.15**	**0.10**	**0.05**	**0.025**	**0.01**	**0.005**	**0.001**	**0.0005**
two-tails	**1.00**	**0.50**	**0.40**	**0.30**	**0.20**	**0.10**	**0.05**	**0.02**	**0.01**	**0.002**	**0.001**
df											
1	0.000	1.000	1.376	1.963	3.078	6.314	12.71	31.82	63.66	318.31	636.62
2	0.000	0.816	1.061	1.386	1.886	2.920	4.303	6.965	9.925	22.327	31.599
3	0.000	0.765	0.978	1.250	1.638	2.353	3.182	4.541	5.841	10.215	12.924
4	0.000	0.741	0.941	1.190	1.533	2.132	2.776	3.747	4.604	7.173	8.610
5	0.000	0.727	0.920	1.156	1.476	2.015	2.571	3.365	4.032	5.893	6.869
6	0.000	0.718	0.906	1.134	1.440	1.943	2.447	3.143	3.707	5.208	5.959
7	0.000	0.711	0.896	1.119	1.415	1.895	2.365	2.998	3.499	4.785	5.408
8	0.000	0.706	0.889	1.108	1.397	1.860	2.306	2.896	3.355	4.501	5.041
9	0.000	0.703	0.883	1.100	1.383	1.833	2.262	2.821	3.250	4.297	4.781
10	0.000	0.700	0.879	1.093	1.372	1.812	2.228	2.764	3.169	4.144	4.587
11	0.000	0.697	0.876	1.088	1.363	1.796	2.201	2.718	3.106	4.025	4.437
12	0.000	0.695	0.873	1.083	1.356	1.782	2.179	2.681	3.055	3.930	4.318
13	0.000	0.694	0.870	1.079	1.350	1.771	2.160	2.650	3.012	3.852	4.221
14	0.000	0.692	0.868	1.076	1.345	1.761	2.145	2.624	2.977	3.787	4.140
15	0.000	0.691	0.866	1.074	1.341	1.753	2.131	2.602	2.947	3.733	4.073
16	0.000	0.690	0.865	1.071	1.337	1.746	2.120	2.583	2.921	3.686	4.015
17	0.000	0.689	0.863	1.069	1.333	1.740	2.110	2.567	2.898	3.646	3.965
18	0.000	0.688	0.862	1.067	1.330	1.734	2.101	2.552	2.878	3.610	3.922
19	0.000	0.688	0.861	1.066	1.328	1.729	2.093	2.539	2.861	3.579	3.883
20	0.000	0.687	0.860	1.064	1.325	1.725	2.086	2.528	2.845	3.552	3.850
21	0.000	0.686	0.859	1.063	1.323	1.721	2.080	2.518	2.831	3.527	3.819
22	0.000	0.686	0.858	1.061	1.321	1.717	2.074	2.508	2.819	3.505	3.792
23	0.000	0.685	0.858	1.060	1.319	1.714	2.069	2.500	2.807	3.485	3.768
24	0.000	0.685	0.857	1.059	1.318	1.711	2.064	2.492	2.797	3.467	3.745
25	0.000	0.684	0.856	1.058	1.316	1.708	2.060	2.485	2.787	3.450	3.725
26	0.000	0.684	0.856	1.058	1.315	1.706	2.056	2.479	2.779	3.435	3.707
27	0.000	0.684	0.855	1.057	1.314	1.703	2.052	2.473	2.771	3.421	3.690
28	0.000	0.683	0.855	1.056	1.313	1.701	2.048	2.467	2.763	3.408	3.674
29	0.000	0.683	0.854	1.055	1.311	1.699	2.045	2.462	2.756	3.396	3.659
30	0.000	0.683	0.854	1.055	1.310	1.697	2.042	2.457	2.750	3.385	3.646
40	0.000	0.681	0.851	1.050	1.303	1.684	2.021	2.423	2.704	3.307	3.551
60	0.000	0.679	0.848	1.045	1.296	1.671	2.000	2.390	2.660	3.232	3.460
80	0.000	0.678	0.846	1.043	1.292	1.664	1.990	2.374	2.639	3.195	3.416
100	0.000	0.677	0.845	1.042	1.290	1.660	1.984	2.364	2.626	3.174	3.390
1000	0.000	0.675	0.842	1.037	1.282	1.646	1.962	2.330	2.581	3.098	3.300
z	0.000	0.674	0.842	1.036	1.282	1.645	1.960	2.326	2.576	3.090	3.291
	0%	50%	60%	70%	80%	90%	95%	98%	99%	99.8%	99.9%
	Confidence Level										

Table entry for z is the area under the standard normal curve to the left of z.

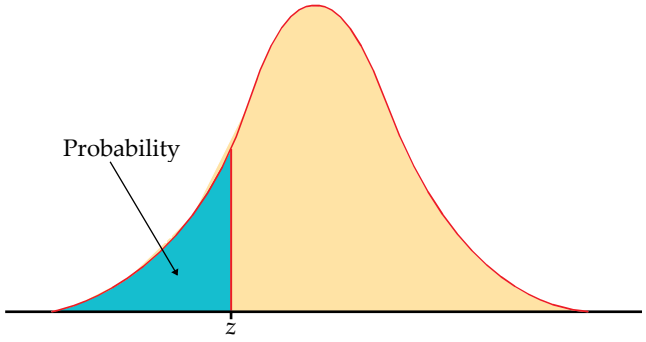

TABLE A

Standard normal probabilities

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
−3.4	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002
−3.3	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0004	.0003
−3.2	.0007	.0007	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0005
−3.1	.0010	.0009	.0009	.0009	.0008	.0008	.0008	.0008	.0007	.0007
−3.0	.0013	.0013	.0013	.0012	.0012	.0011	.0011	.0011	.0010	.0010
−2.9	.0019	.0018	.0018	.0017	.0016	.0016	.0015	.0015	.0014	.0014
−2.8	.0026	.0025	.0024	.0023	.0023	.0022	.0021	.0021	.0020	.0019
−2.7	.0035	.0034	.0033	.0032	.0031	.0030	.0029	.0028	.0027	.0026
−2.6	.0047	.0045	.0044	.0043	.0041	.0040	.0039	.0038	.0037	.0036
−2.5	.0062	.0060	.0059	.0057	.0055	.0054	.0052	.0051	.0049	.0048
−2.4	.0082	.0080	.0078	.0075	.0073	.0071	.0069	.0068	.0066	.0064
−2.3	.0107	.0104	.0102	.0099	.0096	.0094	.0091	.0089	.0087	.0084
−2.2	.0139	.0136	.0132	.0129	.0125	.0122	.0119	.0116	.0113	.0110
−2.1	.0179	.0174	.0170	.0166	.0162	.0158	.0154	.0150	.0146	.0143
−2.0	.0228	.0222	.0217	.0212	.0207	.0202	.0197	.0192	.0188	.0183
−1.9	.0287	.0281	.0274	.0268	.0262	.0256	.0250	.0244	.0239	.0233
−1.8	.0359	.0351	.0344	.0336	.0329	.0322	.0314	.0307	.0301	.0294
−1.7	.0446	.0436	.0427	.0418	.0409	.0401	.0392	.0384	.0375	.0367
−1.6	.0548	.0537	.0526	.0516	.0505	.0495	.0485	.0475	.0465	.0455
−1.5	.0668	.0655	.0643	.0630	.0618	.0606	.0594	.0582	.0571	.0559
−1.4	.0808	.0793	.0778	.0764	.0749	.0735	.0721	.0708	.0694	.0681
−1.3	.0968	.0951	.0934	.0918	.0901	.0885	.0869	.0853	.0838	.0823
−1.2	.1151	.1131	.1112	.1093	.1075	.1056	.1038	.1020	.1003	.0985
−1.1	.1357	.1335	.1314	.1292	.1271	.1251	.1230	.1210	.1190	.1170
−1.0	.1587	.1562	.1539	.1515	.1492	.1469	.1446	.1423	.1401	.1379
−0.9	.1841	.1814	.1788	.1762	.1736	.1711	.1685	.1660	.1635	.1611
−0.8	.2119	.2090	.2061	.2033	.2005	.1977	.1949	.1922	.1894	.1867
−0.7	.2420	.2389	.2358	.2327	.2296	.2266	.2236	.2206	.2177	.2148
−0.6	.2743	.2709	.2676	.2643	.2611	.2578	.2546	.2514	.2483	.2451
−0.5	.3085	.3050	.3015	.2981	.2946	.2912	.2877	.2843	.2810	.2776
−0.4	.3446	.3409	.3372	.3336	.3300	.3264	.3228	.3192	.3156	.3121
−0.3	.3821	.3783	.3745	.3707	.3669	.3632	.3594	.3557	.3520	.3483
−0.2	.4207	.4168	.4129	.4090	.4052	.4013	.3974	.3936	.3897	.3859
−0.1	.4602	.4562	.4522	.4483	.4443	.4404	.4364	.4325	.4286	.4247
0.0	.5000	.4960	.4920	.4880	.4840	.4801	.4761	.4721	.4681	.4641

Table entry for z is the area under the standard normal curve to the left of z.

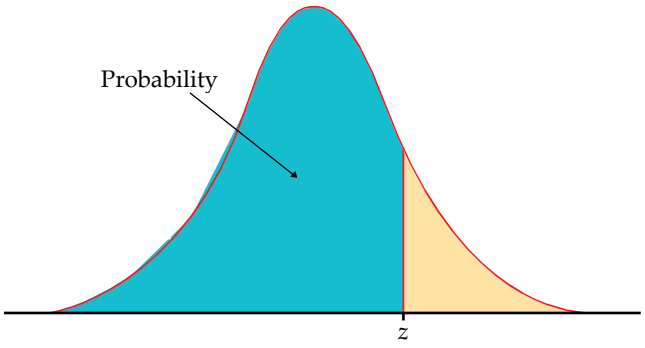

TABLE A

Standard normal probabilities (continued)

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
0.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
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	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549
0.7	.7580	.7611	.7642	.7673	.7704	.7734	.7764	.7794	.7823	.7852
0.8	.7881	.7910	.7939	.7967	.7995	.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
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