

SULIT



KEMENTERIAN PENDIDIKAN TINGGI
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI

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

JABATAN TEKNOLOGI MAKLUMAT & KOMUNIKASI

PEPERIKSAAN AKHIR

SESI I : 2025/2026

DFC30323: STATISTICS AND PROBABILITY

TARIKH : 09 DISEMBER 2025

MASA : 8.30 PAGI – 10.30 PAGI (2 JAM)

Kertas soalan ini mengandungi **ENAM BELAS (16)** halaman bercetak.
Bahagian A: Objektif (30 soalan)
Bahagian B: Struktur (2 soalan)

Dokumen sokongan yang disertakan : Formula

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

SULIT

SECTION B : 55 MARKS
BAHAGIAN B : 55 MARKAH

INSTRUCTION:

This section consists of **TWO (2)** structured questions. Answer **ALL** the questions.

ARAHAN:

Bahagian ini mengandungi DUA (2) soalan berstruktur. Jawab SEMUA soalan.

QUESTION 1
SOALAN 1

CLO1

- i) Define discrete random and continuous variables

Tafsirkan pemboleh ubah rawak diskret dan berterusan.

[3 marks]

[3 markah]

CLO 1

- ii) List **TWO (2)** examples of discrete random and continuous variables.

Senaraikan DUA (2) contoh pemboleh ubah rawak diskret dan berterusan.

[4 marks]

[4 markah]

CLO 1

Following is Table B(ii) presents the probability distribution of the number of defective aluminum cans per hour of cans machine production.

Berikut adalah Jadual A(i) yang merupakan taburan kebarangkalian bagi bilangan tin aluminium rosak setiap jam bagi pengeluaran mesin.

Defective per hour	0	1	2	3	4
Probability	0.12	0.06	0.37	0.18	0.27

Table B(ii): Probability of defective cans produced by machine production

Find the probability that the number of defectives for this machine production through a given hour:

Cari kebarangkalian bahawa bilangan kecacatan bagi pengeluaran mesin ini dalam satu jam tertentu

CLO 1 iii) Exactly 2
Tepat 2

[3 marks]
 [3 markah]

CLO 1 iv) 1 to 3
1 hingga 3

[3 marks]
 [3 markah]

CLO 1 v) Less than 4
Kurang daripada 4

[4 marks]
 [4 markah]

CLO 1 (b) SYZ shop sale a multiples design of Shoes with different prices. Based on table B(i), calculate discrete random variables for Mean and Variance.
Kedai SYZ menjual pelbagai reka bentuk kasut dengan harga yang berbeza. Berdasarkan jadual B(i), kira pemboleh ubah rawak diskret untuk Min dan Varians.

Price of Shoes	1	2	3	4	5
Probabilities	0.10	0.30	0.07	0.45	0.08

Table B1(b): Probability Distribution of Shoe Prices

CLO 1 i) Mean
Min

[2 marks]
 [2 markah]

CLO 1 ii) Variance
Varians

[6 marks]
 [6 markah]

CLO 1 (c) The police department received visitors reports of 60% burglary case. There are 20 houses that have been burglarized over the past month. Find the probability that exactly 15 houses have been burglarized.

Pihak polis menerima laporan yang menyatakan bahawa 60% daripada pelawat melaporkan kes pecah rumah. Terdapat 20 rumah yang telah dipecah masuk dalam tempoh sebulan yang lalu. Cari kebarangkalian bahawa tepat 15 rumah telah dipecah masuk

[4 marks]

[4 markah]

CLO 1

(d) John Doe rolled a dice 40 times. If X is a random variable, it describes the appearance of number 4. Find mean, variance and standard deviation of X .

John Doe menggolekkan dadu sebanyak 40 kali. Jika X adalah pemboleh ubah rawak, ia menggambarkan kemunculan nombor 4. Cari min, varians, dan sisihan piawai bagi X .

CLO 1

i) Mean

Min

[2 marks]

[2 markah]

CLO 1

ii) Variance $\sigma\sigma^2$ *Varians*

[3 marks]

[3 markah]

CLO 1

iii) Standard Deviation σ *Sisihan Piawai*

[2 marks]

[2 markah]

QUESTION 2**SOALAN 2**

CLO 1

(a) i) Explain Systematic Sampling Method

Terangkan Kaedah Pensampelan Sistemik

[4 marks]

[4 markah]

- CLO 1 ii) Elaborate Population and Sampling Distribution
Huraikan Populasi dan Taburan Pensampelan

[4 marks]
[4 markah]
- CLO 1 iii) Clarify the different estimate and estimator
Jelaskan perbezaan antara anggaran dan penganggar

[4 marks]
[4 markah]
- CLO 1 (b) Michael participated in a fishing competition at Lake A. According to
information from the organizer, 17 out of 50 fish in the lake are sardines.
*Michael telah menyertai pertandingan memancing di Tasik A. Menurut
maklumat daripada penganjur, 17 daripada 50 ikan di tasik tersebut adalah
sardin.*
- CLO 1 i) Calculate a 90% confidence interval for the proportion of sardine fish in the
lake.
Kira julat keyakinan 90% bagi peratusan ikan sardin di dalam tasik.

[5 marks]
[5 markah]
- CLO 1 ii) Interpret the confidence interval in percentage
Tafsirkan julat keyakinan dalam peratus

[2 marks]
[2 markah]

SOALAN TAMAT

FORMULA

Mean of a discrete random variable

$$E(X) = \mu = \sum_x x \cdot P(X = x)$$

Standard Deviation for discrete random variable

$$\sigma = \sqrt{\text{Var}(x)}$$

Where

$$\text{Var}(X) = \sum (x - \mu)^2 \cdot P(x)$$

Factorial

$$\binom{n}{r} = \frac{n!}{r!(n-r)!}$$

Z – Value (Z Score)

$$Z = \frac{X - \mu}{\sigma}$$

X – Value

$$X = Z \cdot \sigma + \mu$$

Binomial Distribution

$$P(X) = {}^n C_X P^X (Q)^{n-X}$$

Or

$$P(X) = {}^n C_X P^X (1-p)^{n-X}$$

Or

$$P(x) = \binom{n}{x} \cdot p^x \cdot q^{n-x}$$

Poisson Distribution

$$P(X) = \frac{\lambda^x e^{-\lambda}}{x!}$$

Sample Mean, $\bar{x}$

$$\bar{x} = \frac{\sum x_i}{n}$$

Sample Standard Deviation, s

$$s = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n - 1}}$$

Degree of Freedom

$$df = n - 1$$

where, $n = \text{size sample}$

Confidence Interval

$$\bar{x} \pm ME$$

where,

Standard Error of Mean, (*SEM*)

$$SEM = \frac{\sigma}{\sqrt{n}}$$

$$ME = t_{\alpha/2} \times \frac{s}{\sqrt{n}}$$

Critical t – value,

$t_{\alpha/2}$

t Table											
cum. prob one-tail	t _{.50}	t _{.75}	t _{.90}	t _{.95}	t _{.98}	t _{.99}	t _{.975}	t _{.98}	t _{.995}	t _{.999}	t _{.9995}
two-tails	1.00	0.50	0.40	0.30	0.20	0.10	0.05	0.025	0.01	0.005	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	2.876	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										

Z-Table

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	.0008	.0008	.0008	.0008	.0008	.0007	.0007
-3.0	.0013	.0013	.0013	.0012	.0011	.0011	.0011	.0011	.0010	.0010
-2.9	.0019	.0018	.0018	.0016	.0016	.0015	.0015	.0014	.0014	.0014
-2.8	.0026	.0025	.0024	.0023	.0022	.0021	.0021	.0020	.0019	.0019
-2.7	.0035	.0034	.0033	.0032	.0030	.0029	.0028	.0027	.0026	.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	.1131	.1111	.1093	.1075	.1056	.1036	.1020	.1003	.0985	.0967
-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	.4950	.4900	.4850	.4801	.4751	.4701	.4651	.4601	.4551