STRUCTURE: 100 MARKS
STRUKTUR: 100 MARKS

INSTRUCTION:
This section consists of **FOUR (4)** structured questions. Answer **ALL** questions.

ARAHAN:
*Bahagian ini mengandungi **EMPAT (4)** soalan berstruktur. Jawab semua soalan.*

QUESTION 1
SOALAN 1

CLO1
C1

a)   State **FIVE (5)** data collection methods to obtain data from the respondents:

*Nyatakan **LIMA (5)** kaedah pengumpulan data bagi mendapatkan data daripada responden:*

[5 marks]
[5 *markah*]

b)   The table below shows the estimated distance (in kilometers) from students' houses to Politeknik Tuanku Syed Sirajuddin.

Jadual di bawah menunjukkan anggaran jarak (dalam kilometer) dari rumah pelajar ke Politeknik Tuanku Syed Sirajuddin.

12	420	402	490	434	371	211	29	417	200
27	300	150	803	393	400	30	140	493	145
10	610	290	709	97	315	397	519	112	131
108	207	90	15	19	171	591	111	207	161
500	103	170	187	150	141	817	144	171	417

i.   Approximate the value of range, number of classes and size of class interval for the data above

Anggarkan nilai julat, bilangan kelas dan saiz kelas interval bagi data di atas.

[10 marks]
[*10 markah*]

CLO2
C2

CLO2
C3

ii. Construct frequency distribution table consisting of class interval, frequency, midpoint and class boundaries.

Bina jadual taburan kekerapan yang mengandungi selang kelas, kekerapan, titik tengah dan sempadan kelas.

[10 marks]
[*10 markah*]

QUESTION 2
SOALAN 2

The frequency distribution below shows the number of positive Covid-19 cases in Pahang from 1st March 2022 to 31th March 2022.

Taburan kekerapan di bawah menunjukkan bilangan kes positif Covid-19 di Pahang dari 1 Mac 2022 hingga 30 Mac 2022

The data of positive Covid-19 *Data positif Covid-19*	Number of days *Bilangan hari*
383-653	8
654-924	2
925-1195	6
1196-1466	7
1467-1737	4
1738-2008	4

CLO2
C2

a) From the table, simplify the calculation for mean and median.

Daripada jadual, permudahkan kiraan min dan median.

[12 marks]
[*12 markah*]

CLO2
C3

b) By using the data in 2 a), calculate the Pearson's Coefficient of Skewness 2 (PCS 2).

Dengan menggunakan data di 2 a), kira Pekali Kepencongan Pearson 2 (PCS 2).

[13 marks]
[*13 markah*]

QUESTION 3
SOALAN 3

CLO2
C2

a) A bag contains four red balls, six green balls, two white balls and three black balls. Outline the probability that a ball chosen at random from the bag is:

Sebuah beg mengandungi empat bola merah, enam bola hijau, dua bola putih dan tiga bola hitam. Nyatakan kebarangkalian bahawa bola yang dipilih secara rawak adalah:

(i) A white ball
     Bola putih

(ii) Red or white balls
      Bola merah dan bola putih

(iii) Not a black ball
       Bukan bola hitam

[5 marks]
[*5 markah*]

CLO2
C3

b) i) A bag contains 4 yellow balls and 7 purple balls. Atikah picks a ball at random from the bag and replaces it in the bag. She mixes the balls in the bag and then picks another ball at random from the bag. Calculate the probability that Atikah picks a yellow ball in her second draw using tree diagram.

Sebuah beg mengandungi 4 bola kuning dan 7 bola ungu. Atikah mengambil bola secara rawak dari beg dan menggantikannya di dalam beg. Dia mencampurkan bola di dalam beg dan kemudian mengambil bola lain secara rawak daripada beg itu. Hitung kebarangkalian bahawa Atikah memetik bola kuning dalam cabutan keduanya menggunakan rajah pokok.

[10 marks]
[*10 markah*]

CLO2
C3

b) ii)   In a class of 19 students, 8 boys are asked if they have lunch at school. 4 girls eat lunch at school, while 5 boys not eat lunch at school. Based on the above information, you are required to draw a two-way table to illustrate the results and write the following probabilities of:

Di dalam kelas seramai 19 orang, 8 orang pelajar lelaki ditanya samada mereka makan tengah hari di sekolah. 4 orang pelajar perempuan makan tengah hari di sekolah, manakala 5 orang pelajar lelaki tidak makan tengah hari di sekolah. Berdasarkan maklumat di atas, anda dikehendaki untuk melakarkan jadual-dua hala untuk menggambarkan keputusan ini dan tuliskan kebarangkalian berikut:

(a)   Choosing a boy who eat his lunch at school.
     Seorang pelajar lelaki terpilih dan makan tengah hari di sekolah.

(b)   Choosing a girl who does not eat her lunch at school.
     Seorang pelajar perempuan terpilih dan tidak makan tengahari di sekolah.

(c)   Choosing a boy, and he eats lunch.
     Seorang pelajar lelaki terpilih, dan makan tengah hari.

(d)   Choosing a girl, and she does not eat lunch.
     Seorang pelajar perempuan dipilih, dan tidak makan tengahari.

[10 Marks]
[*10 Markah*]

QUESTION 4
SOALAN 4

a) The following table shows the marks obtained by 6 students (1, 2, 3, 4, 5, and 6) in Statistics and Organizational Behaviour subject in an examination.

Jadual berikut menunjukkan markah yang diperolehi dari 6 orang pelajar (1, 2, 3, 4, 5, dan 6) dalam mata pelajaran Statistik dan Gelagat Organisasi dalam sesuatu peperiksaan.

Student *Pelajar*	1	2	3	4	5	6
Statistics *Statistik*	66	91	83	70	66	54
Organizational Behaviour *Gelagat Organisasi*	80	100	78	68	80	60

CLO2
C2

Based on the above data, simplify the Spearman's rank correlation coefficient.

Berdasarkan data di atas, permudahkan pekali korelasi pangkat Spearman.

[12 marks]
[*12 markah*]

b) A principal at CBA School claims that the students in his school have above average intelligence. A random sample of thirty students IQ has a mean score of 111. Is there sufficient evidence to support the principal's claim? The mean IQ of the population is 100 with a standard deviation of 15. Use a 0.05 level of significance to justify your answer. Prepare your answer.

CLO2
C3

Pengetua di Sekolah CBA mendakwa bahawa pelajar di sekolahnya mempunyai kecerdasan di atas purata. Sampel rawak IQ tiga puluh pelajar mempunyai skor min 111. Adakah terdapat bukti yang mencukupi untuk menyokong tuntutan pengetua? Purata IQ populasi adalah 100 adalah dengan sisihan piawai 15. Gunakan aras keertian 0.05 untuk mewajarkan jawapan anda. Sediakan jawapan anda

[13 marks]
[*13markah*]

SOALAN TAMAT

FORMULA STATISTICS

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

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

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

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

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

$$\hat{x} = Lb + \left[\frac{f0 - f1}{(f0 - f1) + (f0 - f2)}\right] x\ C$$

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

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

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

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

$$cv = \frac{s}{\bar{x}}\ x\ 100$$

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

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

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

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

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

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

$$y = a + bx$$

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

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

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

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

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

$$\bar{x} \pm Z\frac{\alpha}{2}\left(\frac{\sigma}{\sqrt{n}}\right)$$

$$\bar{x} \pm t\frac{\alpha}{2}\left(\frac{s}{\sqrt{n}}\right)$$

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

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

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.

Probability

z
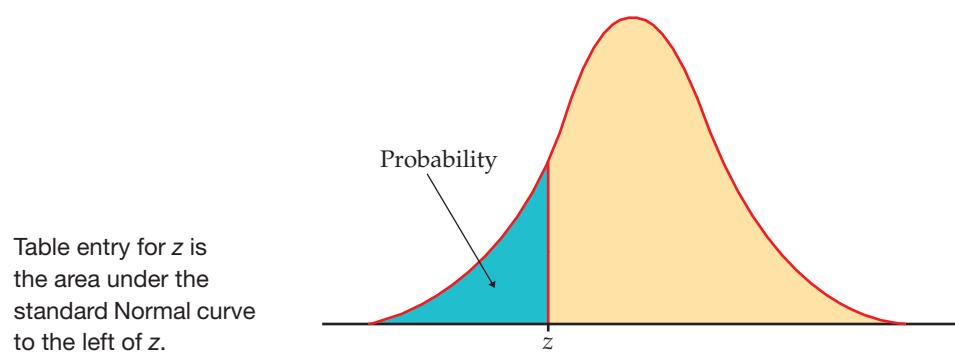
TABLE A

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

Probability

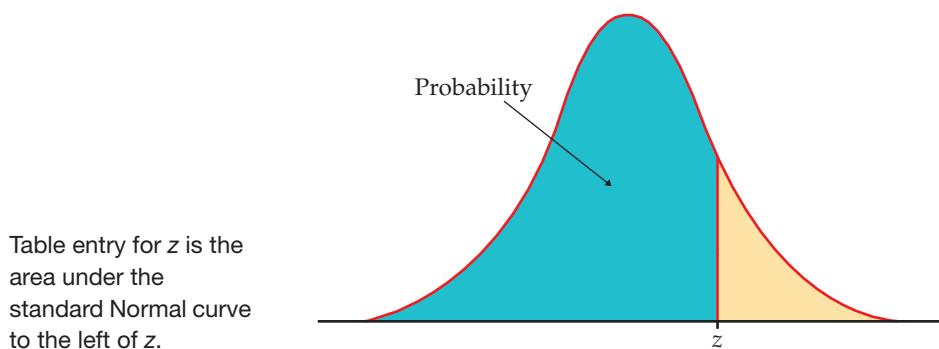Table entry for z is the area under the standard Normal curve to the left of z.

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