2901/305
STATISTICS
November 2018
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN SECRETARIAL STUDIES

STATISTICS

3 hours

INSTRUCTIONS TO CANDIDATES

This paper consists of SEVEN questions.
Answer any FIVE questions in the answer booklet provided.
All questions carry equal marks.
Show all your working.
Candidates should answer the questions in English.

This paper consists of 7 printed pages.

Candidates should check the question paper to ascertain that all the
pages are printed as indicated and that no questions are missing.

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1. (a) Using the following sets:

A = {l,2,3,4,5,a,c}
B = {2,3,8,9, d}
C = {a, b,c,d}

Determine the following:

(i)   AA(BUC);
(ii)   BU(AAC);
(iii)   B n C

(8 marks)

(b) The following distribution shows the number of customers who visited a hotel in a period of 42 days.

Number of customers	Number of days
0-4	4
4-8	12
8-12	8
12-16	7
16-20	5
20-24	6

(i)   Present the data in a histogram.

(ii)   Draw a frequency curve on the same graph in (i) above.

(12 marks)

2. (a) The following data shows the marks scored by candidates in an interview for a secretarial post in an organisation:

20	50	80	40	85	40
40	70	60	70	40	50
30	30	45	50	20	60

(i)   Prepare a frequency distribution table using the data above.

(ii)   Using the result in (i) above, calculate:

(I)   arithmetic mean;
(II)   median.

(8 marks)

(b) The following distribution shows the number of units of a product manufactured by a firm over a period of 36 months:

Number of units manufactured	Number of months
0-30	5
30-60	10
60-90	12
90 -120	5
120 - 150	4

(i)   Calculate the:

   (I)   arithmetic mean;
   (II)   standard deviation;
   (III)   mode;
   (IV)   Pearson's Coefficient of Skewness.

(ii)   Interpret the result in (iv) above.

(12 marks)

3.   (a) The following data shows the number of customers served by a secretary of an organisation over a period of one week.

Day (a?)	Monday	Tuesday	Wednesday	Thursday	Friday
Number of customers (y)	5	12	8	4	10

(i)   Determine the regression equation in the form: $y = a + bx$.

(ii)   Calculate the Coefficient of Determination.

(iii)   Interpret the result in (ii) above.

(12 marks)

(b) The probability that a customer will order for a cake in a restaurant is 0.4. On a certain day, 12 customers visited the restaurant. Calculate the probability that:

(i)   4 customers will order for a cake;
(ii)   at most, 3 customers will order for a cake;
(iii)   none of the customers will order for a cake.

(8 marks)

4. (a) Explain **four** disadvantages of sampling in the collection of data. (8 marks)

(b) A manager of a game park claims that the average number of customers who visit the park per day is 24. The following data shows the number of customers who visited the park in a week:

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Number of customers	25	29	20	28	35	12	26

Test the manager's claim at 5% level of significance. (12 marks)

5. (a) Explain **four** components of a time series. (8 marks)

(b) The following information shows the prices, in Kenya shillings, and quantities demanded, in units, of three commodities X, Y and Z, for the years 2015 and 2016.

Commodity	Prices (Ksh)		Quantity (units)
	2015	**2016**	**2015**
X	120	140	50
Y	180	290	38
Z	280	480	48

Calculate the price index number for the year 2016, using the weighted average of price relatives method. (12 marks)

6. (a) Explain each of the following types of matrices, using an example in each case:

(i)   Transpose matrix;
(ii) Diagonal matrix;
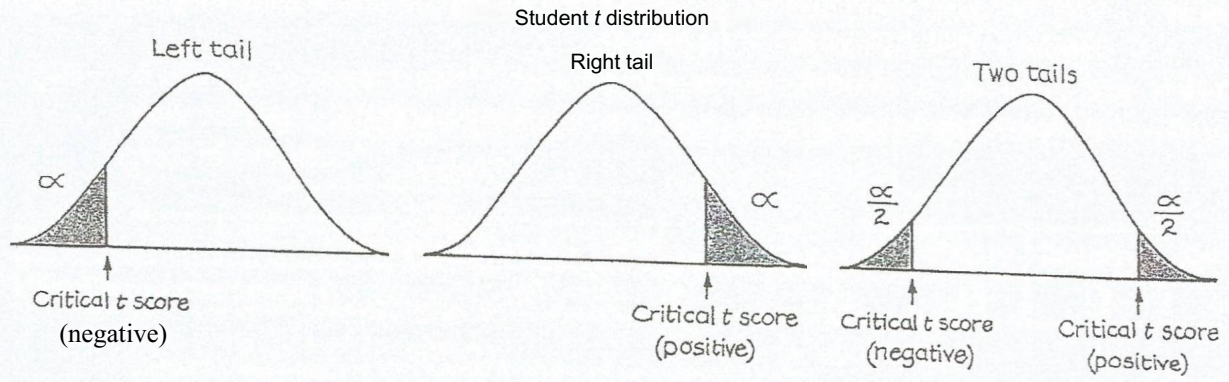(iii) Square matrix;
(iv) Scalar matrix.

(8 marks)

Student *t* distribution

TABLE A-3

t Distribution

a

Degrees of freedom	.005 (one tail) .01 (two tails)	.01 (one tail) .02 (two tails)	.025 (one tail) .05 (two tails)	.05 (one tail) .10 (two tails)	.10 (one tail) .20 (two tails)	.25 (one tail) .50 (two tails)
1	63.657	31.821	12.706	6.314	3.078	1.000
2	9.925	6.965	4.303	2.920	1.886	.816
3	5.841	4.541	3.182	2.353	1.638	.765
4	4.604	3.747	2.776	2.132	1.533	.741
5	41032	3.365	2.571	2.015	1.476	.727
6	3.707	3.143	2.447	1.943	1.440	.718
7	3.500	2.998	2.365	1:895	1.41*5	.711
8	3.355	2.896	2.306	1.860	1.397	.706
9	3.250	2.821	2.262	1.833	1.383	.703
10	3.169	2.764	2.228	1.812	1.372	.700
11	3.106	2.718	2.201	1.796	1.363	.697
12	3.054	2.681	2.179	1.782	1.356	.696
13	3.012	2.650	2.160	1.771	1.350	.694
14	2.977	2.625	2.145	1.761	1.345	.692
15	2.947	2.602	2.132	1.753	1.341	.691
16	2.921	2.584	2.120	1.746	1.337	.690
17	2.898	2.567	2.110	1.740	1.333	.689
18	2.878	2.552	2.101	1.734	1.330	.688
19	2.861	2.540	2.093	1.729	1.328	.688
20	2.845	2.528	2.086	1.725	1.325	.687
21	2.831	2.518	2.080	1.721	1.323	.686
22	2.819	2.508	2.074	1.717	1.321	.686
23	2.807	2.500	2.069	1.714	1.320	.685
24	2.797	2.492	2.064	1.711	1.318	.685
25	2.787	2.485	2.060	1.708	1.316	.684
26	2.779	2.479	2.056	1.706	1.315	.684
27	2.77.1	2.473	2.052	1.703	1.314	.684
28	2.763	2.467	2.048	1.701	1.313	.683
29	2.756	2.462	2.045	1.699	1.311	.683
Large (?)	2.575	2.327	1.960	1.645	1.282	.675

Table A Present Value of Sh 1 Received at the End of n Periods:

$$PVIF_{ftfl} = 1/(1 + rf = (1 + r)\sim^{n}$$

Period	?%	2%	3%	4%	5%	6%	7%	8%	-9%	10%	12%	14%	15%	16%	18%	20%	24%.	28%	32%	36%
1	.aom	QR04	.9709 ■	.9615	.9524	.9434	.9346	.9259	.9174	.9091	.8929	.8772	.8696	.8621	.8475	.8333	.8065	.7813	.7576	.7353
2	'fiono	QA1 7	.9476	.9246	.9070	.8900	.8734	.8573	.8417	.8264	.7972	.7695	.7561	.7432	.7182	.6944	.6504	.6.104.	.5739	.5407
3	.H/L'O	.y4-Zu	.9151	.8890	.8638	.8396	.8163	.7938	.7722	.7513	.7118	.6750	.6575	.6407	.6086	.5787	.5245\:t	.4768	.4348	.3975
4	-i3eri w	979R	.8885	.8548	.8227	.7921	.7629	.7350	.7084	.6830	.6355	.5921	.5718	.5523	'.5158	.4823	.4230	.3725	.3294	■2923 w*
5	.9515	.9057.	.8626	.8219	.7835	.7473	7130	.6806	.6499	.6209	'.5674	.5194	.4972	.4761	.4371	.4019	.3411.	.2910	.2495	.2149 0
6	QA70	.8880	.8375	.7903	.7462	.7050	.6663	.6302	.5963	.5645	.5066	.4556	.4323	.4104	.3704	.3349	.2751	.2274	.1890	.1580
7	Q977	.8706	.8131	.7599	.7107	.6651	.6227	.5835	.5470	.5132	.4523	.3996	.3759	.3538	.3139	.2791	.2218	.1776	.1432	.1162 §
8	•usfe w	w 8535	.7894	.7307	.6768	.6274	.5820	.5403	.5019	.4665	.4039	.3506	.3269	.3050	.2660	.2326	.1789	.1388	.1085	.0854
9	.9143	.8368	.7664	.7026	.6446	.5919	.5439	.5002	.4604	.4241	.3606	.3075	.2843	-2630	.2255·	.1938	.1443	.1084	.0822	.0628 Z
10	.9053	.8203	.7441	.6756	.6139	.5584	.5083	.4632	,4224	.3855	.3220	.2697	.2472	.2267	.1911	.1615	.1164	.0847	.0623	.0462 §
11	8963'	.8043	.7224	.6496	.5847	.5268	.4751	.4289'	.3875	,3505.	.2875	.2366	.2149	.1954	.1619	.1346	.0938	-.0662	.0472	>0340 H
12	J3874	.7885	.7014	.6246	.5568	4970	.4440	.3971	.3555	.3186.	,2567	.2076	.1869	.1685	.1372	.1122	.0757	.0517	.0357	,02?0 <
13	.8787	.7730	.6810	.6006	.5303	.4688	.4150	.3677	.3262	>2897	.2292	.1821	.1625	.1452	.1163	.0935	.0610	.0404	.0271	.0184 i-4
14.	.8700	.7579	.6611	.5775	.5051	.4423	.3878	.3405	.2992	.2633.	.2046	.1597	.1413	.1252	.0985 •	.0779	.0492	.0316	.0205	.0135 W
15	.8613	.7430	.6419	.5553	.4810	.4173	.3624	.3152	.2745	.2394	.1827	.1401	.1229	.1079	.0835	.0649	.0397	.0247	.0155	.0099 p
16	.8528	.7284	.6232	.5339	.4581	.3936	.3387	.2919	.2519,	.2176,	.1631	.1229	.1069	.0930	.0708	.0541 •<	.0320'..	.0193	.0118	.0073
17	.8444	•.7142	.6050	.5134	.4363-	.3714	.3166	.2703	,2311.	.1978	.1456	.1078	.0929	.0802	.0600	.0451	.0258.	.0150 ...	..0089	.OOM
18	.8360	.7002	.5874	.4936	.4155	.3503	.2959	.2502	.2120	.1799	.1300	.0946	.0808	.0691	.0508	.0376	.0208	.0118	.0068	.0039 g
19	.8277	.6864	.5703	.4746	.3967	.3305	.2765	.2317	.1945	.1635	.1161	.0829	.0703	.0596	.0431	.0313	.0168	.0092	.0051	.0029 H
20	.8195	.6730	.5537	.4564	.3769	.3118	.2584	.2145	.1784	..I486	.1037	.0728	.0611	.0514	.0365	.0261	.0135	.0072	.0039	.0021
25	.7798	.6095	.4776	.3751	.2953	.2330	.1842	.1460	.1160	.0923	.0588	.0378	.0304	.0245 .	.0160	.0105	.0046	.0021	.0010	0005
30	.7419	.5521	.4120	.3083	.2314	.1741	.1314	.0994	.0754	.0573	.0334	.0196	.0151	.0116	.0070	.0042	.0016	.0006	.0002	.0001
40	.6717	.4529	.3066	.2083	.1420	.0972	.0668	.0460	.0318	.0221	.0107	.0053	.0037	.0026	.0013	.0007	.0002	.0001		
50	.6080	.3715	.2281	.1407	.0872	.0543'	.0339	.0213	.0134	.0085	.0035	.0014	.0009	.0006	.0003	.0001				
60	.5504	.3048	.1697	.0951	.0535	.0303	.0173	.0099	.0057	.0033	.0011	.0004	.0002	.0001						