

**M.Phil./Ph.D. IN JOURNALISM AND MASS COMMUNICATION  
(MPHILJMC/PHDJMC)**

**Term-End Examination**

**June, 2022**

**RJM-102 : DATA ANALYSIS AND SOFTWARE APPLICATIONS**

*Time : 3 hours*

*Maximum Marks : 100*

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**Note :** Section A is **compulsory**. Answer any **four** questions from Section B and any **two** questions from Section C. Simple calculator is allowed.

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**SECTION A**

Answer **all** the questions :

*10×2=20*

1.  $t_{\text{calc}} = 1.427$ ,  $t_{\text{stat}} = 1.427$ . Write your interpretation.
2. Write steps and code of R programme to carry out the Spearman test.
3. Differentiate between ordinal and ratio data.
4. Differentiate between linear and non-linear relationship.
5. How can we use non-parametric tests for ratio data ?
6.  $\chi^2 = 27.88$ ,  $df = 4$  and critical value = 22.45. Write your interpretation.
7. Differentiate between Chi-square and t-test.
8. Write null and alternate hypothesis for a f-test.
9. Explain discrete variables with an example.
10. Define pie chart and explain the type of data which is required to write a pie chart.

## SECTION B

Answer any **four** questions :

4×10=40

11. The categorical data given below was collected from two different age groups about their choice of news outlets. With the help of a statistical test, find the significance of difference. 180 youth respondents preferred TV, 52 of them preferred newspaper and 95 preferred Internet. 260 senior citizens preferred TV, 107 went for newspaper and 76 for Internet.
12. With the help of Likert scale, a set of ordinal data was collected (See Table I) from health professionals and development workers about their perception towards the usage of ICT.

**Table I**

<i>S. No.</i>	<i>Perception of Health Professionals</i>	<i>Perception of Development Workers</i>
1	3·44	3·06
2	2·36	2·58
3	2·22	2·36
4	2·25	2·11
5	2·21	2·36
6	2·11	2·22
7	2·08	2·32
8	1·89	1·86
9	0·92	1·82
10	1·08	1·32

Find the differences between these two variables and interpret your results using Table II (attached on page 7).

13. Find frequency percentages of the following (Table III) :

- (a) Datewise percentage of cable subscribers
- (b) Region-wise percentage of cable subscribers
- (c) Total subscribers in Northern region and Southern region

**Table III**

<i>S. No.</i>	<i>State</i>	<i>02/07/19</i>	<i>03/07/19</i>	<i>04/07/19</i>	<i>05/07/19</i>	<i>06/07/19</i>
1	Delhi	16000	13000	4000	26000	33000
2	Uttar Pradesh	39000	17000	8000	21000	48000
3	Tamil Nadu	27000	18000	14000	31000	51000
4	Himachal Pradesh	32000	14000	7000	39000	37000
5	Andhra Pradesh	39000	61000	32000	51000	71000
6	Maharashtra	77000	41000	17000	72000	68000
7	Assam	14000	17000	11000	41000	32000
8	Kerala	86000	32000	17000	78000	96000

14. Table IV given below indicates scores that were retrieved from two communication associations of professional researchers.

- (a) Find mean and standard deviation.
- (b) Convert it into an ordinal data and find differences between them.

**Table IV**

<i>Division</i>	<i>Association 1</i>	<i>Association 2</i>
D1	424	0·71
D2	350	0·68
D3	274	0·68
D4	215	0·51
D5	203	0·49
D6	191	0·41
D7	152	0·41
D8	152	0·36
D9	134	0·31
D10	134	0·29
D11	130	0·29
D12	103	0·18
D13	103	0·16

15. A study was conducted among health workers about their knowledge and source of information of HIV/AIDS. The collected categorical data is given below in Table V. Find the gender differences using the attached Table IV (on page 8) and give your interpretation.

**Table V**

<i>Sources of Information on HIV/AIDS</i>	<i>Men Health Workers</i>	<i>Women Health Workers</i>
Print Media	28	13
Digital Media	43	22
Broadcast Media	8	11
Professional Journals	32	2
Interpersonal Source	38	21

## SECTION C

Answer any **two** questions :

2×20=40

16. In a quasi-experimental research, the following scores were recorded after due intervention of media and information literacy training given to secondary level liberal arts students (See Table VII below). Find the difference between the groups using one-way ANOVA. (Refer Table VIIa attached on page 9)

**Table VII**

S. No.	Region 1	Region 2	Region 3	Region 4
1	18	20	20	12
2	31	24	13	4
3	18	14	13	2
4	29	13	24	17
5	8	6	15	12
6	3	19	4	10
7	23	29	15	16
8	39	12	25	14

17. In order to study the relationship between school students' exam performance and their time spent for television viewing, data was collected from a sample and is given below (Table VIII). Find out the correlation, using the given Table IX (attached on page 10) and give your interpretation.

**Table VIII**

Student	Average weekly time spent for TV viewing	Exam Score
1	6	84
2	3	96
3	3	79
4	4	69
5	2	86
6	1	99
7	5	66
8	7	56
9	8	49
10	3	79

18. Table X below gives various topics covered by a National English newspaper and a Regional English newspaper in Oct 2018. Find out significance of differences between the National and Regional newspapers from the given data and interpret your hypothesis with the help of the given Table XI (attached on page 11).

**Table X**

<i>Topics Covered</i>	<i>Regional Newspaper</i>	<i>National Newspaper</i>
Government/Politics	157	107
Health	64	39
Education	111	611
Business	256	561
Agriculture	49	19
Crime	128	112
Religion	8	39
Sports	193	657
Others	485	833

**Table II**  
**Critical Values of the Mann-Whitney U**  
**(Two-Tailed Testing)**

n <sub>2</sub>	α	n <sub>1</sub>																	
		3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
3	.05	--	0	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8
	.01	--	0	0	0	0	0	0	0	0	1	1	1	2	2	2	3	3	3
4	.05	--	0	1	2	3	4	4	5	6	7	8	9	10	11	11	12	13	14
	.01	--	--	0	0	0	1	1	2	2	3	3	4	5	5	6	6	7	8
5	.05	0	1	2	3	5	6	7	8	9	11	12	13	14	15	17	18	19	20
	.01	--	--	0	1	1	2	3	4	5	6	7	7	8	9	10	11	12	13
6	.05	1	2	3	5	6	8	10	11	13	14	16	17	19	21	22	24	25	27
	.01	--	0	1	2	3	4	5	6	7	9	10	11	12	13	15	16	17	18
7	.05	1	3	5	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34
	.01	--	0	1	3	4	6	7	9	10	12	13	15	16	18	19	21	22	24
8	.05	2	4	6	8	10	13	15	17	19	22	24	26	29	31	34	36	38	41
	.01	--	1	2	4	6	7	9	11	13	15	17	18	20	22	24	26	28	30
9	.05	2	4	7	10	12	15	17	20	23	26	28	31	34	37	39	42	45	48
	.01	0	1	3	5	7	9	11	13	16	18	20	22	24	27	29	31	33	36
10	.05	3	5	8	11	14	17	20	23	26	29	33	36	39	42	45	48	52	55
	.01	0	2	4	6	9	11	13	16	18	21	24	26	29	31	34	37	39	42
11	.05	3	6	9	13	16	19	23	26	30	33	37	40	44	47	51	55	58	62
	.01	0	2	5	7	10	13	16	18	21	24	27	30	33	36	39	42	45	48
12	.05	4	7	11	14	18	22	26	29	33	37	41	45	49	53	57	61	65	69
	.01	1	3	6	9	12	15	18	21	24	27	31	34	37	41	44	47	51	54
13	.05	4	8	12	16	20	24	28	33	37	41	45	50	54	59	63	67	72	76
	.01	1	3	7	10	13	17	20	24	27	31	34	38	42	45	49	53	56	60
14	.05	5	9	13	17	22	26	31	36	40	45	50	55	59	64	67	74	78	83
	.01	1	4	7	11	15	18	22	26	30	34	38	42	46	50	54	58	63	67
15	.05	5	10	14	19	24	29	34	39	44	49	54	59	64	70	75	80	85	90
	.01	2	5	8	12	16	20	24	29	33	37	42	46	51	55	60	64	69	73
16	.05	6	11	15	21	26	31	37	42	47	53	59	64	70	75	81	86	92	98
	.01	2	5	9	13	18	22	27	31	36	41	45	50	55	60	65	70	74	79
17	.05	6	11	17	22	28	34	39	45	51	57	63	67	75	81	87	93	99	105
	.01	2	6	10	15	19	24	29	34	39	44	49	54	60	65	70	75	81	86
18	.05	7	12	18	24	30	36	42	48	55	61	67	74	80	86	93	99	106	112
	.01	2	6	11	16	21	26	31	37	42	47	53	58	64	70	75	81	87	92
19	.05	7	13	19	25	32	38	45	52	58	65	72	78	85	92	99	106	113	119
	.01	3	7	12	17	22	28	33	39	45	51	56	63	69	74	81	87	93	99
20	.05	8	14	20	27	34	41	48	55	62	69	76	83	90	98	105	112	119	127
	.01	3	8	13	18	24	30	36	42	48	54	60	67	73	79	86	92	99	105

**Table IV**  
**CHI-SQUARE STATISTICAL TABLE (Critical Values)**

DF	<i>P</i> =0.10	<i>P</i> =0.05	<i>P</i> =0.025	<i>P</i> =0.01	DF	<i>P</i> =0.10	<i>P</i> =0.05	<i>P</i> =0.02	<i>P</i> =0.01
1	2.706	3.841	5.024	6.635	21	29.615	32.671	35.479	38.932
2	4.605	5.991	7.378	9.210	22	30.813	33.924	36.781	40.289
3	6.251	7.815	9.348	11.345	23	32.007	35.172	38.076	41.638
4	7.779	9.488	11.143	13.277	24	33.196	36.415	39.364	42.980
5	9.236	11.070	12.833	15.086	25	34.382	37.652	40.646	44.314
6	10.645	12.592	14.449	16.812	26	35.563	38.885	41.923	45.642
7	12.017	14.067	16.013	18.475	27	36.741	40.113	43.195	46.963
8	13.362	15.507	17.535	20.090	28	37.916	41.337	44.461	48.278
9	14.684	16.919	19.023	21.666	29	39.088	42.557	45.772	49.588
10	15.987	18.307	20.483	23.209	30	40.256	43.773	46.979	50.892
11	17.275	19.675	21.920	24.725	31	41.422	44.985	48.232	52.191
12	18.549	21.026	23.337	26.217	32	42.585	46.194	49.480	53.486
13	19.812	22.362	24.736	27.688	33	43.745	47.400	50.725	54.776
14	21.064	23.685	26.119	29.141	34	44.903	48.602	51.966	56.061
15	22.307	24.996	27.488	30.578	35	46.059	49.802	53.203	57.302
16	23.542	26.296	28.845	32.000	36	47.212	50.998	54.437	58.619
17	24.769	27.587	30.191	33.409	37	48.363	52.192	55.668	59.893
18	25.989	28.869	31.526	34.805	38	49.513	53.384	56.896	61.162
19	27.204	30.144	32.852	36.191	39	50.660	54.572	58.120	62.428
20	28.412	31.410	34.170	37.566	40	51.805	55.758	59.342	63.691



**Table VIIa**  
**F-Table**

Denominator DF	Numerator DF									
	1	2	3	4	5	6	7	8	9	10
1	161.448	199.500	215.707	224.583	230.162	233.986	236.768	238.883	240.543	241.882
2	18.513	19.000	19.164	19.247	19.296	19.330	19.353	19.371	19.385	19.396
3	10.128	9.552	9.277	9.117	9.013	8.941	8.887	8.845	8.812	8.786
4	7.709	6.944	6.591	6.388	6.256	6.163	6.094	6.041	5.999	5.964
5	6.608	5.786	5.409	5.192	5.050	4.950	4.876	4.818	4.772	4.735
6	5.987	5.143	4.757	4.534	4.387	4.284	4.207	4.147	4.099	4.060
7	5.591	4.737	4.347	4.120	3.972	3.866	3.787	3.726	3.677	3.637
8	5.318	4.459	4.066	3.838	3.687	3.581	3.500	3.438	3.388	3.347
9	5.117	4.256	3.863	3.633	3.482	3.374	3.293	3.230	3.179	3.137
10	4.965	4.103	3.708	3.478	3.326	3.217	3.135	3.072	3.020	2.978
11	4.844	3.982	3.587	3.357	3.204	3.095	3.012	2.948	2.896	2.854
12	4.747	3.885	3.490	3.259	3.106	2.996	2.913	2.849	2.796	2.753
13	4.667	3.806	3.411	3.179	3.025	2.915	2.832	2.767	2.714	2.671
14	4.600	3.739	3.344	3.112	2.958	2.848	2.764	2.699	2.646	2.602
15	4.543	3.682	3.287	3.056	2.901	2.790	2.707	2.641	2.588	2.544
16	4.494	3.634	3.239	3.007	2.852	2.741	2.657	2.591	2.538	2.494
17	4.451	3.592	3.197	2.965	2.810	2.699	2.614	2.548	2.494	2.450
18	4.414	3.55	3.160	2.928	2.773	2.661	2.577	2.510	2.456	2.412
19	4.381	3.522	3.127	2.895	2.740	2.628	2.544	2.477	2.423	2.378
20	4.351	3.493	3.098	2.866	2.711	2.599	2.514	2.447	2.393	2.348
21	4.325	3.467	3.072	2.840	2.685	2.573	2.488	2.420	2.366	2.321
22	4.301	3.443	3.049	2.817	2.661	2.549	2.464	2.397	2.342	2.297
23	4.279	3.422	3.028	2.796	2.640	2.528	2.442	2.375	2.320	2.275
24	4.260	3.403	3.009	2.776	2.621	2.508	2.423	2.355	2.300	2.255
25	4.242	3.385	2.991	2.759	2.603	2.490	2.405	2.337	2.282	2.236
26	4.225	3.369	2.975	2.743	2.587	2.474	2.388	2.321	2.265	2.220
27	4.210	3.354	2.960	2.728	2.572	2.459	2.373	2.305	2.250	2.204
28	4.196	3.340	2.947	2.714	2.558	2.445	2.359	2.291	2.236	2.190
29	4.183	3.328	2.934	2.701	2.545	2.432	2.346	2.278	2.223	2.177
30	4.171	3.316	2.922	2.690	2.534	2.421	2.334	2.266	2.211	2.165
31	4.160	3.305	2.911	2.679	2.523	2.409	2.323	2.255	2.199	2.153
32	4.149	3.295	2.901	2.668	2.512	2.399	2.313	2.244	2.189	2.142
33	4.139	3.285	2.892	2.659	2.503	2.389	2.303	2.237	2.179	2.133
34	4.130	3.276	2.883	2.650	2.494	2.380	2.294	2.225	2.170	2.123
35	4.121	3.267	2.874	2.641	2.485	2.372	2.285	2.217	2.161	2.114
36	4.113	3.259	2.866	2.634	2.477	2.364	2.277	2.209	2.153	2.106
37	4.105	3.252	2.859	2.626	2.470	2.356	2.270	2.202	2.145	2.098
38	4.098	3.245	2.852	2.619	2.463	2.449	2.262	2.194	2.138	2.091
39	4.091	3.238	2.845	2.612	2.456	2.342	2.255	2.187	2.131	2.084
40	4.085	3.232	2.839	2.606	2.449	2.336	2.249	2.180	2.124	2.077
41	4.079	3.226	2.833	2.600	2.443	2.330	2.243	2.174	2.118	2.071
42	4.073	3.220	2.827	2.594	2.438	2.324	2.237	2.168	2.112	2.065
43	4.067	3.214	2.822	2.589	2.432	2.318	2.232	2.163	2.106	2.059
44	4.062	3.209	2.816	2.584	2.427	2.313	2.226	2.157	2.101	2.054
45	4.057	3.204	2.812	2.579	2.422	2.308	2.221	2.152	2.096	2.049
46	4.052	3.200	2.807	2.574	2.417	2.304	2.216	2.147	2.091	2.044
47	4.047	3.195	2.802	2.570	2.413	2.299	2.212	2.143	2.086	2.039
48	4.043	3.191	2.798	2.565	2.409	2.295	2.207	2.138	2.082	2.035
49	4.038	3.187	2.794	2.561	2.404	2.290	2.203	2.134	2.077	2.030
50	4.034	3.183	2.790	2.557	2.400	2.286	2.199	2.130	2.073	2.026

**Table IX**  
**PEARSON'S CORRELATION COEFFICIENT  $r$  (Critical Values)**

Level of Significance for a One-Tailed Test											
	.05	.025	.01	.005	.0005	.05	.025	.01	.005	.0005	
Level of Significance for a Two-Tailed Test											
$df=(N-2)$	.10	.05	.02	.01	.001	$df=(N-2)$	.10	.05	.02	.01	.001
1	0.988	0.997	0.9995	0.9999	0.99999	21	0.352	0.413	0.482	0.526	0.640
2	0.900	0.950	0.980	0.990	0.999	22	0.344	0.404	0.472	0.515	0.629
3	0.805	0.878	0.934	0.959	0.991	23	0.337	0.396	0.462	0.505	0.618
4	0.729	0.811	0.882	0.971	0.974	24	0.330	0.388	0.453	0.496	0.607
5	0.669	0.755	0.833	0.875	0.951	25	0.323	0.381	0.445	0.487	0.597
6	0.621	0.707	0.789	0.834	0.928	26	0.317	0.374	0.437	0.479	0.588
7	0.582	0.666	0.750	0.798	0.898	27	0.311	0.367	0.430	0.471	0.579
8	0.549	0.632	0.715	0.765	0.872	28	0.306	0.361	0.423	0.463	0.570
9	0.521	0.602	0.685	0.735	0.847	29	0.301	0.355	0.416	0.456	0.562
10	0.497	0.576	0.658	0.708	0.823	30	0.296	0.349	0.409	0.449	0.554
11	0.476	0.553	0.634	0.684	0.801	40	0.257	0.304	0.358	0.393	0.490
12	0.457	0.532	0.612	0.661	0.780	60	0.211	0.250	0.295	0.325	0.408
13	0.441	0.514	0.592	0.641	0.760	120	0.150	0.178	0.210	0.232	0.294
14	0.426	0.497	0.574	0.623	0.742	$\infty$	0.073	0.087	0.103	0.114	0.146
15	0.412	0.482	0.558	0.606	0.725						
16	0.400	0.468	0.542	0.590	0.708						
17	0.389	0.456	0.529	0.575	0.693						
18	0.378	0.444	0.515	0.561	0.679						
19	0.369	0.433	0.503	0.549	0.665						
20	0.360	0.423	0.492	0.537	0.652						

**Table XI**

**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	<b>0.50</b>	<b>0.25</b>	<b>0.20</b>	<b>0.15</b>	<b>0.10</b>	<b>0.05</b>	<b>0.025</b>	<b>0.01</b>	<b>0.005</b>	<b>0.001</b>	<b>0.0005</b>
two-tail	<b>1.00</b>	<b>0.50</b>	<b>0.40</b>	<b>0.30</b>	<b>0.20</b>	<b>0.10</b>	<b>0.05</b>	<b>0.02</b>	<b>0.01</b>	<b>0.002</b>	<b>0.001</b>
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
<b>Z</b>	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%
	<b>Confidence Level</b>										