MANIPAL
ACADEMY of HIGHER EDUCATION
(Deemed to be University under Section 3 of the UGC Act, 1956)

Reg. No.										

DEPARTMENT OF SCIENCES, II SEMESTER M.Sc. (CHEMISTRY)

END SEMESTER EXAMINATION, APRIL 2019

Subject: Research Methodology and Technical communication (HUM 4220)
(REVISED CREDIT SYSTEM-2017)

Time: 3 Hours Date: 29-04-2019 MAX. MARKS: 50

Note: Answer **ALL** questions.

1A. How do researchers come up with a hypothesis? Explain the elements of formulating a good hypothesis. **4**

1B. What is a research design? Explain the characteristics of good research design. **3**

1C. Differentiate between nominal, ordinal, interval and ratio scales, with an example of each. **3**

1D. You are deputed as a research head for educational unit. The top management has entrusted you a job to investigate the impact of RMTC course for the PG students. You have to submit a research proposal about the above issue. Your proposal should have the title of your study and the sub- heading containing:

(i) Problem statement
(ii) Research objective(s)
(iii) Rational for the study
(iv) Research question(s). **6**

2A. What does a measure of central tendency indicate? Describe the important measures of central tendencies. **2**

2B. Enumerate different methods of collecting data. Which one is most suitable for conducting enquiry regarding family welfare program in India? **2**

2C. Explain briefly basic concepts involved in hypothesis testing. Give a brief note on procedure for hypothesis testing. **4**

2D. The mean produce of wheat of a sample of 100 fields in 200 lbs. per acre with a standard deviation of 10 lbs. Another samples of 150 fields gives the mean of 220 lbs. with a standard deviation of 12 lbs. Can the two samples be considered to have been taken from the same population whose standard deviation is 11 lbs? Use 5 per cent level of significance. **4**

2E. In a test given to two groups of students, the marks obtained are as follows.

First group	18	20	36	50	49	36	34	49	41
Second group	29	28	26	35	30	44	46		

Examine the significance of difference between mean marks obtained by students of the above two groups. Test at 5% level of significance. **4**

3A. (i) Explain criteria used for authorship of research publication. What you mean by the term 'ghost authorship'?
(ii) Describe the components of an effective poster presentation. **6**

3B. Describe ethics in research and publishing in the context of chemistry. What are different types of plagiarism and tools available to minimize them? **6**

3C. Write similarities or differences among the following;
(i) Copyright & author publishing agreement
(ii) Open access and subscription oriented journals
(iii) Scopus database and chemical abstracts search **6**

Data given: Tabulated value for z-statistic at 5% level of significance: for two tailed test: ±1.96 and for one tailed test: ±1.645.
t- distribution table:

t-distribution

	Confidence Level									
	60%	70%	80%	85%	90%	95%	98%	99%	99.8%	99.9%
	Level of Significance									
2 Tailed	0.40	0.30	0.20	0.15	0.10	0.05	0.02	0.01	0.002	0.001
1 Tailed	0.20	0.15	0.10	0.075	0.05	0.025	0.01	0.005	0.001	0.0005
df										
1	1.376	1.963	3.133	4.195	6.320	12.69	31.81	63.67	—	—
2	1.060	1.385	1.883	2.278	2.912	4.271	6.816	9.520	19.65	26.30
3	0.978	1.250	1.637	1.924	2.352	3.179	4.525	5.797	9.937	12.39
4	0.941	1.190	1.533	1.778	2.132	2.776	3.744	4.596	7.115	8.499
5	0.919	1.156	1.476	1.699	2.015	2.570	3.365	4.030	5.876	6.835
6	0.906	1.134	1.440	1.650	1.943	2.447	3.143	3.707	5.201	5.946
7	0.896	1.119	1.415	1.617	1.895	2.365	2.999	3.500	4.783	5.403
8	0.889	1.108	1.397	1.592	1.860	2.306	2.897	3.356	4.500	5.039
9	0.883	1.100	1.383	1.574	1.833	2.262	2.822	3.250	4.297	4.780
10	0.879	1.093	1.372	1.559	1.813	2.228	2.764	3.170	4.144	4.586
11	0.875	1.088	1.363	1.548	1.796	2.201	2.719	3.106	4.025	4.437
12	0.873	1.083	1.356	1.538	1.782	2.179	2.682	3.055	3.930	4.318
13	0.870	1.079	1.350	1.530	1.771	2.160	2.651	3.013	3.852	4.221
14	0.868	1.076	1.345	1.523	1.761	2.145	2.625	2.977	3.788	4.141
15	0.866	1.074	1.341	1.517	1.753	2.131	2.603	2.947	3.733	4.073
16	0.865	1.071	1.337	1.512	1.746	2.120	2.584	2.921	3.687	4.015

****