GURU NANAK INSTITUTE OF TECHNOLOGY
An Autonomous Institute under MAKAUT
2022
TEACHING AND RESEARCH METHODOLOGY
PGCSE301B

TIME ALLOTTED: 3 HOURS **FULL MARKS: 70**

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable

GROUP – A
(Multiple Choice Type Questions)

Answer any ***ten*** from the following, choosing the correct alternative of each question: **10×1=10**

			Marks	CO No
1.	(i)	One of the objectives of research is to a) to test hypothesis b) stratify data c) find statistical results d) none of the above	1	CO3
	(ii)	Applied research aims to a) develop a hypothesis b) describe characteristics of a social community c) find working solution to a practical problem d) none of the above	1	CO4
	(iii)	The highly structured research process essentially consists of a) nine steps b) eleven steps c) eight steps d) none of the above	1	CO1
	(iv)	An example of non-probability sampling is a) stratified sampling b) judgement sampling c) multi-stage sampling d) none of the above	1	CO1
	(v)	Non-participatory survey work is normally done by a) survey by questionnaires b) telephone interview c) observation d) none of the above	1	CO2
	(vi)	There exists an individual *I*, who occupies an environment *N*; there are at least two course of actions *C1* & *C2* and at least two possible outcomes (& *O2*; a research problem is said to exist if a) $P(O_1 \mid I, C_1, N) \neq P(O_1 \mid I, C_2, N)$ b) $P(O_1 \mid I, C_1, N) = P(O_1 \mid I, C_2, N)$ c) $P(O_1 \mid I, C_1, N) \leq P(O_1 \mid I, C_2, N)$ d) None of the above	1	CO4

(vii) In experimental research the treatment is applied to — 1 — CO1
a) control group
b) experimental group
c) both control & experimental group
d) none of the above

(viii) Mean, median & mode are related to each other by — 1 — CO1
a) an inequality relation
b) an exponential relation
c) a simple linear relation
d) none of the above

(ix) Latin Square design ca be classified as — 1 — CO2
a) informal experimental design
b) formal experimental design
c) can be put in any of the above categories
d) none of the above

(x) If Xi is the i^{th} observation and n is the total number of observations then the expression gives the — 1 — CO3

$$\frac{n}{\frac{1}{x_1}+\frac{1}{x_2}+\frac{1}{x_3}+\cdots+\frac{1}{x_i}+\cdots+\frac{1}{x_n}}$$

a) geometric mean
b) arithmetic mean
c) harmonic mean
d) none of the above

(xi) Motivation research and opinion research can be classified as — 1 — CO2
a) qualitative research
b) quantitative research
c) both the above
d) none of the above

(xii) Principle of randomization is used primarily to — 1 — CO2
a) control the control group
b) to provide protection against effect of extraneous variables
c) to control the experimental group
d) none of the above

GROUP – B
(Short Answer Type Questions)

Answer any ***three*** from the following: **3×5=15**

		Marks	CO No
2.	List the different types of research & explain briefly.	5	CO3
3.	Explain the difference between research methods & research methodology.	5	CO4
4.	Explain briefly the following two steps in the research process: i. Developing a working hypothesis ii. Determining sample design	5	CO1

5.		Define a research problem using formal notation; explain briefly.	5	CO2
6.		Define weighted arithmetic mean; give an example.	5	CO1

GROUP – C
(Long Answer Type Questions)

Answer any ***three*** from the following: **3×15=45**

			Marks	CO No.
7.	(a)	What is an extraneous variable? explain clearly	8	CO3
	(b)	What is confounded relationship? Explain clearly	7	CO4
8.	(a)	Define average deviation; explain briefly with example	8	CO1
	(b)	Define standard deviation; explain briefly with example	7	CO2
9.	(a)	Explain principle of replication & principle of randomization with small examples	8	CO1
	(b)	Describe the principles of experimental research design as proposed by Prof. R.A. Fisher	7	CO3
10.	(a)	Describe in detail the completely randomized experiment design approach.	8	CO4
	(b)	Describe in detail the 'before-and-after with control' approach for experiment design.	7	CO1
11.	(a)	Explain the simple random sampling technique briefly.	5	CO2
	(b)	Discuss the convenience sampling technique briefly.	5	CO1
	(c)	Describe the cluster sampling technique briefly.	5	CO3