10. Define Principal Component Analysis (PCA). What is the purpose of dimensionality reduction in PCA? Explain the concept of explained variance in PCA and how it helps in selecting the numbers of principal components. 3+3+5=11

11. Notebook 5

12. Viva-voce 10

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PG Even Semester Exam, May 2025

Geography

2nd Semester

COURSE NO. GEOALIF- 555

[Quantitative Methods in Geography]

Full Marks : 70
Pass Marks : 28

Time : 3 hours

The figures in the margin indicate full marks for the questions

Answer five questions, taking one from each Unit

UNIT-I

1. The following table shows the distribution of marks obtained by students in an examination. Calculate the mean, median and mode. 4+4+3=11

Marks	Number of Students
40-50	5
50-60	8
60-70	15
70-80	20
80-90	7
90-100	5

Turn over

2. The following table shows the distribution of marks obtained by students in an examination. 6+5=11

Marks	Number of Students
0-10	4
10-20	6
20-30	10
30-40	7
40-50	7

UNIT-II

3. Define Sampling. Discuss the role of confidence level, margin of error, population proportion and population size in determining sample size. 2+9=11

4. A researcher wants to compare the monthly income of workers in two different industries: the textile industry and the construction industry. A simple random sampling survey is conducted and the following data is collected: 11

Industry	Mean monthly earnings (Rs.)	Standard deviation of sample data of monthly earnings (Rs.)	Size of sample
Textile Industry	850	75	150
Construction Industry	900	100	120

Mandi	9,99,777	2,93,739	12,787
Shimla	8,14,010	2,15,777	8,755
Sirmaur	5,29,855	1,60,745	11,262
Solan	5,80,320	1,64,536	25,645
Una	5,21,173	1,15,491	8,601
Total	68,64,602	17,29,252	3,92,126

8. Calculate the Gini's coefficient for the district wise SC and ST population in Himachal Pradesh (2011 census) from the data given inQ.7. 11

UNIT-V

9. Construct the composite index for each country for all the three indicators using rank method and interpret the result. 11.

Country	Life Expectancy (Years)	Literacy Rate (%)	GDP per Capita (USD)
USA	78.5	99.0	67,000
India	69.4	74.0	2,300
Brazil	75.0	93.0	9,000
Japan	84.0	99.0	40,000
South Africa	64.0	87.0	6,500
Germany	81.0	99.0	50,000
China	77.0	96.0	10,000
Canada	82.0	99.0	46,000
Mexico	76.0	94.0	9,500
Russia	72.0	99.0	11,000

Test the hypothesis at the 5% level of significance that there is no difference in the monthly earnings between workers in the two industries.

UNIT-III

5. A researcher wants to examine the relationship between the numbers of hours studied per week and the marks obtained in an exam among students.

Student	Hours Studied	Marks Obtained
1	5	65
2	3	50
3	4	60
4	6	68
5	2	45
6	8	80
7	7	75
8	5	66
9	9	85
10	4	55
11	6	70
12	3	52

a. Compute the correlation coefficient using Karl Pearson's method. 4

b. Perform the students 't' test, where the critical value for 10 degrees of freedom is 3.17 at 1%, 2.76 at 2% and 2.23 at 5% level of significance. 4

c. Interpret the relationship between hours studied and marks obtained. 3

6. a. Calculate the correlation coefficient using Spearman's rank method from the data given in Q. 5. 4

b. Perform the students 't' test for 'p' value, where the critical value for 10 degrees of freedom in3.17 at 1%, 2.76 at 2% and 2.23 at 5% level of significance. 4

c. Interpret the relationship between hours studied and marks obtained. 3

UNIT-IV

7. The district wise total population of SC and ST population in Himachal Pradesh (2011 census) is given below. Find out the relative concentration of SC and ST population using Location Quotient and interpret the result. 11

District	Total Population	SC Population	ST Population
Bilaspur	3,81,956	98,989	10,693
Chamba	5,19,080	1,11,690	1,35,500
Hamirpur	4,54,768	1,08,256	3,044
Kangra	15,10,075	3,19,385	84,564
Kinnaur	84,121	14,750	48,746
Kullu	4,37,903	1,22,659	16,822
Lahaul-Spiti	31,564	2,235	25,707

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