# 2020

## GEOGRAPHY — HONOURS

### Paper : CC-7

### (Statistical Methods in Geography)

**Full Marks : 50**

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words as far as practicable.*

**Use of Scientific calculators is allowed in this Examination / Paper.**

### Group - A

Answer ***any five*** questions (each within **50** words). 2×5

**1.** Distinguish between variable and attribute.

**2.** What is the relationship between mean, median and mode in a positively skewed frequency distribution?

**3.** Differentiate between population and sample.

**4.** Examine whether the following variables are discrete or continuous :

(a) Age of a person

(b) Size of land holding

(c) Size of a family

(d) Temperature of a place.

**5.** A jar contains 6 granite pebbles, 9 basalt pebbles and 10 sandstone pebbles. If a pebble is drawn from the jar at random, what is the probability that this pebble is sandstone?

**6.** Compute the mode of age in years in a unimodal distribution with moderate skewness, given mean equals to 25 years and median equals to 23 years.

**7.** What are partition values and how are they represented diagrammatically?

### Group - B

Answer ***any four*** questions (each within **150** words). 5×4

**8.** Define probability. State the three axioms of probability.

**9.** Distinguish between systematic and stratified sampling.

**10.** Prepare a grouped frequency distribution table from the following data :

**Table no. - 1**

| Sex Ratio (Females / '000 Males) | Number of states and U.T.s. |
|---|---|
| < 700 | 0 |
| < 750 | 1 |
| < 800 | 2 |
| < 850 | 5 |
| < 900 | 11 |
| < 950 | 23 |
| < 1000 | 33 |
| < 1050 | 34 |
| < 1100 | 35 |

**11.** It is given that Pearson's bi-variate correlation co-efficient (r) between use of fertilizers and agricultural productivity is 0.82 and the number of pairs of observations is 17. Determine using the T-test of significance whether the relationship between use of fertilizers and agricultural productivity is significant at 5% level of significance. (Refer to Table-A1 – Critical value of students' T)

**12.** Compare the relative advantages of using standard deviation and co-efficient of variation as methods of dispersion. If the standard deviation of income is ₹ 12 and the mean is ₹ 30, find the co-efficient of variation.

**13.** What are the differences between Primary and Secondary data?

## Group - C

Answer ***any two*** questions (each within **500** words).

**14.** (a) Define null hypothesis and alternative hypothesis.

(b) A random sample of 100 people reveals the following details regarding their educational attainment level and salary. Use the chi-square test to determine whether there is any relationship between the level of educational attainment and the level of salary and whether the relationship is significant at 5% level of significance. (Table – A2 — Critical values of chi-square) 2+8

**Table - 2 : Educational Attainment Levels and Salary Levels of Population**

| Educational Attainment Levels | Low Salary | Medium Salary | High Salary | Total |
|---|---|---|---|---|
| Graduate | 5 | 10 | 20 | 35 |
| Medium | 9 | 16 | 15 | 40 |
| Elementary | 12 | 8 | 5 | 25 |
| Total | 26 | 34 | 40 | 100 |

**15.** (a) What is the formula for Spearman's Rank Correlation?

(b) From the following data in Table – 3, find the linear regression equation required for estimation of 'y'. 2+8

**Table - 3 : Relative Relief and Road Density of a given region**

| Serial No. | Relative Relief (in metres) | Road Density (km per sq km) |
|---|---|---|
| 1 | 20 | 2.50 |
| 2 | 80 | 2.00 |
| 3 | 240 | 1.50 |
| 4 | 380 | 0.75 |
| 5 | 120 | 1.00 |
| 6 | 640 | 0.25 |
| 7 | 280 | 1.25 |
| 8 | 520 | 0.25 |
| 9 | 440 | 0.75 |
| 10 | 320 | 1.00 |

**16.** (a) What is time series?

(b) From the given data, compute and draw the trend by four-yearly moving average. Graphically represent the time-series data.

| Year | Electricity Generated (million kw) |
|---|---|
| 2001 | 101 |
| 2003 | 107 |
| 2005 | 113 |
| 2007 | 121 |
| 2009 | 136 |
| 2011 | 148 |
| 2013 | 142 |
| 2015 | 140 |

2+4+2+2

**17.** Discuss the different scales of measurement of data with suitable examples. 10

**11.** **Table - A1**

| Degrees of freedom | Significance level (one-tailed) 0.05 | 0.025 | 0.01 | 0.005 | 0.00005 |
|---|---|---|---|---|---|
| | Significance level (two-tailed) 0.1 | 0.05 | 0.02 | 0.01 | 0.001 |
| 1 | 6.31 | 12.71 | 31.82 | 63.66 | 636.62 |
| 2 | 2.92 | 4.30 | 6.97 | 9.93 | 31.60 |
| 3 | 2.35 | 3.18 | 4.54 | 5.84 | 12.92 |
| 4 | 2.13 | 2.78 | 3.75 | 4.60 | 8.61 |
| 5 | 2.01 | 2.57 | 3.37 | 4.03 | 6.86 |
| 6 | 1.94 | 2.45 | 3.14 | 3.71 | 5.96 |
| 7 | 1.89 | 2.37 | 3.00 | 3.50 | 5.41 |
| 8 | 1.86 | 2.31 | 2.90 | 3.35 | 5.04 |
| 9 | 1.83 | 2.26 | 2.82 | 3.25 | 4.78 |
| 10 | 1.81 | 2.23 | 2.76 | 3.17 | 4.59 |
| 11 | 1.80 | 2.20 | 2.72 | 3.11 | 4.44 |
| 12 | 1.78 | 2.18 | 2.68 | 3.05 | 4.32 |
| 13 | 1.77 | 2.16 | 2.65 | 3.01 | 4.22 |
| 14 | 1.76 | 2.15 | 2.62 | 2.98 | 4.14 |
| 15 | 1.75 | 2.13 | 2.60 | 2.95 | 4.07 |
| 16 | 1.75 | 2.12 | 2.58 | 2.92 | 4.01 |

**14.** (b)

**Table A2– Critical Values of CHI-Square**

| Values of $x^2$ with probability P of being exceed in random sampling v = number of degrees of freedom. | | | | | |
|---|---|---|---|---|---|
| v \ P | 0.20 | 0.10 | 0.05 | 0.02 | 0.01 |
| 1 | 1.64 | 2.71 | 3.84 | 5.41 | 6.63 |
| 2 | 3.32 | 4.61 | 5.99 | 7.82 | 9.21 |
| 3 | 4.64 | 6.25 | 7.81 | 9.84 | 11.34 |
| 4 | 5.90 | 7.78 | 9.49 | 11.67 | 13.28 |
| 5 | 7.29 | 9.24 | 11.07 | 13.39 | 15.09 |
| 6 | 8.56 | 10.64 | 12.59 | 15.03 | 16.81 |
| 7 | 9.80 | 12.02 | 14.07 | 16.62 | 18.48 |
| 8 | 11.03 | 13.36 | 15.51 | 18.17 | 20.09 |
| 9 | 12.24 | 14.68 | 16.92 | 19.68 | 21.67 |
| 10 | 13.44 | 15.99 | 18.31 | 21.16 | 23.21 |