2013

M.Sc.

2nd Semester Examination

REMOTE SENSING AND GIS

PAPER—RSG-204

Full Marks : 40

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

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

Illustrate the answers wherever necessary.

Use Separate answer book for each Group.

Group–A

(Fundamental Statistics)

[Marks : 20]

Answer any *two* questions. 2×10

1. (a) For any two observations (x_1 and x_2) prove that AM ≥ GM ≥ HM (where, AM = Arithmetic mean, GM = Geometric mean and HM = Harmonic mean).

(b) Find the Mode and Median of the following observations :

12, 8, 9, 32, 14, 16, 20.

(c) Show that if $\bar{x}$ be the arithmetic mean of the values xi weighted by fi (i = 1, 2, –n), then $\sum_{i=1}^{n} f_i(x_i - \bar{x}) = 0$.

3+3+4

2. (a) Prove that standard deviation is independent of any change of origin, but is dependent on the change of scale.

(b) Find the standard deviation of first n natural number.

(c) Define co-efficient of variation. 4+4+2

3. (a) Define correlation coefficient (r).

(b) Prove that $-1 \leq r \leq 1$.

(c) State two important properties of Normal Distribution. 2+5+3

4. (a) Define the terms : Equally likely and exhaustive.

(b) State and prove total theorem of probability for any two events A and B.

(c) Estimate the probability of appearance of two heads when two coins are tossed. 3+4+3

Group–B

(Statistical Application in GIS)

[Marks : 20]

Answer any *two* questions. 2×10

1. Draw a scatter diagram to show that relationship between distance from city centre and population density of some wards of a city.

Calculate correlation co-efficient (r) for the following dataset & interpret it. Estimate the population density from trend line equation obtained by the least-squares where the distance from city centre is 10 km : 4+4+2

Ward	*Distance from City Centre (km)*	*Population Density (Person/hectare)*
1	2.5	49.51
2	2.9	32.29
3	6.3	10.84
4	5.4	25.55
5	1.8	67.47
6	14.8	1.58
7	7.3	13.76
8	6.3	10.84
9	7.9	2.81
10	4.8	19.31

2. Calculate mean centre of population for the following years and locate it on the given map.

Show the shifting of mean centres of population over time and explain it : 8+2

Sl. No.	*Districts*	*Total Population (2001)*	*Total Population (2011)*	*Lati-tude*	*Longi-tude*
1	Barddhaman	6895514	7723663	23·27	87·9
2	Birbhum	3015422	3502387	23·84	87·62
3	Bankura	3192695	3596292	23·23	87·15
4	Purulia	2536516	2927965	23·42	86·5
5	Midnapur (W)	5193411	5943300	22·42	87·35
6	Midnapur (E)	4417377	5094238	21·94	87·78

3. Differentiate Standard Distance and Standard Deviation. Briefly discuss the utility of standard distance is spatial decision making. Calculate Standard distance from the given dataset : 3+3+4

ID	*Longitude (in degrees)*	*Latitude (in degrees)*
1	81.5215	41.0804
2	84.5060	39.1398
3	81.6785	41.4797
4	82.9874	39.9889
5	84.1974	39.7791

4. Calculate Locational Quotient for different districts of West Bengal and show levels of LQ in the given map. Interpret it : 5+3+2

Sl. No.	*Districts*	*Total Population (2011)*	*Urban Population (2011)*
1.	Bankura	3596292	300679
2.	Burdwan	7723663	3079584
3.	Birbhum	3502387	448368
4.	Howrah	4841638	3064668
5.	Hooghly	5520389	2131994
6.	Kolkata	4486679	4486679
7.	Midnapur (E)	5094238	593468
8.	Midnapur (W)	5943300	714992
9.	Nadia	5168488	1437591
10.	Purulia	2927965	373381
11.	24 Parganas (N)	10082852	5807128
12.	24 Parganas (S)	8153176	2087997