

JK LAKSHMIPAT UNIVERSITY, JAIPUR

INSTITUTE OF ENGINEERING AND TECHNOLOGY

EndTerm Examination (Regular), November 2016
B. Tech in Civil Engineering, Semester VII

Roll No.....

COURSE CE702: GEOINFORMATICS

Time: 3 hours

Max. Marks: 100

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.
4. Arithmetic Graph paper need to be requested to the invigilator for Q9A.

Q.1	Objective type multiple choice questions/fill in the blanks (10 questions @ 1 mark)	10
i.	Which of the following defines a <i>complete</i> GIS? a) A collection of spatial data stored in any system b) Software and data that enables us to ask and answer questions involving where something is and how that location relates to other things c) Goggle Maps and only Google Maps d) A Map	
ii.	What is the correct relationship of flattening parameter f for the Ellipsoidal projection system: a) $(b-a)/b$ b) $(a-b)/a$ c) $(b-a)/a$ d) $(a-b)/b$ Where, a = Equatorial Radius or Semi-Major Axis, b =Polar Radius or Semi-Minor Axis	
iii.	Which of the following best describes the raster data type? a) A grid of pixels with a uniform value within each pixel. b) An attribute table of data with locations attached. c) A coordinate-based data model that represents geographic features as points, lines, and polygons. d) A set of squares with different sizes that hold values and attributes	
iv.	What is a projection? a) The distortions caused by displaying three dimensional data on a two dimensional surface. b) A model showing projected values of a data set after a set amount of time.	

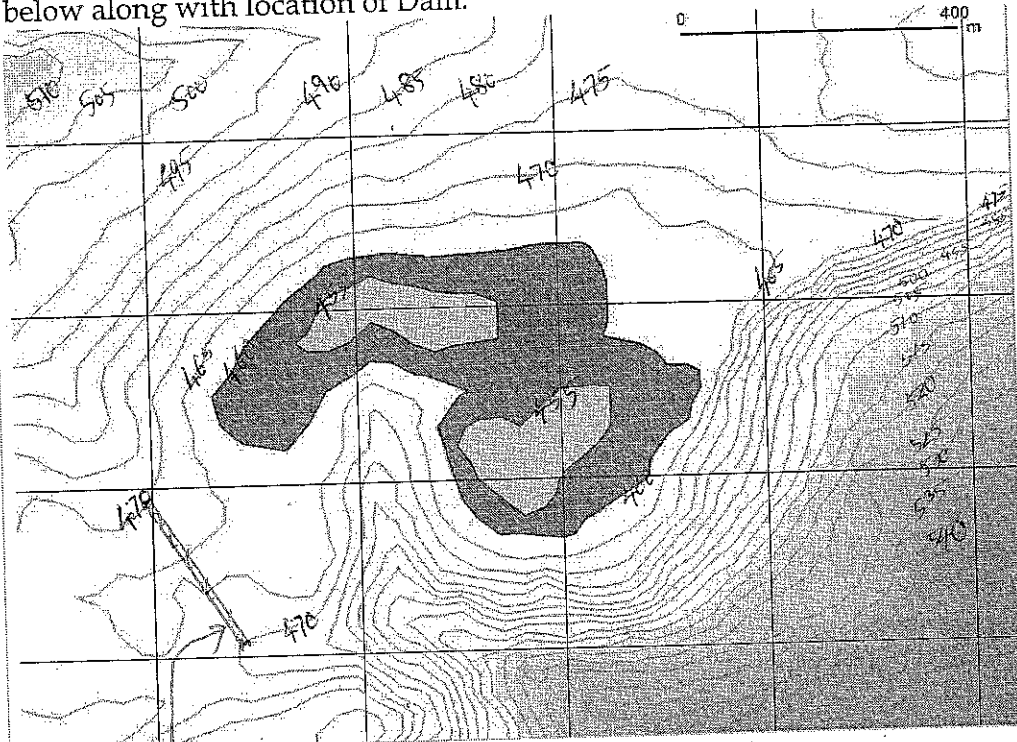
	c) A projection is a way to display three dimensional information on a two dimensional surface like a computer screen or a map. d) A type of map file used to share data after geospatial analysis has been performed.	
v.	To identify a map of a particular area, a map numbering system has been adopted by Survey of India. The grid numbering system of identification is based on region defined: a) Within 40° N to 84° N Latitude and 84° E to 124° E Longitude) at the scale of 1: 10,000,000 containing 120 Maps b) Within 40° N to 84° N Latitude and 44° E to 124° E Longitude) at the scale of 1: 10,000,000 containing 136 Maps c) Within 4° N to 40° N Latitude and 44° E to 124° E Longitude) at the scale of 1: 1,000,000 containing 136 Maps. d) Within 4° N to 40° N Latitude and 44° E to 124° E Longitude) at the scale of 1: 1,000,000 containing 120 Maps	
vi.	Global Positioning Service (GPS) is based on a principle called a). Transmission b). Trilateration c). Orbiteration d). Globalization	
vii.	What does 1mm on a map drawn at a scale of 1:50,000 represent on the ground? a). 500 centimetres b). 50 centrimetres c). 5 metres d). 50 metres	
viii.	Which of the following is not a type of map projection? a). Azimuthal b). Geographic c). Cylindrical d). Conic	
ix.	Resolution may best be defined as: a). The smallest feature that can be mapped or measured b). The overall quality of a dataset c). The size of the smallest recording unit d). The smallest unit or measurement into which data can be disaggregated	
x.	How many satellites are used in the US NAVSTAR GPS satellite constellation? a). 25 b). 24 c). 30 d). 20	
Q.2	Short answer type questions (4 questions @ 2.5 marks)	10
i	What is GPS ?	
ii	Define Geodesy and Geoid?	
iii.	Prove that 1° =111.11 KM graticule distance?	
iv	What is proximity analysis?	

Q.3A	What are the important components to model the shape of the Earth and to develop a coordinate system for a flat map. Detail out the number of components and concepts to model the shape of the Earth?	05
Q.3B	What is Geo-Referencing? What are the different algorithms for carrying out spatial interpolation under Geo-Referencing? Why it is required and what are the steps in doing Geo-Referencing using Quantum GIS?	05

Q.4A	Explain the stages of remote sensing?	05
Q.4B	Explain atmospheric scattering and detail out Rayleigh, Mie and non-selective scattering based on wavelength of radiation being scattered and the size of particles causing scattering?	05

Q.5 A	What is UTM Global coordinate/projection System? Explain its philosophy of grid design along with mention of datum? What is convention followed to represent a point in South of Equator and west of Central Meridian?	0 5																				
Q.5B	For the JKL campus shown (Figure 1 in Appendix), find the UTM coordinates for i). Administrative Block , ii) IET Block and iii) Mess as shown on the map with Attributes details given below:	0 5																				
<table><tr><th>S. No</th><th>JKLU Campus</th><th>Latitude</th><th>Longitude</th><th>Elevation</th></tr><tr><td>1</td><td>Administrative Block</td><td>26°50'11.03"N</td><td>75°39'3.18" E</td><td>378m</td></tr><tr><td>2</td><td>IET Block</td><td>26°50'8.50"N</td><td>75°39'0.59" E</td><td>378m</td></tr><tr><td>3</td><td>Mess</td><td>26°50'1.87"N</td><td>75°39'5.68" E</td><td>378m</td></tr></table>			S. No	JKLU Campus	Latitude	Longitude	Elevation	1	Administrative Block	26°50'11.03"N	75°39'3.18" E	378m	2	IET Block	26°50'8.50"N	75°39'0.59" E	378m	3	Mess	26°50'1.87"N	75°39'5.68" E	378m
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Given UTM zone numbering (Figure 2 in Appendix).																						

Q.6A	What is Remote Sensing and explain the stages in Remote Sensing in brief?	05
Q.6B	What are the spectral bands used in Remote Sensing explain it with a neat sketch with different wavelength range for each of the spectral bands?	05
OR		
Q.6B	Explain the procedure of carrying out proximity analysis (Buffer zone creation), and what would be utility of creating a Buffer in this analysis? Give some practical applications of Buffer analysis?	05
Q.7A	What is the Standard Positioning Service? What is Precise Positioning Service (PPS)?	05
OR		
Q.7A	Explain common errors in handling GPS data? Explain the procedure of removing errors to improve the positional accuracy of a GPS data collected?	05

Q.8A	Explain the procedure to estimate the submergence area and capacity of the reservoir for water stored up to full reservoir level (F.R.L. =470 m) using average end formula method or prismoidal formula method for the contour map shown below along with location of Dam.	05
	 DAM LOCATION	
Q.9A	Refer to Figure 3 given in the Appendix and determine the geographic area and perimeter of Rajasthan state using cartography concepts and compare it with the actual value's which are: Geographical Area=3, 42,239 km², Perimeter= 3390 km. What is the percentage error and what may be the reasons for the same? Locate Jaipur City with geographic coordinates (75.8°E, 26.9°N) on your cartography map of Rajasthan drawn to scale.	10
Q.9B	Detail out any two term projects carried out by other groups of your class in the current semester excluding yours: - Title, objectives along with study area mention giving information about approximate geographic extent, average rainfall, topographical variation for their study area - What all GIS maps have been prepared for their study and also mention about data portals for India for data download - Detailed Methodology containing formulation (Mathematical relationship) and analysis carried out. - How can you use proximity analysis (Buffer creation) in their application. - Outcome of their work and final recommendations made.	20

Appendix:

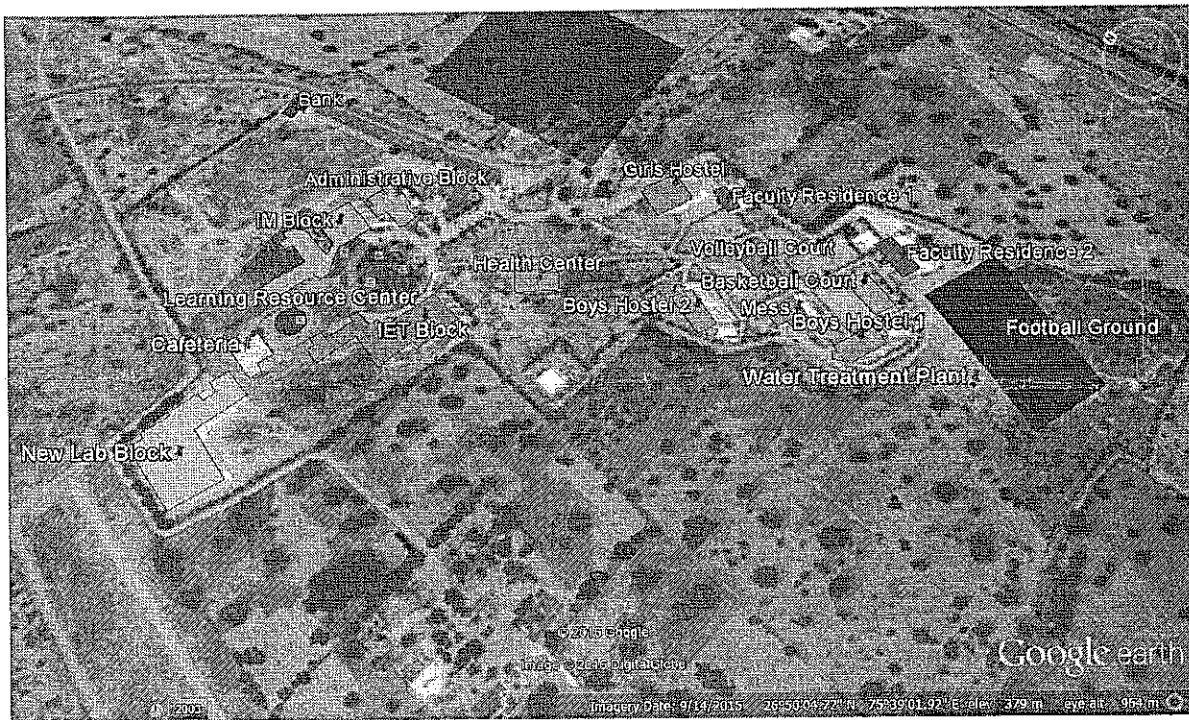


Figure 1: JK LakshmiPat University Campus (Source: Google earth)

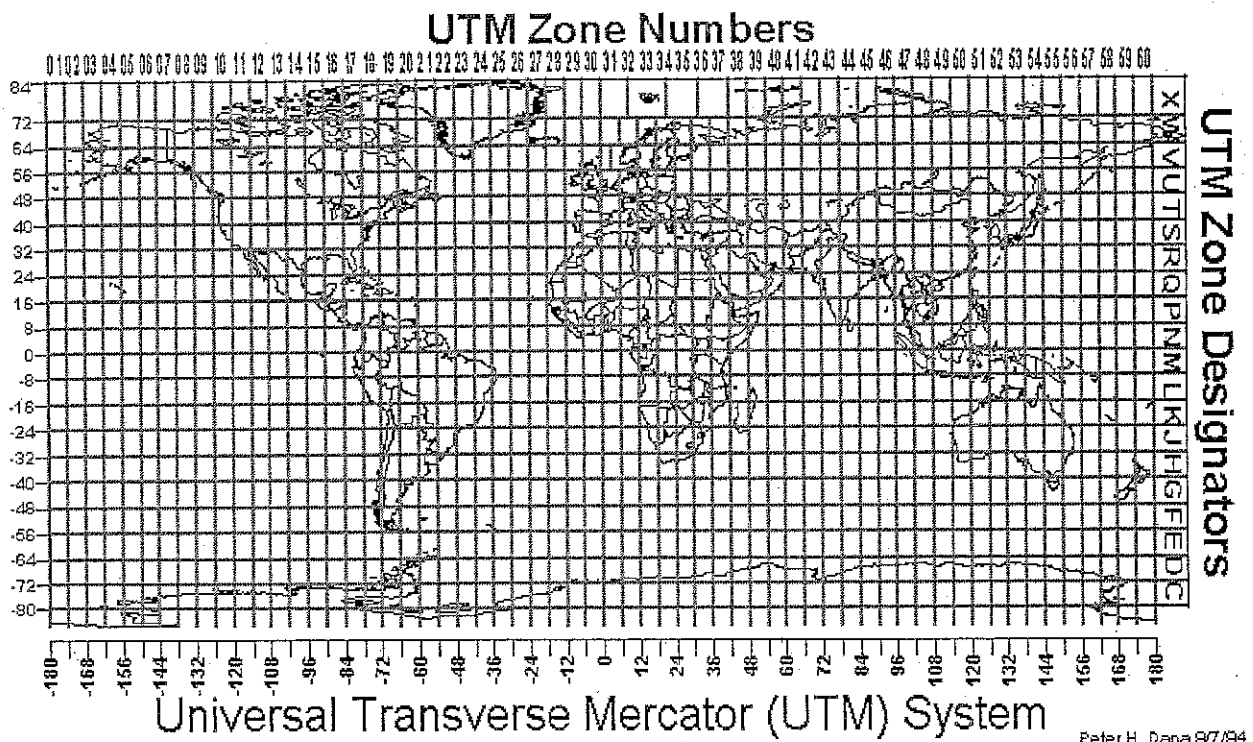


Figure 2: UTM system zone numbering for the World

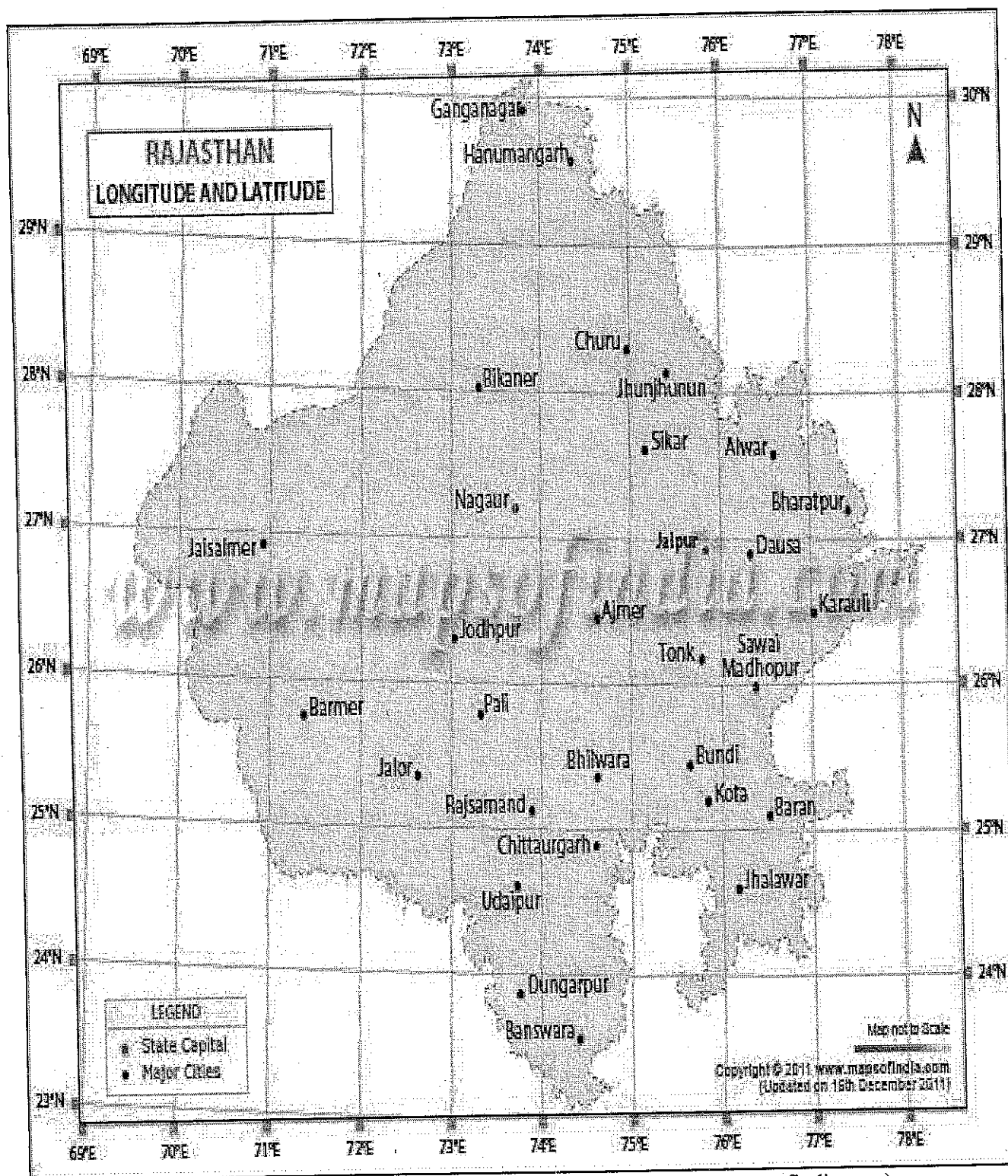


Figure3: Rajasthan Longitude and Latitude map (Source:www.mapsofindia.com)