INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal, Hyderabad -500 043

CIVIL ENGINEERING

TUTORIAL QUESTION BANK

Course Name	:	**DIGITAL LAND SURVEYING AND MAPPING**
Course Code	:	ACE803
Class	:	VI semester
Branch	:	Civil Engineering
Year	:	2018-19
Course Coordinator	:	Mr. CH.Venugopal reddy
Course Faculty	:	MR. CH.Venugopal reddy

COURSE OBJECTIVES:

The course should enable the students to:

I.	Provide basics of digital surveying and mapping of earth surface using total station, GPS and mapping software.
II.	Understand the fundamentals of total station and its working & measurements for land surveying.
III.	Understand fundamentals, working & measurements using GPS for land surveying.
IV.	Solve surveying problems by applying fundamentals, digital surveying procedure, working, data reduction

TUTORIAL QUESTION BANK

S.No	QUESTIONS	Blooms Taxonomy Level	Course Learning Outcomes
UNIT- I			
Fundamentals of Land Surveying & GPS			
Part - A (Short Answer Questions)			
1	How is Global Positioning System used?	Understand	CACE803.01
2	What are the applications of GPS?	Remember	CACE803.02
3	Will GPS be free in the future?	Understand	CACE803.01
4	What's the status of the GPS?	Understand	CACE803.01
5	What is the status of Selective Availability (SA)?	Understand	CACE803.05
6	What is Global Positioning System Rollover?	Remember	CACE803.05
7	What happens if you use a jammer?	Understand	CACE803.03
8	List the factors for selection of base lines.	Remember	CACE803.03
9	Define the terms a) Reduced level b) Bench mark.	Remember	CACE803.04
10	What do you mean by closing error in traversing?	Understand	CACE803.02
11	What is meant by sensitivity of bubble?	Remember	CACE803.01
12	Write the arithmetic check in reduction of level by rise & fall method.	Remember	CACE803.02
13	Define surveying. What are the fundamental principles of surveying?	Understand	CACE803.02
14	What is the object or purpose of surveying?	Remember	CACE803.03

15	What is well conditioned triangle? What are its specific advantages?	Remember	CACE803.03
16	Define the segments in Global Positioning System.	Remember	CACE803.04
17	State Datum and its importance in surveying.	Understand	CACE803.02
18	Define line of collimation.	Understand	CACE803.05
19	Define check line and state its importance.	Understand	CACE803.06
20	Write the formula for an area using mid-ordinate rule.	Understand	CACE803.05
21	Write the formula for an area using Simpson's rule.	Remember	CACE803.03
22	Write the formula for an area using trapezoidal rule.	Understand	CACE803.02
23	List the essential parts of a theodolite.	Remember	CACE803.04
24	What is meant by compound curve?	Remember	CACE803.05
25	What is backward tangent?	Understand	CACE803.06
Part - B (Long Answer Questions)			
1	Explain the term GPS and its application in surveying.	Remember	CACE803.01
2	Explain the term GPS Jammer and its uses in surveying?	Understand	CACE803.02
3	What are the disadvantages of jammers and why are jammers prohibited?.	Understand	CACE803.02
4	What is the Standard Positioning Service?	Understand	CACE803.03
5	How do I report a GPS Mapping Data error such as an incorrect address for a home or a business?	Understand	CACE803.01
6	How to file a complaint or need more information on GPS?	Remember	CACE803.02
7	How do I report a GPS Mapping Data error such as an incorrect address for a home or a business?	Understand	CACE803.04
8	What are different methods of surveying?	Remember	CACE803.05
9	The area of certain field was measured with 30m chain and found to 5000sqm.After the work the chain was found to be 10cm short. What is the true area of the field?	Remember	CACE803.06
10	Describe with sketch the characteristics of contours.	Understand	CACE803.05
11	Describe various methods of contouring.	Remember	CACE803.01
12	What are the operations involved in chain surveying.	Understand	CACE803.02
13	Write about different types of chains.	Remember	CACE803.02
14	What are the instruments used for setting right angles to a chain line.	Understand	CACE803.03
15	What are different sources of error in chain surveying?	Understand	CACE803.01
16	Give the classification of surveying in brief based up on Purpose / objectives.	Remember	CACE803.04
17	Give the classification of surveying in brief based up on Instruments used.	Remember	CACE803.06
18	Define the terms. Level surface, Datum, Bench mark and Mean sea level	Understand	CACE803.04
19	Explain briefly about the different types of levelling instruments.	Understand	CACE803.05
20	Write a note on Uses and advantages of contours.	Understand	CACE803.04
21	Write a note on uses of contour maps.	Understand	CACE803.02
22	Define the terms transit theodolite, Non-transit theodolite, vertical axis and horizontal axis	Remember	CACE803.04
23	Explain the temporary adjustments of theodolite	Understand	CACE803.01
24	What are the demerits in a total station?	Remember	CACE803.01
25	Write short notes on electronic theodolite.	Remember	CACE803.01
Part - C (Problem Solving and Critical Thinking Questions).			
1	The following perpendicular offsets were taken at 10m intervals from a survey line to an irregular boundary line 3.25, 5.60, 4.20, 6.65, 8.75, 6.20, 3.25, 4.20, 5.65 calculate the area enclosed between the survey line , the irregular boundary line , and the first and last offsets, by the application of i) Trapezoidal rule ii) Simpson'srule	Remember	CACE803.02

<table>
<tr><td>2</td><td>A series of offsets were taken from a chain line to a curved boundary line at intervals of 5metres the following order 0,2.65,3.80,3.75,4.65,3.60,4.95,5.85m compute the area between the chain line, the curved boundary line and the end offsets by
i) Average - ordinate rule
ii) Trapezoidal rule</td><td>Understand</td><td>CACE803.02</td></tr>
<tr><td>3</td><td>The following staff readings were observed successively with a level, the instrument having been moved after third, sixth and eight readings 2.228, 1.606, 0.988, 2.090, 2.864, 1.262, 0.602, 1.982, 1.044, 2.684 meters. Enter the above readings in a page of a level book and calculate the R L of points if the first reading was taken with a staff held on a bench mark of 432.384m.</td><td>Understand</td><td>CACE803.07</td></tr>
<tr><td>4</td><td>The following ten readings were taken with a level, the instrument being shifted after the fifth and eighth readings: 1.315, 0.965, 1.345, 1.1.05, 0.875, 1.155, 1.305, 1.675, 1.345 and 1.875. The RL of the first turning point is 100.000. Find the reduced levels of the remaining points by the Rise and fall method.</td><td>Understand</td><td>CACE803.04</td></tr>
<tr><td>5</td><td>Eight readings were taken with a level in sequence as follows: 1.585, 1.315, 2.305, 1.225, 1.325, 1.065, 1.815 and 2.325. The level was shifted after the third and sixth readings. The second change point was a bench mark of elevation 186.975. Find the reduced levels of the remaining stations. Use the rise and fall method.</td><td>Remember</td><td>CACE803.06</td></tr>
<tr><td>6</td><td>A 20 –m tape was tested before starting the day’s work and found to be 0.02 m short. At the end of the day it was tested again and found to be 0.06 m too long. If the total length measured during the day was 1243.5, find the true length.</td><td>Remember</td><td>CACE803.05</td></tr>
<tr><td>7</td><td>To find out the included angles in a closed traverse PQRSTP, the following observations were made with compass. Calculate the included angles after correcting for local attractions
<table>
<tr><th>LINE</th><th>FB</th><th>BB</th></tr>
<tr><td>PQ</td><td>N 62 45’ E</td><td>S 62º 15’W</td></tr>
<tr><td>QR</td><td>N 21º 00’ E</td><td>S 20º 45’ W</td></tr>
<tr><td>RS</td><td>N71º 30’ W</td><td>S 71º 30’ E</td></tr>
<tr><td>ST</td><td>S 39º 00’ W</td><td>N 38º 00 E</td></tr>
<tr><td>TP</td><td>S 54º 30’ E</td><td>N 53º 15’ W</td></tr>
</table></td><td>Understand</td><td>CACE803.04</td></tr>
<tr><td>8</td><td>The length of a line measured with a 20m.chain was found to be 3,200 links. The same, when measured with a 30 m chain was found to be 640 m. If the 20 m chain was ¼ links too long, what was the error in the 30 m chain?</td><td>Remember</td><td>CACE803.06</td></tr>
<tr><td>9</td><td>A chain line ABC crosses a river, B and C being on the near and distant banks respectively. The respective bearings of C and A taken at D, a point 60 m measured at right angles to AB from B are 2800 and 1900 , AB being 32 m. Find the width of the river.</td><td>Remember</td><td>CACE803.04</td></tr>
<tr><td>10</td><td>The following offsets were taken from a chain line to hedge compute the area included between the chain line, the hedge and offset by trapezoidal rule.
<table>
<tr><td>Distance</td><td>0</td><td>20</td><td>40</td><td>60</td><td>80</td><td>120</td><td>160</td><td>220</td><td>280</td></tr>
<tr><td>Offset</td><td>6.4</td><td>10.8</td><td>18.6</td><td>21.2</td><td>9.6</td><td>6.4</td><td>7.5</td><td>3.3</td><td>9.6</td></tr>
</table></td><td>Understand</td><td>CACE803.05</td></tr>
<tr><td colspan="4">UNIT - II</td></tr>
<tr><td colspan="4">Global Positioning System (GPS)</td></tr>
<tr><td colspan="4">Part – A (Short Answer Questions)</td></tr>
<tr><td>1</td><td>No matter how inexpensive and wide-spread GPS technology becomes, why will it not entirely solve the problem of creating precise and</td><td>Remember</td><td>CACE803.05</td></tr>
</table>

	accurate GIS datasets?		
2	What is selective availability?	Understand	CACE803.05
3	What is differential GPS?	Remember	CACE803.05
4	High accuracy, survey quality GPS is usually associated wit	Understand	CACE803.05
5	The latitude, longitude, and altitude displayed by a GPS receiver represent.	Understand	CACE803.05
6	Who Uses Global positioning system?	Remember	CACE803.05
7	What is static GPS?	Understand	CACE803.05
8	What is kinematic GPS?	Remember	CACE803.05
9	Will Gps Be Free In The Future?	Remember	CACE803.05
10	What kind of orbits are the GPS satellites in?	Understand	CACE803.05
11	What is absolute positioning?	Remember	CACE803.05
12	What is Relative positioning?	Understand	CACE803.05
13	What is GPS receiver?	Remember	CACE803.05
14	What is navigation receiver?	Understand	CACE803.05
15	What is Surveying receiver?	Understand	CACE803.05
16	Write about point of intersection	Remember	CACE803.05
17	Write brief notes on Geographical Information System.	Understand	CACE803.05
18	Define the segments in Global Positioning System.	Remember	CACE803.05
19	What is the main function of a total station?	Remember	CACE803.05
20	Explain the term portable GPS.	Understand	CACE803.05
21	What is the basic idea of GPS positioning?	Remember	CACE803.05
22	Explain the term GPS positioning service	Understand	CACE803.05
23	What are the types of GPS receivers?	Remember	CACE803.05
24	What is time system in GPS	Understand	CACE803.05
25	How important is time system in positioning in GPS?	Understand	CACE803.05
Part - B (Long Answer Questions)			
1	Will GPS technology really make much difference to most GIS applications?	Remember	CACE803.05
2	What GIS applications can make the best use of GPS technology? Which application will be affected the least?	Remember	CACE803.05
3	To what extent is the problem of georeferencing a major obstacle to the creation of global GIS?	Understand	CACE803.05
4	What is The Standard Positioning Service?	Understand	CACE803.05
5	What is Nmea 2000?	Understand	CACE803.05
6	What is Nmea 0183?	Remember	CACE803.05
7	Explain Portable Gps?	Understand	CACE803.05
8	What is differential GPS?	Remember	CACE803.05
9	What is The Standard Positioning Service?	Remember	CACE803.05
10	What is Is-95?	Understand	CACE803.05
11	What is Interagency Gps Executive Board?	Remember	CACE803.05
12	What is Gps Modernization?	Remember	CACE803.05
13	How does Gps Work?	Remember	CACE803.05
14	What is the difference between GPS & GIS?	Understand	CACE803.05
15	Explain how GPS can be used in land surveying?	Understand	CACE803.05
16	What do you understand by the term Network adjustment?	Remember	CACE803.05
17	Explain the term: a) GPS observation b) DOP value	Understand	CACE803.05
18	Explain the term: a) Planimetric standard b) Vertical standard c) Positions standards	Remember	CACE803.05
19	In total station how many number of primary axis are considered.	Remember	CACE803.05

20	Explain the term: a) Phase shift method b) Pulsed laser system	Understand	CACE803.05
21	What is the importance of navigation data in GPS?	Understand	CACE803.05
22	Explain the term: a) Space segment b) Control segment c) User Segment.	Remember	CACE803.05
23	Explain in detail about DGPS and RTK method.	Understand	CACE803.05
24	Explain briefly about the different type of error in GPS system.	Remember	CACE803.05
25	Write short notes on a) The reference b) Rover stations c) Baseline solution	Understand	CACE803.05
UNIT - III			
TOTAL STATION(TS) & DIGITAL LAND SURVEYING (DLS)			
Part – A (Short Answer Questions)			
1	What is Total station?	Remember	CACE803.06
2	What is the accuracy of Total station?	Understand	CACE803.06
3	What is EDM in survey?	Understand	CACE803.06
4	What is the least count of Total station?	Understand	CACE803.06
5	What is the least of prism in Total station?	Understand	CACE803.06
6	What is the advantage of GPS in Survey?	Remember	CACE803.06
7	EMD stands for.	Understand	CACE803.06
9	How many types of bench marks are there?	Remember	CACE803.06
10	A stone that marks the boundary is called.	Remember	CACE803.06
11	What are the linear surveying methods?	Understand	CACE803.06
12	Define transit theodolite.	Remember	CACE803.06
13	Which unit in total station processes data collected?	Remember	CACE803.06
14	The bubble in a total station is centralised using	Understand	CACE803.06
15	Which is the latest development in a total station?	Understand	CACE803.06
16	Mention the formula for to calculate horizontal distance if staff held vertical.	Remember	CACE803.06
17	What is long cord in a curve?	Remember	CACE803.07
18	What is meant by Non-transit theodolite?	Understand	CACE803.07
19	What do you understand by term telescope inverted?	Remember	CACE803.07
20	Define the term trigonometric levelling.	Remember	CACE803.07
21	Define axis of level tube in theodolite.	Understand	CACE803.07
22	Define reverse curve and what are the advantages of reverse curve	Remember	CACE803.07
23	List the essential parts of a theodolite.	Understand	CACE803.07
24	Define horizontal axis of theodolite.	Remember	CACE803.07
25	Describe briefly the advantages of electronic theodolite	Understand	CACE803.07
Part - B (Long Answer Questions)			
1	Explain the components used in Total station.	Remember	CACE803.06
2	How does the total station work in surveying.	Understand	CACE803.06
3	How to operate a Total station.	Understand	CACE803.06
4	What are the different models in Total station?	Understand	CACE803.06
5	What are ways to shift a Total station instrument during a survey?	Understand	CACE803.06
6	How Topographic surveys done by Total station?	Remember	CACE803.06
7	Write the procedure for levelling by Total station.	Understand	CACE803.06
8	Write notes on electronic note book.	Remember	CACE803.07
9	Explain the components of electronic note book.	Remember	CACE803.07
10	Write short notes on Reflectors Total stations.	Understand	CACE803.07
11	Explain about GPS Total station.	Remember	CACE803.07

12	Write the procedure for Road (High way) surveying by TS.	Understand	CACE803.07
13	How to calculate horizontal & vertical angles by Total station?	Understand	CACE803.07
14	What is triangulation method?	Remember	CACE803.07
15	What Is Meant By Hydro graphic Survey?	Understand	CACE803.07
16	Describe briefly the advantages of electronic theodolite	Remember	CACE803.08
17	Explain briefly how GPS works to determine the position coordinates.	Understand	CACE803.08
18	Write a brief note on Global Positioning System	Remember	CACE803.08
19	Derive the equation for heights and distances using trigonometric levelling, When bases are accessible and inaccessible.	Remember	CACE803.08
20	What is mean by face left and face right of theodolite? How would you change face? What instrumental errors are eliminated by face left and face right observations?	Understand	CACE803.08
21	Explain the procedure for the reiteration method of measuring horizontal angles	Remember	CACE803.08
22	What are the merits and demerits of total station?	Understand	CACE803.08
23	Derive the equation for heights and distances using trigonometric levelling, when bases are inaccessible.	Understand	CACE803.08
24	State the any two techniques followed in advantage surveying.	Understand	CACE803.08
25	Explain functioning and capabilities of a total station.	Understand	CACE803.08
UNIT - IV			
DIGITAL MAPPING & DIGITAL DATA MANIPULATION (DDM)			
Part – A (Short Answer Questions)			
1	What could be the role of digital maps in education?	Understand	CACE803.08
2	What is the range of medium range EDM?	Understand	CACE803.08
3	Each point entered in a total station is stored in	Understand	CACE803.08
4	The bubble in a total station is centralised using:	Understand	CACE803.08
5	How many types of EDM are there based on the reflector type?	Understand	CACE803.08
6	How many types of chains are used in chain surveying?	Remember	CACE803.08
7	The process of a location of intermediate points on a survey line is:	Understand	CACE803.08
8	The biggest of the survey line is called:	Understand	CACE803.08
9	The book in which chain measurements are entered is called:	Remember	CACE803.08
10	How many types of cross staff are available?	Understand	CACE803.08
11	What is the difference between magnetic north and geographic north is?	Remember	CACE803.08
12	How many links are there in Gunter's chain .	Remember	CACE803.09
14	What is principle of chain surveying?	Remember	CACE803.09
15	How are Survey stations on the ground?	Understand	CACE803.09
Part - B (Long Answer Questions)			
1	What type of Software is used in GPS?	Remember	CACE803.09
2	What are the errors in GPS observables?	Understand	CACE803.09
3	How is GPS data pre-processing?	Understand	CACE803.09
4	IN GPS what is baseline processing?	Understand	CACE803.09
5	What is network adjustment in GPS?	Understand	CACE803.09
6	What is point positioning in GPS data processing?	Remember	CACE803.09
7	How quality assessment of GPS surveying is done?	Understand	CACE803.09
8	Explain parts of Total station.	Remember	CACE803.09
9	What are the Accessories of Total stations?	Remember	CACE803.09
10	How will you do the handling & setting of Total station.	Understand	CACE803.10
11	How will you the distance by Total station?	Remember	CACE803.10
12	Explain the procedure for measuring horizontal angle by Total station.	Understand	CACE803.10
13	Explain the procedure for measuring Vertical angle by Total station	Remember	CACE803.10
14	What are the errors in Total station?	Remember	CACE803.10
15	What is an Edm in Surveying?	Understand	CACE803.10

UNIT 5			
DIGITAL LAND SURVEYING AND MAPPING (DLS&M)			
Part – A (Short Answer Questions))			
1	What is Mapping?	Remember	CACE803.11
2	What is the principle of GPS positioning?	Understand	CACE803.11
3	What are errors present in GPS observables?	Remember	CACE803.11
4	Hydrographic surveys deal with the mapping of what?	Understand	CACE803.11
5	Pantagraph is used for measurement of what?	Understand	CACE803.11
6	The first reading from a level station is called.	Remember	CACE803.11
7	What are geodetic surveys?	Understand	CACE803.11
8	How many Number of links are in a metre length of a chain?	Remember	CACE803.11
9	What is differential levelling?	Remember	CACE803.11
10	Contours of different elevations may cross each other only in the case of.	Understand	CACE803.11
11	Two concave lenses of 60 cm focal length are cemented on either side of a convex lens of 15 cm focal length. The focal length of the combination is.	Understand	CACE803.12
12	Closed contours of decreasing values towards their centre, represent What?	Remember	CACE803.12
13	An imaginary line lying throughout on the surface of the earth and preserving a constant inclination to the horizontal, is called what?	Remember	CACE803.12
14	What is the name of the software that provides most accurate GPS positioning.	Understand	CACE803.12
15	Explain the term topographic map?	Remember	CACE803.12
16	What is the importance of topographic map in Digital land surving.	Remember	CACE803.12
17	What is the method involved for collection of digital field data.	Understand	CACE803.12
18	Explain the term radiation in digital data field.	Remember	CACE803.13
19	How the qualities of GPS field data are judged?	Understand	CACE803.13
20	What are the basic parameters required for establishment of a total station.	Remember	CACE803.13
21	What are the conditions for most accurate GPS positioning.	Remember	CACE803.13
22	What are the steps for GPS data processing for establishment of control points?	Understand	CACE803.13
23	What do you understand by the following term a) WGS84 Cartesian coordinates b) WGS84 Geodetic coordinates	Remember	CACE803.13
Part - B (Long Answer Questions)			
1	What are the basics of vertical representation?	Remember	CACE803.11
2	Explain the term error propagation in digital land surveying and mapping?	Understand	CACE803.11
3	What is survey specifications	Remember	CACE803.11
4	How is contouring done by Total station?	Remember	CACE803.11
5	What are other errors in Total station?	Understand	CACE803.11
6	What are the fundamentals of Mapping?	Remember	CACE803.11
7	Explain the basics of Mapping?	Understand	CACE803.11
8	What is Mapping software?	Remember	CACE803.11
9	What is Automated mapping?	Remember	CACE803.11
10	Explain detail about the working steps in Mapping?	Understand	CACE803.11
11	How to establish a control point?	Remember	CACE803.11
12	Explain the term data preparation in Digital land surveying?	Understand	CACE803.12
13	What is Map making?	Understand	CACE803.12
14	What is detailing of digital land surveying?	Remember	CACE803.12
15	Explain how many location photographs are required (at least) for photogrammetry?	Understand	CACE803.12

16	Explain briefly about inner orientation of camera.	Understand	CACE803.12
17	Define in photogrammetry imaging process?	Remember	CACE803.12
18	What does close range photogrammetry called in computer vision community?	Remember	CACE803.12
19	Explain the fundamental principle of photogrammetry?	Remember	CACE803.12
20	Explain the type of photograph on which the apparent horizon doesn't appear?	Understand	CACE803.13
21	Explain the term photogrammetry.	Remember	CACE803.13
22	Explain briefly which photogrammetry method has topographical mapping as a common application	Remember	CACE803.13
23	Write briefly about the various steps involved in digital map making.	Understand	CACE803.13
24	Write a note on automated mapping.	Remember	CACE803.13
25	Write short note on the following: a) Planning b) Data preparation c) Field survey d) processing	Understand	CACE803.13

Prepared by:
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HOD, CE