K. S. K COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF

CIVIL ENGINEERING

QUESTION BANK

SUBJECT CODE : CE6304 **YEAR/ SEM :** II/ III

SUBJECT NAME :SURVEYING-I

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Question Bank

Subject Name: CE6304 – SURVEYING-I Year/Sem : II/III

UNIT I-INDRODUCTION AND CHAIN SURVEYING
PART-A

1. Define Surveying. What are the fundamental principles of surveying?
2. What is the object or purpose of surveying?
3. Name the different ways of classification of surveys.
4. Differentiate between plane and geodetic surveying.
5. Classify surveying based on the equipments
6. Explain the constructions of a diagonal scale.
7. Define chain surveying. What is the fundamental principle of chain surveying?
8. What is a well-conditioned triangle? What is its specific advantage?.
9. What are the operations involved in chain survey?
10. What are the instruments required for a chain survey?
11. Write the different types of Chain.
12. Differentiate between Gunter's chain and Engineer's Chain
13. Define: (a).Main stations. (b). Subsidiary stations (c). Tie stations
14. Distinguish between a check line and a tie line.
15. What are the instruments used for setting out right angles to a chain line
16. What are offsets? Classify them.
17. What is the use of a line Ranger? 18. What are the stages of fieldwork in chain Surveying?
18. What are the steps involved in chain survey?
19. What are the different tape corrections?
20. What are the errors in chaining?
21. What are the different sources of errors in chain surveying?
22. Enumerate the instruments used for measurement of lengths of survey lines.

Part B

1. Explain the principles of surveying? With a simple sketch state the construction and use of a cross staff (16)
2. a. Explain the different method of ranging with neat sketch. (8)
   b. What are the accessories for a chain survey? Explain the functions of each. (8)
3. How chain can be done on an uneven ground or sloping ground? Point out the advantages and disadvantages of this method. (16)
4. Explain different corrections that can be applied to chain or tape. (16)
5. Explain in details how a chain traversing can be done. (16)
6. The distance between two points measured with a Gunter's chain was found to be 7500 links. The same distance was measured with an Engineers chain and was found to be 4930 feet. If the Gunter's chain was 0.25 Link too short, what was error in engineer's chain? (16)

7.A chain was tested before starting a survey and was found to be exactly 20m and 20cm. The area of the plan drawn to a scale 8cm to 1cm was 220sq.cm. Find the true area of the field. (16)
8.A 30m chain was found to be 0.1m too long after chaining 2400m. If the chain was correct before commencement of the work, find the true distance. (16)
9.A 30m steel tape was standardized on the flat and was found to be exactly 3mm under no pull at 66°F. It was used in catenary to measure a base of 5 bays the temperature during the measurement was 92°F and the pull exerted during the measurement was 10kg. The area of the cross section of the tape was 0.08 sq.cm and the specific weights of steel is 7.86 g/cc. A = 0.0000063 per 1 F and e = 2.109 x 10 kg/sq.cm. Find the true length of the line. (16)
10. A steel exactly 30m long at 18°C when supported throughout its length under a pull of 8 kg, A line was measured with a tape under a pull of 12 kg and found to be 1602 m. the mean temperature during the measurement was 26 C. Assuming the tape to be supported at every 30m, calculate the length of the line, given that cross sectional area of the tape is 0.04 sq.cm, the weight of 1 cc = 0.0077 kg, the coefficient of expansion =0.000012 per 1 C, and the modulus of elasticity = 2.1 x 10 kg / sq.cm (16)

UNIT II-COMPASS SURVEYING AND PLANE TABLE SURVEYING
PART-B

1. Define: Compass surveying. What are the objects of compass surveying?
2. Write the names of the instruments used in chain surveying.
3.Define: (a). True meridian and bearing.
4. What do you understand by Whole circle bearing and quadrantal bearing of a line?
5. Convert the whole circle bearing into reduced bearing: 50^0, 176^0, 210^0, 232^0, 150^0, 76^0, 310^0 ,242^0.
6.Differentiate between Prismatic compass and Surveyor's compass with reference to reading and tripod
7. The fore bearing of a line PQ is N 28^0 W. What is its back bearing?
8. Define: Fore and Back bearing
9.The fore bearing of line AB is $155^0$25'20". Identify the back bearing of the line AB in quadrantal system.
10.Define and distinguish between magnetic dip and magnetic declination. 11. The magnetic bearing of a line is $48^0$24'. Calculate the true bearing
11.The magnetic bearing of a line is S $28^0$30' E. Calculate the true bearing if the magnetic declinations are $5^0$38' East and 5^0 38' West.
12.What is local attraction? What are the sources of local attractions?
13. Distinguish between closed traverse and open traverse
14. What is plane table surveying? When is it preferred? Write its principle.
15.Name four methods of plane surveying.
16. When a three- point problem resorted to in plane table surveying?
17.State the First and second Lehman's rule.
18. What are the Advantages of plane table surveying?
19. some of the errors in plane tabling.

Part – B

1. Explain with neat sketches the different types of compasses. (16)
2. Differentiate prismatic and surveyor compass. (16)

3. How closing error can be adjusted by using graphical method? (16)
4. Examine the following notes on a compass survey for local attraction. Determine correct bearings. Also determine the included angles at A,B,C,D and E. (16)

Station	FB	BB
A	S10°0'W	N85°0'E
B	S77°0'E	N10°0'E
C	N05°0'	N75°0'W
D	N54°0'W	S02°0'
E	S88°0'W	S50°0'

5. The following angles were observed in clockwise direction in an open traverse angle ABC = 124°15', angle BCD = 156°30' angle CDE = 102°0' angle DEF = 95°15' angle EFG = 215°30' magnetic bearing of line AB was 241°30'.what would be the bearing of line FG = ?. (16)
6. Explain different method of plotting a compass traverse? (16)
7. The following are the magnetic bearings of a closed traverse ABCD carried out in an area under the influence of local attraction. Find the correct magnetic bearings, if the magnetic declination for the area is 1°45'E,find also the true bearings. (16)

Line	Magnetic bearing	
	FB	BB
AB	21°14'	202°30'
BC	138°20'	318°20'
CD	202°18'	23°23'
DA	293°41'	111°20'

8. The bearing of one side of a regular pentagon was found to be N300E. Find bearings of other lines. The following angles were observed in clockwise direction in an open traverse angle ABC = 124°15', angle BCD = 156°30' angle CDE = 102°0' angle DEF =95°15' angle EFG = 215°30' magnetic bearing of line AB was 241°30'.what would be the bearing of line FG =?. (16)
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11.Explain radiation method of plane tabling. (16)
12..Explain intersection method of plane tabling. (16)
13.Explain traversing method of plane tabling. (16)
14.Explain two-point problem. (16)
15.Explain three-point problem. (16)
16.Explain strength of fix. (16)

UNIT III-LEVELLING
PART-A

1. Define Levelling. What are the uses of leveling?
2. Define benchmark and reduced level.
3. What are the different kinds of bench marks?
4. What do you mean by datum surface?
5. What is mean by line of collimation and height of collimation?
6.Write the different types of levels.
7.List the essential parts of a Level.
8. Explain the theory of direct leveling
9. Distinguish between differential levelling and reciprocal levelling.
10. Compare height of collimation method and rise and fall method.
11.List out the leveling problems.
12.Define sensitivity of a bubble. State any two factors affecting the same.
13.What is a spire test?
14.Define Contour, contour interval and, horizontal equivalent.
15.. What are the different Characteristics of contour?
16.What are the uses of contours?
17.Write the different formulae to calculate the area of the irregular plate.
18. How do you calculate the capacity of the reservoir from the contour map?

Part – B

1.Explain the different types of levels and staves with neat sketches. (16)
2.a) Mention the differences between height of collimation method and rise and fall method (8)

b) Record the following observations in the form of a leveling field book and obtain the reduced level of the each point. Give the necessary checks.

Reading on inverted staff on point A whose reduced level is 52.345 = 3.565
Reading on staff on point B natural ground = 0.85
Change of instruments position.
Reading on staff on point B on ground = 1.210
Reading on inverted staff on point C = 3.975

Use rise and fall method and height of collimation method. (8)

3. The following consecutive readings were taken along AB with a 4m leveling staff on continuously slowing ground at intervals of 20m :0.34m on A, 1.450,2.630,3.875,0.655,1.745,2.965,3.945,1.125,2.475,3.865 on B.
The elevation A was 60.350. enter the above readings in a level book form and work out RLs by rise and fall method. Also find the gradient of the line AB. (16)

4.Explain, in details, the different types of leveling. (16)

5.Insert the missing enters and rebook by rise and fall method. Apply usual checks. (16)

BS	IS	FS	HI	RL	Remarks
X			279.080	277.650	OBM
	2.010			X	
	X			278.070	
3.370		0.400	X	278.680	
	2.980			X	
	1.410			280.640	
		X		281.370	TBM

6.What is sensitiveness? How is it measured? Explain. (16)

7.The following notes refer to reciprocal levels taken with one level. (16)

Inst.at	Staff Reading on		Remarks
	A	B	
P	1.820	2.740	Dist PQ = 1010m
Q			RL of P = 126.380

Find (a) true RL of Q (b) Combination for curvature and refraction (c) Angular error in collimation adjustment of the inst.
What will be the difference in answers are interchanged?

8.Two points A and B are 1200m apart across a wide river. The following reciprocal levels are taken with one level. (16)

Inst station	Staff reading on	
	A	B
A	1.485	2.365
B	1.035	1.402

The error in the collimation adjustment of the level is +0.008m in 60m. Calculate the true difference of level between A and B and the error due to refraction only

9.In testing a dumpy level for the collimation error, the following observations were obtained.

Level at	Staff readings on		Remarks
	A	B	
C	1.465	2.005	C' Is exactly midway between A &B
D	1.310	1.660	'D' Is midway between A & C and in same St. line as A,C &B. Dist between A &B = 80m

Find out the staff readings on A and B in order that the line of collimation is truly Hl when the instruments was at D. (16)

10. The following reciprocal level were taken during the testing of a dumpy level. (16)

Level at	Staff reading on	
	A	B
A	1.370	2.105
B	1.140	1.765

Is the line of collimation adjustments? Find the true readings.

UNIT IV-LEVELLING AND APPLICATIONS
PART-A

1.What do you mean by Contour Interval.
2.Define Contour.
3.What are the uses of Contours?
4.Lisi out the Characteristics of Contours
5.Name the Factors that affect Contour Interval.
6.Name the methods of locating Contours.
7.Name the Various methods for interpolation of Contours.
8.Define lead.
9.Define Lift.
10.What is Saddle?
11.What is Longitudinal Sectioning?

Part – B

1.Explain the characteristics of contours. (16)
2.Explain the methods of locating contours. (16)
3.Explain the interpolation of contours with neat sketch (16)
4.Explain the uses of contours maps. (16)
5.Explain about the Mass hall Diagrams with neat sketch. (16)
6.Derive the formulas for calculation of areas and Volumes. (16)
7.Drive on expression for simpson's rule and trapezoidal rule. (16)
8.Certain field has three straights sides PQ, QR, RS and an irregular side PS. Calculate the area Of the field from the following data. PQ = 130m, QR =200m, PS = 150m, PR = 230m. Offset taken outwards from PS to the irregular boundary at chain ages 0,30,60,90,120 and 150 Have values 0,3.2,1.6,6.8,4.0 and 0 (16)
9.The following perpendicular offsets were taken at 10 metres intervals from a survey line to a 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 using average ordinate rule, trapezoidal rule and simpson's rule. (16)
10.A railway embankment is 10m wide with side slopes 2:1. Assuming the ground to be level in a direction traverse to the centerline , calculate the volume contained in a length of 150m, the central heights at 30m intervals beings 2.5,3.00,4.00,3.75, and 2.75 respectively. (16)

UNIT V-THEODOLITE SURVEYING

PART-A

1.Define: Theodolite surveying. What are the uses of a theodolite?

2. Why a type of theodolite is called a transit theodolite?

3. List the essential parts of a theodolite.

4. List the essential qualities ofatheodolitetelescope. The essential.parts of the telescope:

6. What are the temporary adjustments of the theodolite?

7.List out the permanent adjustments of Theodolite

8. List out the fundamental lines of Theodolite

9.What is an anallatic lens? What is the use of an anallatic lens?

10. Name the two methods of measuring horizontal angles using a thedolite. When each method is advantageously used?

11. State what errors . are eliminated by repetition method.

12.What are the methods used to plot the traverse.

13.Define closing error.

14. Define: Balancing. What are the methods used to balancing the traverse?

15.Explain the Bowditch's rule in balancing the traverse.

16. What is Gale's table? What is its use?

17. Define: Omitted measurements.

18. What is closed traverse? What are the two checks applicable in this case?

19. Define: Trigonometrical leveling or Heights and Distances.

Part-B

1.The following readings were taken on a vertical staff with a tacheometer fitted with an analytic lens and having a constant of 100. (16)

Staff station	Bearing	Staff readings			Vertical angles
A	47°10'	0.940	1.500	2.060	8°0'
B	227°10'	0.847	2.000	3.153	-5°0'

Calculate the relative level of the ground at A and B and the gradient between A and B.

2.How do you calculate the horizontal and vertical distances between a instrument station and a staff station when the line of collimation is inclined to the horizontal and the staff is held vertically. (16)

3.Explain the procedure of estimating the horizontal and vertical distances where the line of collimation is inclined to the horizontal and the staff is held normal to the line of collimation (16)

4.The following notes refer to a line levelled tacheometrically with an anallatic tacheometer, the multiplying constant being 100: (16)

Inst. station	Height of axis	Staff station	Vertical angles	Hair readings	Remarks
P	1.5	B.M	-6°12’	0.963, 1.515, 2.067	R.L of B.M. = 460.65 m staff held vertically.
P	1.5	Q	7°5’	0.819, 1.341, 1.863	
Q	1.6	R	12°27’	1.860, 2.445, 3.030	

Compute the reduced levels of P.Q and R and the horizontal distances PQ and QR.

5. A tacheometer is setup at an intermediate point at on a traverse course PQ. The Following observations are made on the vertically held staff. (16)

Staff Station	Vertical Angle	Staff Intercept	Axial Hair reading
P	8°36’	2.350	2.105
Q	6°6’	2.055	1.895

The Instrument is fitted with an analytic lens and the constant is 100- compute the length of PQ and R-C of Q that of P being 321.5m.

6.Calculate the horizontal and vertical distances using tangential tacheometry when Both the observed angles are angle of elevation and angle of depression. (16)

7.A theodolite has a tacheometric multiplying constant of 100 and an additive constant of zero. The centre reading on a vertical staff held at point B was 2.292 m when sighted from A. If the vertical angle was +25º and the horizontal distance AB 190.326 m, calculate the other staff readings and show that the two intercept intervals are not equal. Using these values, calculate the level of B if A is 37.950 m angle of depression and the height of the instrument is 1.35 m. (16)

8.Explain the different between tangential and stadia tacheometry. How will you determine the stadia constants? (16)

9.Two points A & B are on opposite sides of a summit. The tacheometer was set up at P on top of the summit, and the following readings were taken. (16)

Inst. station	Height of axis	Staff station	Vertical angles	Hair readings	Remarks
P	1.500	A	-10°	1.150, 2.050, 2.950	RL of P = 450.500m
P	1.500	B	-12°	0.855, 1.605, 2.355	

10. The following observation were made using a tacheometer fitted with an anallatic lens, the multiplying constant being 100. (16)

Inst. station	Height of axis	Staff station	WCB	Vertical angles	Hair readings	Remarks
O	1.550	A	30°30’	4°30’	1.155, 1.755, 2.355	RL of O = 150.00
		B	75°30’	10°15’	1.250, 2.00, 2.750	

Calculate the distance AB, and the RLs of A and B. Find also the gradient of the line AB.

11.Two observations were taken upon a vertical staff by means of a theodolite, the reduced level of its trunnion axis being 160.95. In the case of the first, the angle of elevation was 4°36’ and the staff reading 0.75. In the case of second observation, the staff reading was 3.45 and the angle of elevation 5°48’. Calculate the reduced level of the staff station and its distance from the instrument. (16)

12.A staff was held vertically at distance of 45m and 120m from the centre of a theodolite fitted with stadia hairs and the staff intercepts with the telescope horizontal were 0.447m and 1.193m respectively. The instrument was then set over a station P of R .L 500.25m and the height of the instrument was 1.45m. The hair readings on a staff held vertically at station Q were 1.20, 1.93 and 2.66m while the vertical angle was -9°30’. Find the distance PQ and the RL of Q. (16)

13.Explain the permanent adjustment of theodolite? (16)

14.Explain the parts of theodolite? (16)

15. How horizontal angles are measured using repetition a reiteration method? (16)