

*Note: All questions are compulsory. Marks are indicated against each question in square brackets.*

**Q1. Answer the following briefly. [CO2]**

- (a) Instrument used for chain survey. [0.5]  
 (b) Number of offsets required if road crosses chainline obliquely. [0.5]  
 (c) Operation of fly leveling. [1]  
 (d) Interpretation of the statement that "FB and BB of a line is not equal to 180°". [1]  
 (e) What is horizontal equivalent ? Why horizontal equivalent is not constant in contouring? [1]  
 (f) The FB bearing of a line AB is S 45° 30' E. What will be back bearing of line? [1]

**Q2. From a topographic map, the areas enclosed by contour lines for a proposed dam are given below. Find the capacity of reservoir. [CO3] [2]**

Contours (m)	Area enclosed (hectares)
500	20
505	100
510	400
515	900
520	1100

**Q3. A 20 m chain was found to be 15 cm too long after chaining a distance of 1600 m. it was found to be 30 cm too long at the end of day's work after chaining a total distance of 3200 m. Determine the correct distance if the chain was correct before the commencement of the work. [CO6] [3]**

**Q4. How can you use a contour map to get the inter-visibility between two survey stations? Explain the procedure with neat sketch. [CO1] [4]**

**Q5. The following staff readings were observed successively with a level, the instrument having been moved after fourth and eighth reading:**

2.25, 1.65, 1.85, 2.90, 1.85, 1.20, 0.65, 2.75, 1.55, 2.80 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 at the bench mark of 100 m. [CO4] [4]

**Q6.** Reciprocal levelling was conducted across a wide river to determine the difference in level of points *A* and *B*, *A* situated on one bank of the river and *B* situated on the other. The following results on the staff held vertically at *A* and *B* from level stations 1 and 2, respectively, were obtained. The level station 1 was near to *A* and station 2 was near to *B*.

Level at	Reading on	
	<i>A</i>	<i>B</i>
1	1.485	1.725
2	1.190	1.415

- (a) If the reduced level of *B* is 55.18 m above the datum, what is the reduced level of *A*? [CO4] [2]  
 (b) Assuming that the atmospheric conditions remain unchanged during the two sets of the observations, calculate the combined curvature and refraction correction if the distance *AB* is 315 m. [CO6] [2]

**Q7.** Below down is the contour map highlighted with points A, B, C, D and E. Explain these features. [CO1]

[3]

