


Name: Enrolment No:	
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UPES
End Semester Examination, December 2024

Course: Surveying and Remote Sensing Program: B.Tech in Civil Engineering Course Code: CIVL 2037	Semester: III Time : 03 hrs Max. Marks: 100
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Instructions: Draw neat sketches wherever required. Assume suitable data if necessary.

SECTION A
(5Qx4M=20Marks)

S. No.	List of questions	Marks	CO
Q 1	Draw neat sketches of the following: a. Arrow b. Metric chain c. Spiral curve d. Convex vertical curve	4 x 1	CO1
Q 2	Fill in the blanks: a. _____ = Reflected energy + Absorbed energy + Transmitted energy. b. The relief displacement _____ as the distance from principle point increases. c. If the number of sides resulting in a closed traverse is increased from three to four, the sum of interior angles increases by _____. d. The reduced bearing of a 10 m long line is N30°E. The departure of the line is _____ m.	4 x 1	CO1
Q 3	The latitude and departure of line AB is +78 m and -45.1 m respectively. What is the whole circle bearing of line AB?	4	CO2
Q 4	Define the following terms: a. GIS b. Relief displacement c. Topographical survey d. Bearing	4 x 1	CO1
Q 5	Differentiate between the following: a. L-1 and L-2 carrier waves b. Active and passive remote sensing c. Raster and Vector data model d. Profile levelling and cross-sectioning	4 x 1	CO1

SECTION B (4Qx10M= 40 Marks)												
Q 6	Discuss the working and applications of remote sensing, demonstrating the stages of an ideal remote sensing system.	10	CO2									
Q 7	Describe the different types of GPS positioning approaches, with appropriate figures.	10	CO2									
Q 8	A theodolite was set up at a station P. The angle of depression to a vane 2 m above the foot of a staff held at another station Q was 45°. The horizontal distance between stations P and Q is 20 m. The staff reading at a benchmark S of RL 433.050 m is 2.905 m. Neglecting the errors due to curvature of earth and refraction, estimate the RL of station Q.	10	CO3									
Q 9	Calculate the sag correction for a 30m steel tape under a pull of 100 N in three equal spans of 10m each. Weight of one cubic cm of steel = 0.078 N. Area of cross section of tape = 0.08 sq. cm. OR A section line AB appears to be 20.32 cm on a photograph for which the focal length is 16 cm. The corresponding line measures 2.54 cm on a map which is to a scale of 1:50,000. The terrain has an average elevation of 200 m above mean sea level. Calculate the flying altitude of the aircraft above mean sea level when the photograph was taken.	10	CO3									
SECTION-C (2Qx20M=40 Marks)												
Q 10	<p>a) Two points A and B having elevations of 500 m and 300 m respectively above mean sea-level appear on the vertical photograph having focal length of 20 cm and flying altitude of 2500 m above datum. Their corrected photographic co-ordinates are as follows:</p> <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: left;">Point</th> <th style="text-align: left;">x coordinate</th> <th style="text-align: left;">y coordinate</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">a</td> <td style="text-align: center;">+ 2.65 cm</td> <td style="text-align: center;">+ 1.36 cm</td> </tr> <tr> <td style="text-align: center;">b</td> <td style="text-align: center;">- 1.92 cm</td> <td style="text-align: center;">+ 3.65 cm</td> </tr> </tbody> </table> <p>Determine the length of the ground line AB.</p> <p>b) The scale of an aerial photograph is 1 cm = 100 m. The photograph size is 20 cm x 20 cm. Determine the number of photographs required to cover an area 10 km x 10 km, if the longitudinal overlap is 60% and the side overlap is 25%.</p>	Point	x coordinate	y coordinate	a	+ 2.65 cm	+ 1.36 cm	b	- 1.92 cm	+ 3.65 cm	10 + 10	CO3
Point	x coordinate	y coordinate										
a	+ 2.65 cm	+ 1.36 cm										
b	- 1.92 cm	+ 3.65 cm										
Q 11	The following consecutive readings were taken with a level and a 4.0 m staff on a continuously sloping ground at a common interval of 30 m: 0.780, 1.535, 1.955, 2.430, 2.985, 3.480, 1.155, 1.960, 2.365, 3.640, 0.935, 1.045, 1.630, and 2.545. The reduced level of the first point A was 180.750 m. Rule out a page of a level field book and enter the above readings. Analyze and calculate the reduced levels of the points by both the height of collimation method and the rise and fall method. Also perform the required checks.	20	CO4									

OR

Design a simple circular curve with the deflection angle between both tangents as 60° , and radius of 400m by estimating T , L , L_c , M and E , and determining the chainages of PC and PT if the chainage of $PI = 3 + 463.2$.