

Name:

Enrolment No:



**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**

**End Semester Examination, December 2018**

**Course: Route Surveying and planning (CIVL 7001)**

**Semester: I**

**Programme: M Tech Pipeline Engineering**

**Time: 03 hrs.**

**Max. Marks: 100**

**Instructions:**

**SECTION A**

S. No.		Marks	CO
Q 1	Define profile leveling and sketch the same.	4	CO1
Q 2	Differentiate between Whole circle bearing system and Reduced bearing system.	4	CO2
Q 3	How to use the upper plate of a theodolite.	4	CO3
Q 4	Differentiate between moving hair and fixed hair methods of tachometry.	4	CO4
Q 5	Define tangent length of curve and how is it derived?	4	CO5

**SECTION B**

Q 6	The following readings were noted while doing leveling, draw the level field book and find the Xs,							<b>10</b>	<b>CO1</b>	
	Station	BS	IS	FS	Rise	Fall	RL			Remarks
	A	0.345					100.00			
	B	1.350		X1		0.750	X5			
	C		X2		0.350		X6			
	D		X3			1.260	X7			
E			X4	0.450		X8				
Q 7	The included angles of a traverse are given below. Find the bearings of the other lines and the deflection angles at the stations for plotting. Bearing of AB=S45°00'E, angle A= 101°48', angle B= 95°30', angle C = 75°15', angle D = 87° 27'.							<b>10</b>	<b>CO2</b>	
Q 8	Find the length and bearing of line BC from the partial data available for traverse ABCDA.							<b>10</b>	<b>CO3</b>	
	Line	AB	BC	CD	DA					
	Length (m)	24.8	185.5	35.24	203.1					
	Bearing	N 3°45' E	N 78 ° 40' E	Missing	missing					
Q 9	The vertical angle of depression was 6° 06'. From the same set up, the reading on a staff held at BM of RL 926.55 was 2.005 m. A tachometer was kept at a station P and observations were made to a staff held vertically at Q. the cross hair readings 1.705, 1.805 and 2.705. Find the horizontal distance PQ and the RL of point Q. K=100 and C=0							<b>10</b>	<b>CO4 , CO5</b>	

	<b>(OR)</b> The tangent length of a $5^\circ$ circular curve is 42.35 m. determine the deflection angle, apex distance and the length of long chord																	
<b>SECTION-C</b>																		
Q 10	The following staff readings were observed in sequence: 2.325, 3.605, 2.385, 2.635, 1.655, 2.085, 3.125 and 0.555. The instrument was shifted after the 2 <sup>nd</sup> and 4 <sup>th</sup> readings. The fifth reading was taken to an arbitrary benchmark of elevation 50.000. Find the reduced levels of all other points. Apply usual checks	<b>20</b>	<b>CO1</b>															
Q11	<p>A curve of radius 200 m and deflection angle <math>45^\circ</math> was to be set from offsets from the chords produced. The chainage of the first tangent point is 104.35 m. calculate the first five offsets from the chords produced to set out the curve. [10]</p> <p>Line AB is along the north direction and line BC has a bearing of <math>121^\circ 30'</math>. A curve has to be set tangential to a point 125 m from B along BA and also tangential to BC. Tabulate the radial offsets from the tangents to set out the curve. [10]</p> <p><b>(OR)</b></p> <p>The RL of the BM was 130.450. The instrument constants were 100 and 0.2. To determine the elevation of a point P, a tachometer was set up at station A and observations were made to a staff held vertically at P. As a check, the instrument was set up at another B and observations were taken to a staff held at P. Determine the RL of P from the following data recorded.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Instrument at</th> <th style="text-align: center;">Staff at</th> <th style="text-align: center;">Vertical Angle</th> <th style="text-align: center;">Hair Readings</th> <th style="text-align: center;">Readings at BM</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><b>A</b></td> <td style="text-align: center;"><b>P</b></td> <td style="text-align: center;"><b><math>3^\circ 35'</math></b></td> <td style="text-align: center;"><b>1.205, 1.705, 2.305</b></td> <td style="text-align: center;"><b>1.75</b></td> </tr> <tr> <td style="text-align: center;"><b>B</b></td> <td style="text-align: center;"><b>P</b></td> <td style="text-align: center;"><b><math>2^\circ 35'</math></b></td> <td style="text-align: center;"><b>0.905, 1.400, 2.005</b></td> <td style="text-align: center;"><b>2.25</b></td> </tr> </tbody> </table>	Instrument at	Staff at	Vertical Angle	Hair Readings	Readings at BM	<b>A</b>	<b>P</b>	<b><math>3^\circ 35'</math></b>	<b>1.205, 1.705, 2.305</b>	<b>1.75</b>	<b>B</b>	<b>P</b>	<b><math>2^\circ 35'</math></b>	<b>0.905, 1.400, 2.005</b>	<b>2.25</b>	<b>20</b>	<b>CO4, CO5</b>
Instrument at	Staff at	Vertical Angle	Hair Readings	Readings at BM														
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**Instructions:**

**SECTION A**

S. No.		Marks	CO
Q 1	What are the different chains used in surveying.	4	CO1
Q 2	Convert the following WCB values to RB values 45°,134°,278°,234°.	4	CO2
Q 3	Derive the distance for an inclined line of sight with an angle of depression $\alpha$ using tachometry.	4	CO3
Q 4	Explain the procedure for finding vertical angles using theodolite.	4	CO4
Q 5	What is a compound curve draw sketch.	4	CO5

**SECTION B**

Q 6	The roof has an RL of 100.45 with an inverted staff reading of 2.015, if the staff reading on the floor is 0.925, find the RL of the floor, and also the room height.	10	CO1																							
Q 7	Find the points of local attraction and correct them. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Line</th> <th>FB</th> <th>BB</th> </tr> </thead> <tbody> <tr> <td>AB</td> <td align="center">34°</td> <td align="center">214°</td> </tr> <tr> <td>BC</td> <td align="center">125°</td> <td align="center">304°</td> </tr> <tr> <td>CD</td> <td align="center">245°</td> <td align="center">64°</td> </tr> <tr> <td>DA</td> <td align="center">345°</td> <td align="center">157°</td> </tr> </tbody> </table>	Line	FB	BB	AB	34°	214°	BC	125°	304°	CD	245°	64°	DA	345°	157°	10	CO2								
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AB	34°	214°																								
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Q 8	If the radius of the curve is 300 mt and the deflection angle 30° find the tangent length, length of chord.	10	CO5																							
Q 9	Find the missing values of the following traverse <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Line</th> <th>Length</th> <th>Bearing</th> </tr> </thead> <tbody> <tr> <td>AB</td> <td align="center">115</td> <td align="center">35°</td> </tr> <tr> <td>BC</td> <td align="center">60</td> <td align="center">145°</td> </tr> <tr> <td>CD</td> <td align="center">95</td> <td align="center">missing</td> </tr> <tr> <td>DA</td> <td align="center">145</td> <td align="center">missing</td> </tr> </tbody> </table> <p><b>(OR)</b></p> <p>The following readings were taken using tachometry find the constants.</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Instrument at</th> <th colspan="3">Stadia readings</th> </tr> </thead> <tbody> <tr> <td>A</td> <td align="center">0.450</td> <td align="center">0.900</td> <td align="center">1.350</td> </tr> </tbody> </table>	Line	Length	Bearing	AB	115	35°	BC	60	145°	CD	95	missing	DA	145	missing	Instrument at	Stadia readings			A	0.450	0.900	1.350	10	CO3, CO4
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B	0.500	1.000	1.500		
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**SECTION-C**

Q 10 Some observations are missing from the page of a field book shown below. Find the missing readings from the available data .

Staff Station	Back sight	Intermediate sight	Fore sight	Rise	Fall	RL	Remarks
A						100.90 5	
B		3.050		0.250			
C	1.35		2.150				
D		1.25					
E		3.45					
F						101.61	

**20 CO1**

Q11 A simple circular curve has a radius 600 m and a deflection angle of 25°. Tabulate the ordinates from the chord to set out the curve, using offsets from long chord and radial offsets method (assume all data necessary)

**(OR)**

To determine the elevation of a point P, a tachometer was set up at station A and observations were made to a staff held inclined at P. As a check, the instrument was set up at another B and observations were taken to a staff held at P. The RL of the BM was 140.455. The instrument constants were 100 and 0.3. Determine the RL of P from the following data recorded.

**20 CO4, CO5**

Instrument at	Staff at	Vertical Angle	Hair Readings	Readings at BM
<b>A</b>	<b>P</b>	<b>3° 45'</b>	<b>2.35, 2.95, 3.55</b>	<b>0.85</b>
<b>B</b>	<b>P</b>	<b>4°30'</b>	<b>0.45, 1.90, 2.35</b>	<b>1.05</b>