END TERM EXAMINATION

THIRD SEMESTER [B.Tech] DECEMBER 2015

Paper Code: ETCE-209	Subject: Surveying
Time: 3 Hours	Maximum Marks: 75

Note: Attempt any five questions including Q. no. 1 which is compulsory.

Q1 Answer the following:-

(a) What are different sources of error in chain surveying? Explain with one example of each. **(3)**

(b) What do you understand by degree of accuracy? Discuss various methods of expressing degree of accuracy. **(3)**

(c) Explain different methods of chaining on sloping ground? Discuss the advantages of each method? **(3)**

(d) The true bearing of a tower as observed from a station A is 350° 30' and the magnetic bearing of the tower is 2° 30'. The back bearing of the line AB when measured with same prismatic compass was found to be 330° 30'. What is the true bearing of line AB? **(3)**

(e) What are the effects of curvature of the earth and refraction on the accuracy of leveling? Derive an expression for the corrections due to both the effects. **(3)**

(f) Find the distance to the visible horizon from the top of a light house 50m high. What is the dip of horizon? Take radius of the earth equal to 6370km. **(3)**

(g) The line of sight is not perpendicular to the horizontal axis in a vernier transit theodolite. How can you adjust it? **(3)**

(h) Derive the relationship $\delta = 1718.9C/R$; where δ is the tangential angle of the chord of length C and R is the radius of the curve. **(3)**

(i) What is a satellite station? How would you reduce the horizontal angles? **(3)**

Q2 (a) Determine the correct length of a line reduced to the mean sea level when the recorded length with a tape hanging in centenary at a tension of 85N and at a temperature of 25°C is 30.073m. The difference between the ends is 0.42m and the site is 2000m above sea level.
The tape had been previously standardized in centenary at a tension of 50N and at a temperature of 28°C, and the distance between zeros was 30.037m. Weight of tape= 7N; cross sectional areas = 3.9mm²; Coefficient of expansion= 1.15x10⁻⁵per°C; Young's modulus= 200Gpa; Radius of earth= 6370km. **(5)**

(b) Below are the bearings observed in a traverse survey conducted with a prismatic compass at a place where local attraction was suspected?

Line	FB	BB
PQ	124° 30'	304° 30'
QR	68° 15'	246° 00'
RS	310° 30'	135° 15'
SP	200° 15'	17° 45'

At what stations do you suspect local attraction? Find the corrected bearings of the lines and also calculate the included angles. **(7)**

Q3 (a) A distance of 2000m was measured by a 30m chain. Late on it was detected that the chain was 0.1m too long. Another 500m (i.e. total 2500m) was measured and its was detected that the chain was 0.15m too long. If the length of the chain in the initial stage was correct, determine the exact length that was measured. **(5)**

(b) The following consecutive readings were taken with a dumpy level and a 4m leveling staff on continuously sloping ground at 30m intervals.
0.680, 1.455, 1.855, 2.330, 2.885, 3.380, 1.055, 1.860, 2.265, 3.540, 0.835, 0.945, 1.530, 2.250.
The R.L. of the starting point was 85.750m.
(i) Rule out a page of level book and enter the above readings.
(ii) Determine the gradient of line joining the first and last point. **(7)**

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Q4 (a) Discuss the procedure of testing of a vernier transit theodolite for checking the permanent adjustments and making the adjustments, if necessary. **(7)**

(b) Discuss the characteristics of contours. Give suitable examples. What are the advantages of direct contouring over indirect contouring? **(5)**

Q5 (a) What is orientation? What are different methods of orientation of a plane table? Discus the trial and error method for solution of three point problem. **(5)**

(b) With a tacheometer stationed at P, sights were taken on three points A, B and C as follows:

Ins. Stn.	To	Vertical angle	Stadia readings	Remarks
P	A	-4° 45'	2.405, 2.705, 3.005	R.L. of A= 107.08m; staff held normal
	B	00° 00'	0.765, 1.070, 1.375	R.L. of B=113.41m; staff held vertical
	C	+2° 45'	0.720, 1.700, 2.680	Staff held normal

The instrument was fitted with an anallatic lens; the constant of instrument is 100. Calculate the distance of A, B and C from P. Also find vertical intercept of A, B and C from trunion axis. **(7)**

Q6 (a) Describe the method of setting out curve by linear method (Perpendicular offsets from tangent). **(5)**

(b) Two straights T_1V and VT_2 are intersected by a third line AB. The angles VAB and VBA are measured to be 27° 45' and 35° 55', and the distance AB= 358m. Calculate the radius of the simple circular curve which will be tangential to the three lines T_1A, AB and BT_2 and the chainages of point of curve, and point of tangency if the chainage of V= 6854.5m. **(7)**

Q7 (a) Enumerate and derive the expressions for various elements of a reverse curve with help of a neat sketch. **(5)**

(b) Calculate the chainages at the beginning and at the end of a broad gauge railway track when it deflects through an angle of 30° with a centre line radius of 300m. Also set out a transition curve using a unit chord of 10m. Take, α=0.3m/sec³; V=60km/hr and chainage of intersection point is 1400.00m. **(7)**

Q8 (a) An observer standing on the deck of a ship just sees the top of a light house which is 50m above the sea level. If the height of observer's eye is 6m above the sea level, determine the distance of the observer from the light house. **(5)**

(b) From an eccentric station S, 13.25meters to the west of the main station, the following angles were measured:
∠BSC = 76° 32' 30"; ∠CSA = 54° 25' 20"
The stations S and C are to the opposite sides of the line AB. Calculate the correct angle ABC if lengths AB and BC are 5280.5m and 4930.2m respectively. **(7)**

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