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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
Third semester B.Tech degree examinations (S) September 2020



Course Code: CE207

Course Name: SURVEYING

Max. Marks: 100

Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks.

Marks

- 1 a) Explain with sketch, ranging a line if the end stations are not intervisible. (7)
- b) The following bearings were observed on a compass traversing. At what stations do you suspect local attraction? Find the true bearings if declination was $1^{\circ}30'$ W. (8)

Line	FB	BB
AB	$80^{\circ}45'$	260°
BC	$130^{\circ}30'$	$311^{\circ}35'$
CD	$240^{\circ}15'$	$60^{\circ}15'$
DA	$290^{\circ}30'$	$110^{\circ}10'$

- 2 a) Differentiate (7)
- (i) declination and dip
- (ii) latitude and departure
- (iii) contour interval and horizontal equivalent
- b) The following consecutive readings were taken with a dumpy level and a 4m levelling staff on a continuously sloping ground on a straight line at a common interval of 30 m. 0.855 (on A), 1.545, 2.335, 3.115, 3.825, 0.455, 1.380, 2.055, 2.855, 3.455, 0.585, 1.015, 1.850, 2.755, 3.845 (on B). The RL of A was 380.500m. Make a level field book and calculate the reduced levels of points using Height of Instrument method and apply usual checks. Determine the gradient of line AB. (8)
- 3 a) Explain how the error due to curvature, refraction and collimation are eliminated in reciprocal levelling. (7)
- b) Define contour. Explain the characteristics of contour with sketches. (8)

PART B*Answer any two full questions, each carries 15 marks.*

- 4 a) How will you measure horizontal angle using theodolite by repetition method and reiteration method? (7)
- b) A railway embankment is 9 m wide at formation level, with side slope of 2 to 1. Assuming the ground to be level transversely, calculate the volume of the embankment in cubic metres in a length of 180 m, the centre heights at 30 m intervals being 0.6, 0.8, 1.5, 1.8, 0.75, 0.3 and 0.67 m respectively. Use prismoidal formula. (8)
- 5 a) List down the criteria to be followed for the selection of triangulation figures. (5)
- b) What is meant by satellite station and reduction to centre? Derive expression for reducing angles measured at a satellite station positioned to the right side of the original triangulation station. (10)
- 6 a) Define Mass haul diagram. Draw a mass haul diagram to explain the characteristics of it. (7)
- b) Two triangulation stations A and B are 70 km apart and have elevations 250 m and 290 m respectively. Find the minimum height of signal required at B so that the line of sight may not pass near the ground than 2 m. The intervening ground C, 40 km from A may be assumed to have a uniform elevation of 200 m. (8)

PART C*Answer any two full questions, each carries 20 marks.*

- 7 a) Explain the principle of least squares. (8)
- b) Find the most probable value of the angles A, B and A+B from the following observations using the method of normal equations (12)
- A = $42^{\circ}20'30.4''$ weight 1
- B = $36^{\circ}18'25.2''$ weight 2
- A+B = $78^{\circ}38'50.3''$ weight 3
- 8 a) Define (8)
- (i) Weight of observation
- (ii) Most probable value
- (iii) True error
- (iv) Residual error



- (v) True value
 - (vi) Observed value
 - (vii) Observed equation
 - (viii) Conditioned equation
- b) What is the principle of Electromagnetic distance measurement? Explain any one instrument based on this principle. (12)
- 9 a) Explain the possible errors in total station surveying. (8)
- b) Define the following terms in astronomy: (12)
- (i) Celestial sphere
 - (ii) Celestial horizon
 - (iii) Observers meridian
 - (iv) Vertical circle
 - (v) Prime vertical
 - (vi) Hour circle
 - (vii) Declination circle
 - (viii) Zenith and nadir
