Reg. No._____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER B.TECH DEGREE EXAMINATION, JANUARY 2017

Course Code**: CE 207**

Course Name**: SURVEYING (CE)**

Max. Marks: 100 Duration: 3 Hours

PART A

(Answer Any Two Full Questions)

1. (a) What are the general principles of surveying? Differentiate between plane and geodetic surveying. (7.5)

   (b) Define contour and explain any six characteristics of contours. (7.5)

2. (a) Distinguish between fore bearing and back bearing. How are they related with each other? (2.5)

   (b) The magnetic bearing of a line at a station point was found as 187°. It was found that the station was affected by local attraction. The local attraction at the station rotates the magnetic needle 2° anticlockwise from its meridian. Calculate correct magnetic bearing of the line. Estimate true bearing of the line if the magnetic declination at the station is 4°E. (5)

   (c) The following readings were taken with a dumpy level and a 4 m levelling staff on a continuously sloping ground at 30m intervals.

   0.685,1.455,1.850,2.330,2.885,3.380,1.055,1.860,2.265,3.540,0.835,0.945,1.530 and 2.250. The reduced level of the first point is 80.750. Rule out a page of a level book and enter the above readings. Determine RLs of all points using height of instrument method. Determine the gradient of the line joining the first and last point. (7.5)

3. (a) What is meant by local attraction? How do you apply correction to it? How does it affect the computation of included angles? (7.5)

   (b) What is reciprocal levelling? How it is accomplished? In reciprocal levelling between two stations A and B the level was set up near A and the staff readings on A and B were 2.645 and 3.220 m respectively. The level was then moved and set up near B, the respective staff readings on A and B were 1.085 and 1.665. Find the true difference in level between A and B. (7.5)

PART B

(Answer Any Two Full Questions)

4. (a) State Simpson's rule and Trapezoidal rule for computation of area. A series of offsets were taken at 3m intervals in the following order from a chain line to a

curved boundary 2.16, 1.53, 1.80, 1.98, 1.80, 1.59, 1.80, 2.52, 2.43, 2.40, 2.58, 2.70, 2.91, and 3.06 meters. Find the area between the chain line, curved boundary and the end offsets by simpson's rule and trapezoidal rule. (7.5)

(b) How do you determine the intervisibilty of triangulation stations? (7.5)

5. (a) Explain Mass diagram and its characteristics features. (7.5)

(b) The altitudes of two proposed stations A and B, 80 km apart are respectively 225m and 550 m. The intervening obstructions situated at C, 40 km from A has an elevation of 285m. Ascertain if A and B are intervisible. And if necessary find how much B should be raised so that the line of sight must nowhere be less than 3m above the surface of the ground. (7.5)

6. (a) Explain how would you measure with a theodolite (i) Horizontal Angle by repetition and (ii) Vertical Angle (7.5)

(b) What is meant by satellite station and reduction to centre. From an eccentric station S, 13 metres to the west of the main station B, the following angles were measured. Angle BSC= 75°25'32", Angle CSA = 55°32'20''. The stations S and C are to the opposite sides of the line AB. Calculate the correct angle ABC if the lengths AB and BC are 5288m and 4940m respectively. (7.5)

PART C

(Answer any Two Full Questions)

7. (a) Explain the terms (i) Celestial sphere ii) Astronomical Triangle iii) Declination iv) Hour Angle v) Right Ascension (10)

(b) Explain any five laws of weights established from the method of least squares. (10)

8. (a) Explain the principle behind electro magnetic distance measurement. (5)

(b) Explain the characteristics of EDM instruments. (5)

(c) The following are the mean values observed in the measurement of three angles A, B, C at one station

A =86°42'46.2'' with weight 4 A+B =134°36°33.6'' with weight 3

A+B+C =262°18'10.4'' with weight 1 B+C =185°35'24.8'' with weight 2

Calculate the most probable value of A, B and C. (10)

9. (a) Explain the principle behind the measurement of horizontal angle, vertical angle and slope distance using total station. (10)

(b) How will you determine probable error of computed quantities? (10)

Reg. No._____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER B.TECH DEGREE EXAMINATION, JULY 2017

Course Code**: CE 207**

Course Name**: SURVEYING (CE)**

Max. Marks: 100 Duration: 3 Hours

PART A

Answer Any Two Full Questions.

1. (a) Write the primary classification of survey and distinguish between them. (3.5)

   (b) What is a well conditioned triangle? Why is it preferred in surveying? Examine whether a triangle having sides 80m,60m and 40m is a well conditioned triangle or not. (4)

   (c) Explain how reciprocal levelling eliminates the effect of atmospheric refraction and earth's curvature. (4)

   (d) A level is set up at O on a line AB 50m from A and 1400m from B. The staff reading on A is 0.585 m and that on B is 3.695 m. Find the true level difference between A and B. (3.5)

2. (a) Explain the term Ranging of a line. Describe how you would range a chain line between two points which are not intervisible. (7.5)

   (b) The following readings refer to reciprocal levels taken with one level.

Instrument Near	Staff Reading on (metres)		Remarks
	P	Q	
P	1.825	2.745	Distance PQ=1010m
Q	0.925	1.605	RL of P =126.36

   Find i) the true RL of Q ii) Combined Correction for curvature and refraction. (7.5)

3. (a) The following bearings were taken in running a compass survey.

Line	Fore Bearing	Back bearing
AB	124°30'	304°30'
BC	68°15'	246°0'
CD	310°30'	135°15'
DA	200°15'	174°45'

   At what stations do you suspect local attraction? Find the correct bearings of the lines and also compute the included angle. (7.5)

(b) Define i) Contour ii) contour Interval iii) Contour Gradient iv) Horizontal Equivalent. (4)

(c) Explain the factors affecting the choice of contour interval. (3.5)

PART B

Answer any Two Full questions.

4. (a) Volume of earth work is to be calculated for a railway embankment 12m wide with side slope 1.5:1. Assuming the ground to be level in a direction transverse to the centre line, calculate the volume contained in a 180m length, the centre heights at 30m intervals in meters as 0.70,1.20,1.75,1.45,1.20,0.95,0.65 using a) prismoidal rule and b) trapezoidal rule. (7.5)

(b) Explain the steps in ascertaining the intervisibility between triangulation stations. (7.5)

5. (a) What is meant by eccentricity of signal? How would you correct the observation when made upon an eccentric signal? (7.5)

(b) The following table gives the latitudes and departures in metres of the sides of a closed traverse ABCDEA

Side	Latitude		Departure	
	N	S	E	W
AB	2.28			13.80
BC	7.55		2.70	
CD		2.37	7.50	
DE	1.23		5.40	
EA		8.69		1.80

Calculate the area of the traverse by latitude and meridian distance method and latitude and double meridian distance method. (7.5)

6. (a) Define the following terms:

i) Mass haul diagram ii) free haul and over hauliii) Lead and lift. (7.5)

(b) Two triangulation stations A and B are 70km apart and have elevations 250m and 290m respectively. Find the minimum height of signal required at B so that line of sight may not pass near the ground than 2 metres. The intervening ground may be assumed to have a uniform elevation of 200m. (7.5)

PART C

Answer any Two Full Questions.

7. (a) the following are the observed values of an angle:

Angle	Weight
50°20'20"	2
50°20'22"	2
50°20'19"	3

Find i) Probable error of single observation of unit weight.

ii) Probable error of weighted arithmetic mean.

iii) Probable error of single observation of weight 3. (10)

(b) Explain the following terms

i) Celestial sphere, ii) Zenith and Nadir iii) Observer's Meridian

iv) Hour Circle and Hour angle v) Declination and Polar distance (10)

8. (a) Form the normal equations for x, y and z in the following equations of equal weight.

$4x+3y+z=4$

$x+3y+2z=6$

$4x+y+4z=22$

If the weights of the above equations are 2,3 and 1 respectively, form the normal equations for x,y,z. (10)

(b) What is meant by modulation? Explain the different methods of modulation with examples of EDM instruments that use these modulation methods. (10)

9. (a) The following observations of three angles A, B, C were taken at one station

A= 83°24'6.8"	with weight 3
B=55°09'54.2"	with weight 2
C= 110°09'28.9"	with weight 2
A+B= 138°34'3"	with weight 2
B+C = 165°19'22.1"	with weight 1
A+B+C= 248°43'30.9"	with weight 1

Determine the most probable value of each angle by method of differences. (10)

(b) Explain the steps to be followed for the set up of a total station over a point during field work. (10)

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Total Pages: 2

Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2017

Course Code: CE207

Course Name: SURVEYING (CE)

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks.

Marks

1 a) Define the terms; i) Base line ii) Check line iii) Tie line (3)

b) Explain the different types of bearings. (4)

c) The following readings were taken in a running closed compass traverse. (8)

Line	FB	BB
AB	49 °55’	230 °00’
BC	177 °45’	356 °00’
CD	104 °15’	284 °55’
DE	165 °15’	345 °15’
EA	259 °30’	79 °90’

i) State the stations which were affected by local attraction.

ii) Determine the corrected bearings

iii) Calculate the true bearings if the declination was 1° 30’ W.

2 a) Explain the process of Profile levelling and Cross sectioning levelling. (7.5)

b) The following consecutive readings were taken with a level and 5m levelling staff on a continuously sloping ground at a common interval of 30m. 0.375 (on Q); 1.030; 1.825; 2.935; 3.630; 4.785; 0.625; 2.105; 3.110; 4.485 (on R). Assume Reduced level of first point as 208.125m.Make up level page book, Calculate the reduced levels of all the points by collimation method and apply usual checks. Also find the gradient of QR. (7.5)

3 a) What are the different methods of orientation in plane table surveying? (7.5)

b) What do you mean by Contouring? Describe the methods of contouring with its merits and demerits. (7.5)

PART B

Answer any two full questions, each carries 15 marks.

4 a) Define Mass Diagram. Describe its characteristics (7.5)

b) Describe the methods of computation of volume by i) Average end formula and ii) Prismoidal formula (7.5)

5 a) What is transit theodolite and what are the temporary adjustments in Theodolite? (7.5)

b) Explain the method of observing the horizontal angle by the method of repetition and reiteration in triangulation survey. What are the errors eliminated by the method of repetition? (7.5)

6 a) Explain the terms; (7.5)

i) Satellite stations ii) reduction to centre ii) Opaque Signals

b) The following perpendicular offsets were taken at 10m intervals from a survey line AB to an irregular boundary line: 2.50, 3.80, 4.33, 6.76, 5.30, 7.25, 8.95, 8.25 and 5.50.Calculate the area in sqm, enclosed between the survey line, the irregular boundary ,the first and the last offsets by i) Simpsons rule ii)the trapezoidal rule iii) the average ordinate rule (7.5)

PART C

Answer any two full questions, each carries 20 marks.

7 a) Explain the terms; (10)

i) Azimuth ii) Zenith and nadir iii) Polar distance

iv) Celestial sphere v) Co-altitude

b) What are the advantages and applications of Total Station? (10)

8 a) State the fundamental principle of the method of least squares and describe how to determine the most probable value in direct observations of equal weights? (4)

b) The following are the condition equations of different weights. Construct the normal equations for x, y and z. (6)

$4x + 2y + z - 11 = 0$, wt:3

$3x + 3y + 2z - 9 = 0$, wt:2

$5x + y + 3z - 16 = 0$, wt:4

c) Explain the principle of Electromagnetic Distance Measurement and describe the types of EDM instruments? (10)

9 a) What are the errors in Total Station survey? (4)

b) What are the fundamental parameters that can be measured using Total Station? (6)

c) Explain the laws of weights established from the method of least squares. (10)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER B.TECH DEGREE EXAMINATION, APRIL 2018

Course Code: CE207

Course Name: SURVEYING (CE)

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks Marks

1 a) Explain the principle of levelling with a neat sketch. (4)

b) Define the different types of survey stations and survey lines. (5)

c) Define Orientation. What are the different methods of orientation adopted in graphical method of surveying? (6)

2 a) Define contour. What are the factors affecting selection of contour interval? (7)

b) The following bearings were observed in traversing, with a compass, an area where local attraction was suspected. Find the amounts of local attraction at different stations, the correct bearings of lines and the included angles. (8)

Line	F.B.	B.B.
AB	68˚15’	248˚15’
BC	148˚45’	326˚15’
CD	224˚30’	46˚00’
DE	217˚15’	38˚15’
EA	327˚45’	147˚45’

3 a) How are bearings designated? Distinguish between them. (6)

b) The following consecutive readings were taken with a level and a 4m levelling staff on a continuously sloping ground at common intervals of 30m. (9)

8.855 (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 entries in a level field book and apply the usual checks. Determine the gradient.

PART B

Answer any two full questions, each carries 15 marks

4 a) State Simpson’s rule and trapezoidal rule for computation of area. (3)

b) What is meant by triangulation figures? Explain each with neat sketches. (5)

c) The elevation of two triangulation stations A and B, 100 km apart, are 180 m and 450 m respectively. The intervening obstruction situated at C, 75 km from A, has an elevation of 259 m. Ascertain if A and B are intervisible. If not, by how much B should be raised so that the line of sight must nowhere be less than 3 m above the surface of the ground, assuming A as the ground station. (7)

5 a) Explain the construction and characteristics of mass diagram. (5)

b) A road at a constant RL of 180.00 m runs North to South. The ground East to West is level. The surface levels along the centre line of the road are as follows: (10)

Chainage (m) 0 30 60 90 120 150 180
Level (m) 183.5 182.45 182.15 181.55 180.95 182.05 180.8
Compute the volume of cutting using Trapezoidal formula and Prismoidal formula. Given that the width of formation level is 8m and the side slopes 1.5 to 1.

6 a) List the factors which determine the inter-visibility between triangulation stations. (5)
b) List the temporary adjustments of a theodolite. (5)
c) Explain the horizontal angle measurement procedure. (5)

PART C

Answer any two full questions, each carries 20 marks

7 a) Explain any five laws of weights. (5)
b) Define the following terms: (10)
i) Observer's meridian ii) Zenith distance iii) Azimuth
iv) Declination v) Hour circle
c) Explain the advantages of total station survey. (5)

8 a) The following are the mean values observed in the measurement of three angles A, B and C at one station. (13)
A = 76˚42'46.2" with weight 4, A+B = 134˚36'32.6" with weight 3
B+C = 185˚35'24.8" with weight 2, A+B+C = 262˚18'10.4" with weight 1
Calculate the most probable value of each angle.
b) Define modulation and explain the different methods of modulations. (7)

9 a) Define the term 'most probable value'and explain the method of finding least squares. (10)
b) What is meant by EDM instruments? Explain different types of EDM instruments with examples (10)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

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) What is Ranging and explain types of ranging (6)

b) Explain the principle of chain surveying (4)

c) Explain survey stations and various survey lines in chain surveying (5)

2 a) Define Orientation and what are the methods of orientation (7)

b) The following bearings were observed in traversing with a compass, an area where local attraction was suspected. Find the correct bearings of lines (8)

Line	FB	BB
AB	292°15’	111° 45’
BC	221°45’	41° 45’
CD	90°05’	270° 0’
DE	80°35’	261° 40’
EA	37°0’	216° 30’

3 a) What are the characteristics and uses of contour (7)

b) The following consecutive readings were taken with a level and 4m levelling staff on a continuously sloping ground at common interval of 20m.

0.602,1.234,1.860,2.574,3.450,0.235,1.285,2.820,3.255,0.525,1.824,2.722,2.985.The reduced level of the first point was 228.225m. Calculate the reduced levels of the points and also find the gradient of the line joining first and last points (8)

PART B

Answer any two full questions, each carries 15 marks.

4 a) Define Triangulation surveying and explain its classifications. (7)

b) From a satellite station O, 6 metres from the main triangulation station P,the following directions were observed

P = 0° 0’0”, Q =140° 18’30”, R =230° 20’4”,S =290° 4’10” (8)

The length PQ, PR and PS were computed to be 3260m, 4020.4m and 3082.6m respectively. Determine the directions of PQ, PR and PS

5 a) Explain the characteristics and uses of mass haul diagram (7)

b) A series of offsets were taken from a chain line to a curved boundary line at intervals of 15m in the following order 1.15, 2.65,3.80,3.70,4.65,3.60,4.95,5.85m. Compute the area by a) average ordinate rule b) trapezoidal rule c) Simpsons rule (8)

6 a) List the fundamental lines of transit theodolite (5)

b) Discuss various types of signals used for triangulation survey (5)

c) Explain the horizontal angle measurement by repetition method (5)

PART C

Answer any two full questions, each carries 20 marks.

7 a) Write short note on weight of an observation (5)

b) What are the advantages of using Total station survey (7)

c) Briefly explain the field *procedure* of Total station survey for co ordinate determination (8)

8 a) Find the most probable values of the following observations at station O (10)

A =9° 48’36.6” wt 2

B =54° 37’48.3” wt. 3

A +B =104° 26’28.5” wt 4

b) Explain types of EDM (10)

9 a) Define the term most probable value and explain the different methods for finding it. (10)

b) Define the following terms

1. The celestial sphere
2. The Zenith (10)
3. Azimuth
4. Declination
5. Hour circle

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER B.TECH DEGREE EXAMINATION(S), MAY 2019

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)	Define local attraction. Which are the different methods of eliminating local attraction in a closed traverse?	(5)
	b)	The following consecutive readings were taken with a level and 5m levelling staff on a continuously slopping ground at a common interval of 20 m, :0.385, 1.030,1.925,2.825,3.730,4.685,0.625,2.005,3.110,4.485. Prepare a page of field book and calculate the reduced level of points if first reading was taken on a bench mark of RL 208.125 m.	(10)
2	a)	Define bearing. Which are the different systems of designating bearings?	(4)
	b)	Distinguish between dip and declination, isogonic and agonic lines.	(5)
	c)	The magnetic bearing of a line AB is S $28^0$30'E. Find the true bearing if declination is $7^0$30' W	(6)
3	a)	Explain the different methods of orientation in plane table survey.	(6)
	b)	Define contour. Which are the different methods of locating contour?	(9)

PART B

Answer any two full questions, each carries 15 marks.

4	a)	Explain repetition method of measurement of horizontal angle.	(5)
	b)	Two triangulation stations A and B are 60 km apart and have elevation 240 m and 280 m respectively. Find minimum height of signal required at B so that line of sight may not pass near the ground than 2 m. The intervening ground has an elevation of 200 m.	(10)
5	a)	Define mass diagram. What are its uses?	(5)
	b)	Explain the different steps in triangulation survey.	(10)
6	a)	Explain prismoidal rule for calculating volume of a plot.	(5)
	b)	A railway embankment is 10 m wide with side slope 1.5 (H) : 1 (V). Assuming the ground to be levelled in a direction transverse to centre line, calculate the	(10)

volume contained in a length of 120 m, the centre height at 20 m interval being in metres 2.2, 3.7, 3.8, 4.0, 3.8, 2.8, 2.5 using trapezoidal and prismoidal formulae.

PART C

Answer any two full questions, each carries20 marks.

7 a) Explain the principle of least squares. (5)

b) Explain the principle of EDM measurement. (5)

c) The following are the mean values observed in the measurement of three angles A, B, C at one station, Calculate the most probable value. (10)

$A = 76^0 42'46.2''$ weight 4

$A+B = 134^0 36'32.6''$ weight 3

$B+C = 185^0 35'24.8''$ weight 2

$A+B+C = 262^0 18'10.4''$ weight 1.

8 a) Define celestial horizon, hour angle, Zenith, Nadir, celestial equator. (10)

b) Explain the operation of total station. (10)

9 a) Explain different types of EDM instruments. Which are the different types of modulation of electromagnetic waves? (10)

b) Form the normal equation for x, y, z in the following equation (10)

$3x+3y+z-4=0$ weight 2

$x+2y+2z-6=0$ weight 3

$5x+y+4z-21=0$ weight 1

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER B.TECH DEGREE EXAMINATION(R&S), DECEMBER 2019

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 What are general principles of survey? Differentiate between plane and geodetic survey 8

b Explain the principle of levelling with neat sketch. 4

c Define i) base line,ii)Check line iii) Tie line 3

2 a What is the necessity of ranging survey lines. Describe how you would range a chain line between two points which are not visible. 7.5

b Explain the process of profile levelling and cross sectional levelling 7.5

3 a What is reciprocal levelling? How it is accomplished? In reciprocal levelling between two stations A and B the level was set up near A and the staff readings on A and B were 2.645 and 3.220 m respectively. The level was then moved and set up near B, the respective staff readings on A and B were 1.085 and 1.665. Find the true difference in level between A and B. 7.5

b) The following bearings were taken in running a compass survey. 7.5

Line	Fore Bearing	Back bearing
AB	124°30’	304°30’
BC	68°15’	246°0’
CD	310°30’	135°15’
DA	200°15’	174°45’

At what stations do you suspect local attraction? Find the correct bearings of the lines and also compute the included angle.

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PART B

Answer any two full questions, each carries 15 marks

4 a State Simpson's rule and Trapezoidal rule for computation of area. A series of offsets were taken at 3m intervals in the following order from a chain line to a curved boundary 2.16, 1.53, 1.80, 1.98, 1.80, 1.59, 1.80, 2.52, 2.43, 2.40, 2.58, 2.70, 2.91, and 3.06 meters. Find the area between the chain line, curved boundary and the end offsets by Simpson's rule and trapezoidal rule. 7.5

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b Describe the methods of computation of volume by i) Average end formula and ii) Prismoidal formula 7.5

5 a What is transit theodolite and what are the temporary adjustments in Theodolite? 7.5

b The altitudes of two proposed stations A and B, 80 km apart are respectively 225m and 550 m. The intervening obstructions situated at C, 40 km from A has an elevation of 285m. Ascertain if A and B are intervisible. And if necessary find how much B should be raised so that the line of sight must nowhere be less than 3m above the surface of the ground. 7.5

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6 a Explain the terms; 7.5
i) Satellite stations ii) reduction to centre ii) Opaque Signals

b Determine the volume of the reservoir enclosed by the contour lines from the data given below using both prismoidal and trapezoidal formula. 7.5

Contour level (m)	Area enclosed by the contour line (m^2)
100	200
105	300
110	500
115	750
120	1000
125	1500
130	2000

PART C

Answer any two full questions, each carries 20 marks

7	a	Explain the terms (i) Celestial sphere ii) Astronomical Triangle iii) Declination iv) Hour Angle v) Altitude	10
	b	Explain any five laws of weights.	5
	c	Explain the advantages of total station survey	5
8	a	Define modulation and explain the different methods of modulations	5
	b	Explain the principle of EDM	5
	c	The following are the condition equations of different weights. Construct the normal equations for x, y and z. *4x + 2y +z – 11 = 0, wt:3* *3x + 3y +2z – 9 =0, wt:2* *5x + y +3z – 16 =0, wt:4*	10
9	a	Define the term ‘most probable value’and explain the various methods to determine it.	12
	b	What are the fundamental parameters required in Total Station surveying?	8

Reg No.:_____ Name:_____

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°30' W. (8)

Line	FB	BB
AB	80°45'	260°
BC	130°30'	311°35'
CD	240°15'	60°15'
DA	290°30'	110°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°20’30.4” weight 1

B = 36°18’25.2” weight 2

A+B = 78°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

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