

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 intervisibility 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 = $75^{\circ}25'32''$, Angle CSA = $55^{\circ}32'20''$. 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

$A = 86^{\circ}42'46.2''$ with weight 4 $A+B = 134^{\circ}36'33.6''$ with weight 3

$A+B+C = 262^{\circ}18'10.4''$ with weight 1 $B+C = 185^{\circ}35'24.8''$ 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)