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## Third Semester B.E. Degree Examination, June/July 2018 Basic Surveying

Time: 3 hrs.

Max. Marks: 80

**Note: Answer any FIVE full questions, choosing  
ONE full question from each module.**

### Module-1

- 1 a. Define surveying. (02 Marks)  
 b. What are the primary divisions of surveying? Explain briefly. (05 Marks)  
 c. The area of the plan of an old survey plotted to a scale of 10 meters to 1cm measures now as 100.2 sq.cm as found by a planimeter. The plan is found to have shrunk, so that a line originally 10cm long now measures 9.7cm only. There was a note on the plan that the 20m chain used was 8cm too short. Find the true area of plan. (09 Marks)

OR

- 2 a. By means of neat sketches show any six conventional symbols used in surveying. (06 Marks)  
 b. Define precision and accuracy. (02 Marks)  
 c. In passing an obstacle in the form of a pond, stations A and D on the main line were taken on the opposite sides of pond, on the left of AD, a line AB, 200m long was laid down and a second line AC, 250m long was ranged on right of AD points B, D and C being in the same straight line, BD and DC were then chained and found to be 125m and 150m. Find the length AD. (08 Marks)

### Module-2

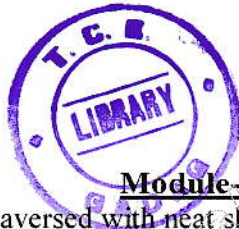
- 3 a. Differentiate between prismatic and surveyors compass (any 3). (06 Marks)  
 b. Convert the whole circle bearings to quadrantal bearings :  
 i)  $22^{\circ}30'$  ii)  $170^{\circ}12'$  iii)  $211^{\circ}54'$  iv)  $327^{\circ}24'$  (02 Marks)  
 c. Determine the value of included angles in a closed compare survey ABCD conducted in clockwise direction given the following data. Apply the check.

Line	FB
AB	$40^{\circ}$
BC	$70^{\circ}$
CD	$210^{\circ}$
DA	$280^{\circ}$

(08 Marks)

OR

- 4 a. Define : i) Face left ii) Transiting iii) Swinging as applied to theodolite surveying. (03 Marks)  
 b. With a neat sketch, explain the method of measurement of horizontal angle by repletion method. State the errors eliminated by this method. (05 Marks)  
 c. The following angles were observed in the clockwise direction in an open traverse.  
 $\angle ABC = 124^{\circ}15'$ ,  $\angle BCD = 156^{\circ}30'$ ,  $\angle CDE = 102^{\circ}00'$ ,  $\angle DEF = 95^{\circ}15'$ ,  $\angle EFG = 215^{\circ}45'$   
 The magnetic bearing of the line AB =  $240^{\circ}30'$  what would be the bearing of line FG?  
 (08 Marks)

**Module-3**

- 5 a. Explain closed and open traversed with neat sketches. (06 Marks)  
b. State Bowditch's and Transit rule. (04 Marks)  
c. Calculate latitudes, departures and closing error for the following traverse conducted at a place.

Line	Length (m)	Web
AB	89.31	45°10'
BC	219.76	72°05'
CD	151.18	161°52'
DE	159.10	228°43'
EA	232.26	300°42'

(06 Marks)

**OR**

- 6 a. Define tacheometry under what circumstances it is used? (04 Marks)  
b. State any four characteristics of a tacheometer. (02 Marks)  
c. A tacheometer is setup at an intermediate point on a traverse course PQ and the following observations are made on a vertically held staff.

Staff stn	Vertical angle	Staff intercept	Axial hair reading
P	+8°36'	2.350	2.105
Q	+6°6'	2.055	1.895

The instrument is fitted with an anallatic lens and the constant is 100.000. Compute the length of PQ and reduced level of Q, if that of P being 321.50 meters. (10 Marks)

**Module-4**

- 7 a. Define the terms : i) Back sight ii) Fore sight iii) Intermediate sight iv) change point. (04 Marks)  
b. Compare height of instrument method and rise and fall method of reduction of levels. (04 Marks)  
c. The following consecutive readings were taken with a level and 5m leveling staff on continuously sloping ground at a common interval of 20 meters :  
0.835, 1.030, 1.925, 2.825, 3.730, 4.685, 0.625, 2.005, 3.110 and 4.485m.  
The reduced level of first point was 208.125m. Rule outer page of level field book and enter the readings. Calculate the reduced levels of points by rise and fall method and apply check. Calculate also the gradient of line joining the first and last point. (08 Marks)

**OR**

- 8 a. Explain reciprocal leveling. (04 Marks)  
b. An observer standing on the deck of ship just sees a light house. The top of light house is 42m above the sea level and the height of observers Eye is 6m above the sea level. Find the distance of observes from the light house. (05 Marks)  
c. In order to ascertain the elevation of the top (Q) of the signal on a hill, observations were made from two instrument stations P and R at a horizontal distance 100m apart, the stations P, R, and Q are in a line. The angles of elevation of Q at P and R were 28°42' and 18°6' respectively. The staff reading on a bench mark of elevation 287.28m from P = 2.870, from R = 3.750. Determine the Elevation of foot of signal if height of signal = 3M. (07 Marks)



**Module-5**

- 9 a. The following perpendicular offsets were taken from a chain line to an irregular boundary.

Chainage (m)	0	30	60	90	120	150	180	210
Offset length (m)	0	2.65	3.80	3.75	4.65	3.60	5.00	5.80

Calculate the area between the chain lines and irregular boundary, first and last offsets by  
 i) Trapezoidal rule ii) Simpson's rule. (08 Marks)

- b. Calculate the area enclosed by a traverse ABCD for the following data : Assume co-ordinator as (100, 200).

Line	Latitude (m)	Departure(m)
AB	+32.05	+40.20
BC	-3	+92.00
CD	-97.85	+6.402
DE	-15.8	-107.00
EA	+84.6	-31.602

(08 Marks)

**OR**

- 10 a. With neat sketches explain any six characteristics of contours. (06 Marks)  
 b. Calculate the area of zero circle with the following data :

IR	FR	Position anchor point	Remarks
6.520	2.724	Outside the fig	Zero of counting disc crossed index once clockwise
1.222	7.720	Inside the fig	Zero of counting disc crossed and index twice anticlockwise

Assume that tracing arm of planimeter was so set that one revolution of measuring wheel measures 100cm<sup>2</sup> on paper. (06 Marks)

- c. Write short notes on :  
 i) Interpolation of contours  
 ii) Contour gradient. (04 Marks)

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