311(S)

December 2018

SURVEYING

Time Allowed: 3 Hours   *Full Marks: 70*

Answer to Question No.1 is compulsory and to be answered first.
This answer is to be made in separate loose script(s) provided for the purpose.
Maximum time allowed is 45 minutes, after which the loose answer scripts will be collected and
fresh answer scripts for answering the remaining part of the question will be provided.
On early submission of answer scripts of Question No.1,
a student will get the remaining script earlier.
Answer <u>any five</u> questions from Group-A & B, taking <u>at least two</u> from each group.

1. A. Choose the correct alternative: 1x8

    i) A good surveyor should always try to achieve – (a) Accuracy, (b) Precision, (c) Both accuracy and precision.

    ii) A building is – (a) Obstacle for chaining but not for ranging, (b) Obstacle for ranging but not for chining, (c) Obstacle for both chaining and ranging, (d) Not an obstacle for chaining or ranging.

    iii) The method of offsets involves less measurement on the ground is – (a) Method of perpendicular offsets, (b) Method of oblique offsets, (c) Method of ties, (d) All involve equal measurement on the ground.

    iv) If the whole circle bearing of a line is between 180ϕ and 270ϕ, then the line lies in the – (a) NE quadrant, (b) NW quadrant, (c) SE quadrant, (d) SW quadrant.

    v) When the bearing is measured from magnetic north direction then it is called – (a) Magnetic bearing, (b) True bearing, (c) Grid bearing, (d) None of these.

    vi) Three–point problem can be solved by – (a) Lehmann's method, (b) Bessel's method, (c) Mechanical method, (d) All of these.

    vii) In setting up a plane table, the operation which is done first is – (a) Levelling, (b) Centering, (c) Orientation, (d) Resection.

    viii) Prismatic compass is an instrument used to measure – (a) Whole circle bearing, (b) Quadrant bearing, (c) Grid bearing, (d) None of these.

   B. Answer the following questions (any eight):   1½x8=12

    i) What is base line in chain survey?
    ii) Define main survey stations?
    iii) What is levelling?
    iv) Define G.T.S. bench mark?
    v) Enlist the methods of interpolation of contour.
    vi) What is datum?
    vii) What is meridian?
    viii) What do you mean by azimuth of a line?
    ix) What is the limitation of a prismoidal formula?

Group-A

2. a) What is surveying?
   b) Explain the fundamental principles of surveying.
   c) Distinguish between Plane Surveying and Geodetic Surveying.   2+4+4

3. a) What are the instruments used in chain surveying?
   b) How is the chain survey executed in the field?   3+7

4. a) What do you mean by 'obstruction in chaining'?
   b) A survey line BAC crosses a river, A and C being on the near and distant banks respectively. Standing at D, a point 50 metres measured perpendicularly to AB from A, the bearing of C and B are 320^0 and 230^0 respectively, AB being 25 metres. Find the width of the river.   2+8

5. a) What is bearing?
   b) Write short note on - Designation of bearing.
   c) Convert the following to W.C.B. i) N 46^0 E, ii) S 35^0 W, iii) N 42^0 W and iv) S 34^0 W.   2+4+4

6. a) What is magnetic declination?
   b) A line AB in an old map was having its magnetic bearing as $47^020'$ when the magnetic declination was $1^030'$ E. What is the magnetic bearing of AB now when the magnetic declination is $2^030'$ W?   2+8

Group-B

7. The consecutive readings taken during a levelling operation are as follows: 0.685, 1.315, 1.825, 0.635, 1.205, 1.235, 2.631, 1.355, and -2.015. The instrument was shifted after the third and sixth readings. The third reading was taken to a benchmark of assumed elevation of 100.000 m. Find the reduced levels of other points by rise and fall method.   https://www.wbscteonline.com   10

8. The following readings refer to the reciprocal observations from two points on either side of a river. Determine the true difference of elevation and the collimation error, if any, of the instrument. The distance between the stations = 1200 m.   10

Instrument at	Reading on staff at	
	A	B
A	1.115	1.765
B	1.750	2.315

9. a) What is contour? What do you mean by contour interval and horizontal equivalent?
   b) Discuss characteristics of contours giving suitable sketches.   2+3+5

10. From a chain line 54 m long, offsets were taken at 18 m intervals as:

Chainage (m)	0	18	36	54
Offset (m)	3.8	6.2	9.8	4.7

Find the area between the chain line, boundary and the first & last offsets using the trapezoidal formula and Simpson's formula.   10

11. What are the different methods (systems) of plane tabling? Explain one of them with neat sketch.   10