

**Diploma in Civil Engineering / Diploma
in Electrical & Mechanical Engineering**
Term-End Examination
June, 2008

BET-023 : ELEMENTS OF SURVEY

Time : 2 hours

Maximum Marks : 70

Note : Question no. 1 is **compulsory**. Attempt any **four** questions from the remaining. All questions carry equal marks.

1. (A) Identify whether the following statements are true or false. 6×1=6
- (i) Trigonometric levelling is used when the survey area is highly undulating.
 - (ii) Chain and compass survey is more accurate than theodolite survey.
 - (iii) In case of theodolite, the only movement of one part relative to another should be circular with no backlash, whip or looseness.
 - (iv) In traverse surveying, as many long lines as possible should be used.
 - (v) When the level is moved in a levelling exercise, the position of staff is termed as change point.
 - (vi) The sum of backsights minus the sum of foresights is equal to the difference in R.L. of the first and last station corresponding to the backsights and foresights.

(B) Select the most appropriate answer for each of the following multiple choice objective type questions. $4 \times 2 = 8$

- (i) Ranging is the process of
- (a) Taking offsets from a chain line
 - (b) Fixing ranging rods on the extremities of the area
 - (c) Aligning the chain in a straight line between two ends of a traverse line
 - (d) Ranging over a number of obstacles in the path of survey line

(ii) Elimination of parallax in reading the staff by dumpy level is achieved when

- (a) there is no apparant movement between the image and the cross hair, when the eye is moved from one side to another
- (b) image produced by the object glass is in same horizontal plane as the image of the cross hair viewed through the eyepiece
- (c) image of cross hair viewed through eyepiece may or may not coincide with the image produced by object glass
- (d) the line of collimation of level is parallel to the optical axis

(iii) Before a level can be used for taking observations, it is essential that

- (a) the horizontal hair should be horizontal and the vertical hair vertical
- (b) axis of spirit level is perpendicular to the vertical axis
- (c) line of collimation is parallel to the axis of spirit level
- (d) All of the above

(iv) While using the theodolite in field it is required that

- (a) the optical axis and line of collimation should be parallel to the trunnion axis
- (b) the vertical axis and trunnion axis should be parallel
- (c) when line of collimation is horizontal, the vertical circle reading should be zero and bubble of the index spirit level should be central
- (d) None of the above

2. (a) While choosing a scale for a particular type of survey, what considerations do you propose to adopt? Suggest the scale for

- (i) Building site plan
- (ii) Location surveys
- (iii) Geographical maps, and
- (iv) Town-planning schemes

(b) A rectangular plot of land measures 200 mm \times 300 mm on a city map drawn to a scale of 100 m to 1 cm. Calculate its area in hectares. If the plot is redrawn to a scale of 1 km to cm, what will be its area on the topo sheet ?

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3. (a) List main errors which may occur during traversing and checks you use for angular measurements of traverse.

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(b) The latitudes and departures of two survey stations A and B are (+542.7, -331.2) and (+713.0, +587.8) respectively taking north and east directions as +ve. Another station C is selected along a line with a bearing of $346^{\circ} 14'$ at station A at a distance of 432 m from A. From station C a line CD is selected parallel to AB and 1152 m long. Calculate the bearing of D from B.

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4. (a) State different precautions you suggest to be observed during conducting field work of levelling.

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(b) The following staff readings were observed successively during a levelling exercise. The dumpy level was shifted after third, sixth and eighth reading. (All readings are in meters)

{2.228; 1.606; 0.988; 2.090; 2.864; 1.262; 0.602; 1.982; 1.044; 2.684}

Enter the above readings in the form of a page of level book and compute the R.L. of points, if the first reading was taken with staff on a Bench Mark of 432.384.

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5. Describe 'two point' and 'three point' problems; refer to plane table survey. Describe any one method in detail you will use in solving either of these problems. 14
6. List various "Temporary" and "Permanent" adjustments required to be carried out before using the theodolite. Describe in detail any one of them. 14
7. Write short notes on any *two* of the following : $2 \times 7 = 14$
- (a) Solving traverse problems with omitted/missing measurements
 - (b) Triangulation Survey
 - (c) Geodetic Survey
 - (d) Trigonometric Levelling

