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Total Number of Pages: 3

**B.TECH**  
**PCI4D001**

**4<sup>th</sup> Semester Regular Examination 2016-17**

**ADVANCE SURVEYING**

**BRANCH: CIVIL (HONOURS)**

**Time: 3 Hours**

**Max Marks: 100**

**Q.CODE: Z1096**

**Answer Part-A which is compulsory and any four from Part-B.**  
**The figures in the right hand margin indicate marks.**

**Part – A (Answer all the questions)**

**Q1** Answer the following questions: *multiple type or dash fill up type* **(2 x 10)**

- a) An aerial photograph may be assumed as
- a) Parallel projection
  - b) Orthogonal projection
  - c) Central projection
  - d) None of these
- b) The parallax equation  $\Delta p = \frac{Bm\Delta h}{H - h}$  is applicable to entire overlap of the photographs only if parallax is measured
- a) normal to base line
  - b) parallel to base line
  - c) both (a) and (b)
  - d) . neither (a) nor (b).
- c) The station which is selected close to the main triangulation station, to avoid intervening obstruction, is not known as \_\_\_\_\_
- d) Triangulation surveys are carried out for locating
- a) control points for surveys of large areas
  - b) control points for photogrammetric surveys
  - c) engineering works, i.e. terminal points of long tunnels, bridge abutments, etc.
  - d). all the above.
- e) Total station is a combination of
- a) Tachometer and theodolite
  - b) dumpy level and compass

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- c) auto level and digital level
- d) an electronic theodolite and EDM
- f) GPS use for
  - a) Preparing maps
  - b) ground truth verification
  - c) for navigation
  - d) all of above
- g) The long chord and tangent length of a circular curve of radius R will be equal if the angle of deflection is \_\_\_\_\_
- h) Cross-heads are generally erected at
  - a) 30m interval
  - b) change of grades
  - c) Change of direction
  - d) All of these
- i) Setting out is done
  - a) prior to preparation of plans
  - b) along with preparation of plans
  - c) after the preparation of plans
  - d) if obstructions are present
- j) Overturning of a vehicle on a curve can be avoided by using a \_\_\_\_\_ curve.

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**Q2** Answer the following questions: **Short answer type** (2 x 10)

- a) What are the advantages of an anallactic lens used in tacheometer?
- b) What is a satellite station?
- c) List three types of errors occur in measurement.
- d) What is meant by declination?
- e) What is a transition curve?
- f) Define batter-board used in setting out works.
- g) Explain the terms true error and most probable error.
- h) Where are reverse curves provided?
- i) What is the difference between a theodolite and tacheometer?
- j) What is meant by phase of a signal?

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**Part – B (Answer any four questions)**

- Q3** a) What is meant by triangulation? How will you select base line and triangulation stations? Explain strength of figure. (10)
- b) Define accidental error, true value, conditioned quantity, most probable value, normal equation (5)
- Q4** a) What is Geographical Information System (GIS) ? Explain key components of GIS. List various functions of GIS. (10)
- b) Define the following terms used in aerial photogrammetry : (i) Oblique Photograph (ii) Principal point (iii) Nadir point (iv) Isocentre (v) Swing. (5)
- Q5** a) The altitude of two proposed stations A and B 121 km apart are respectively 211 m and 1120 m. The altitude of two points C and D on (10)

the profiles between them are respectively 290 m and 647 m, the distances being AC=40 km and AD=85 km. Determine whether A and B are intervisible, and if necessary, find the maximum height of a scaffolding at B, assuming A as the ground station.

- b) What do you mean by designation of a curve? (5)
- Q6** a) Two tangents intersect at a distance of 1250.50m having deflection angle of  $60^\circ$ . If the radius of the curve to be laid out is 375m, calculate the length of curve, tangent distance, apex distance, mid ordinate, degree of curve and chainage of P.C & P.T. (10)
- b) Explain “Laws of Weights”. www.bputonline.com (5)
- Q7** a) A tacheometer was set up at station A and the following readings were obtained on a vertically held staff. (10)

| Station | Staff station | Vertical angle | Hair reading                 | Remarks                      |
|---------|---------------|----------------|------------------------------|------------------------------|
| A       | B.M.          | $-2^\circ 18'$ | 3.225,<br>3.550<br>And 3.875 | R.L. of B.M. is<br>437.655 m |
|         | B             | $+8^\circ 36'$ | 1.650<br>2.515<br>And 3.380  |                              |

Calculate the horizontal distance from A to B and the R.L. of B, if the constants of the instrument were 100 and 0.4.

- b) Derive the expression for the horizontal and vertical distances in the fixed hair method when the staff is held vertically and the measured angle is that of elevation. (5)
- Q8** a) Define : (i) True Error (ii) Most Probable error (iii) Residual error. (10)  
 The observed values of an angle are given below :  
 Find (i) probable error of single observation values of unit weight  
 (ii) probable error of weighted arithmetic mean  
 (iii) probable error of single observation of weight 3.

| Angle               | Weight |
|---------------------|--------|
| $85^\circ 40' 20''$ | 2      |
| $85^\circ 40' 18''$ | 2      |
| $85^\circ 40' 19''$ | 3      |

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- b) Explain the displacement and errors in aerial photogrammetry. (5)
- Q9** a) What is base line? How is it selected? Describe the procedure of its extension. (10)
- b) What is tacheometric surveying ? What are the advantages of tacheometric surveying ? (5)