

# JK LAKSHMIPAT UNIVERSITY, JAIPUR

## INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Backlog), Nov.-Dec.2015

B. Tech in Civil Engineering, Semester V

Roll No.....

CE504: SURVEYING-II

Time: 3 hours

Max. Marks: 100

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### Instructions to students:

1. Do not write anything other than your roll number on question paper.
  2. Assume suitable data wherever required and mention it clearly.
  3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.
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Q.1A Objective type multiple choice questions (10 questions @ 1 mark) 10

- i. In Second order or Secondary Triangulation system the length of base line varies between :
  - (a) 1.5 to 5 Km
  - (b) 5 to 15 Km
  - (c) 0.5 to 3 Km
  - (d) 5 to 10 Km
- ii. Co-efficient of refraction (m) is the ratio of :
  - (a) Angle of refraction and the angle subtended at the center of earth by distance over which observation are taken
  - (b) Angle of reflection and the angle subtended at the center of earth by distance over which observation are taken
  - (c) Angle of refraction and the angle of reflection
  - (d) Angle of reflection and the angle of refraction
- iii. The triangulation figures or systems best suited to cover narrow strip of terrain is :
  - a) Centered figures
  - (b) Double chain of triangles
  - (c) Quadrilaterals
  - (d) Single chain of triangles
- iv. The relationship of right angled spherical triangle are very easily obtained from Napier's Rule of circular parts as follows :
  - (a) sine of middle part is equal to product of tangent of opposite part
  - (b) sine of middle part is equal to product of co-sine of adjacent part
  - (c) sine of middle part is equal to product of tangent of adjacent part
  - (b) Both a and b are correct
- v. Accuracy of Differential GPS (DGPS) :
  - (a) 15 - 100 meters
  - (b) 0.5 - 5 meters
  - (c) 20 cm - 1 meters
  - (d) 1 cm - 5 cm

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| vi   | Reciprocal observations are generally made to eliminate the effect of :<br>a. Curvature<br>b. Reflection<br>c. Refraction<br>d. none of the above                                                                                                                                                                                                                                                                                          |
| vii  | In first order or Primary Triangulation system the length of base line varies between :<br>(a) 1.5 to 5 Km<br>(b) 5 to 15 Km<br>(c) 0.5 to 3 Km<br>(d) 5 to 10 Km                                                                                                                                                                                                                                                                          |
| viii | The angular distance of heavenly body from Zenith is known as :<br>(a) Co-declination<br>(b) Co-altitude<br>(c) Azimuth<br>(d) Altitude                                                                                                                                                                                                                                                                                                    |
| ix   | Temporal resolution may be defined as :<br>(a) The smallest angular or linear separation between two objects that can be resolved by the sensor.<br>(b) Number and dimensions of specific wavelength intervals in EMR to which a remote sensing instrument is sensitive.<br>(c) Spectral resolution refers to how often a RS system records imagery of a particular area.<br>(d) None of these                                             |
| x.   | Reiteration method is one of the general methods of observing horizontal angle. It is usually adopted in case :<br>(a) Several angles of well distributed points / objects are to be measured from same instrument station with high precision.<br>(b) When the precision of measurement of a horizontal angle is desired to be more than least count of the instrument.<br>(c) Both a and b are correct<br>(d) Both a and b are incorrect |

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| Q.2  | Short answer type questions (4 questions @ 2.5 marks)                                                                                                                                                                                                                                                                                                                                                         | 10 |
|      | i. Write a short note on "Station Mark" w.r.t. triangulation station.<br>ii. "Modern clocks cannot record variable solar apparent time." Justify the statement with appropriate reasons.<br>iii. What is spherical triangle? Write the basic properties of spherical triangle.<br>iv. During triangulation survey what considerations you should keep in your mind while selecting the triangulation stations |    |
| Q.3A | Discuss about the "Intervisibility of stations" and "Height of station" while selecting commanding positions during triangulation survey.                                                                                                                                                                                                                                                                     | 05 |
| Q.3B | Two triangulation stations A and B are 60 kilometers apart and have elevation of 240 m and 280 m respectively. Find the minimum height of signal required at B so that line of sight may not pass near the ground than 2 meters. The intervening ground may be assumed to have a uniform elevation of 200 meters.                                                                                             | 05 |

- Q.4A Classify the triangulation system based on accuracy, extent and purpose of survey. 05
- Q.4B What do you mean by "Well conditioned Triangle". Show that the best shape of triangle is isosceles with base angles equal to  $56^{\circ}14'$ . 05
- Q.5A If a star (M) is on the prime vertical of the observer than calculate the altitude ( $\alpha$ ), and Hour angle (H) of the body from the Napier's Rule provided that declination ( $\delta$ ) and latitude ( $\theta$ ) are known. 05
- Q.5B If star is at its greatest distance east or west of the meridian than calculate the hour angle (H), and altitude ( $\alpha$ ) of the body from the Napier's Rule provided that declination ( $\delta$ ) and latitude ( $\theta$ ) are known. 05
- Q.6A Explain the following with the help of diagram : 05  
 i. The Repetition method  
 ii. The Reiteration method
- Q.6B From a satellite station S, 5.8 meters from the main triangulation station A, the following directions were observed : 05
- |   |               |       |        |
|---|---------------|-------|--------|
| A | $0^{\circ}$   | $0'$  | $0''$  |
| B | $132^{\circ}$ | $18'$ | $30''$ |
| C | $232^{\circ}$ | $24'$ | $6''$  |
| D | $296^{\circ}$ | $6'$  | $11''$ |

The length AB, AC and AD were computed to be 3265.5 m, 4022.2 m and 3086.4 m respectively. Determine the directions of AB, AC and AD.

OR

- Q.6B If you are observing the difference in elevation (H) between two points P and Q and d is the horizontal distance between P and Q, than justify the statement that observed angle of depression always exceed the angle of elevation by amount  $\theta (1 - 2m)$  where m is the co-efficient of refraction. 05
- Q.7A Explain the following : 05  
 (a) Different Resolutions of Remote Sensing.  
 (b) Remote Sensing is a Science or Art or both? Write your views about this statement.
- Q.7B Write the short note on : 05  
 i. Triangulation figures  
 ii. Kinds of errors in surveying.

OR

- Q.7B Explain the difference between Plane Surveying and Geodetic Surveying. 05
- Q.8A " Discuss in detail the various systems used for the measurement of time. 10

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| Q.9A | The altitude of proposed stations A and B 130 km apart, are respectively 220 m and 1160 m. The altitude of two points C and D on the profile between them are respectively 308 m and 632 m, the distance being AC=50 km and AD= 90 km. Determine whether A and B are intervisible, and if necessary , find the minimum height of a scaffolding at B , assuming A as the ground station. | 10 |
| Q.9B | Discuss the following :<br>(i) Major components of Global Positioning System (GPS)<br>(ii) Types of GPS Positioning.                                                                                                                                                                                                                                                                    | 10 |
| OR   |                                                                                                                                                                                                                                                                                                                                                                                         |    |
| Q.9B | Define the "Equation of Time". Explain why the value of Equation of Time varies in magnitude throughout the year.                                                                                                                                                                                                                                                                       | 10 |