Code : 011508

B.Tech 5th Semester Exam., 2019

ADVANCED SURVEYING

Time : 3 hours *Full Marks* : 70

Instructions :

(i) The marks are indicated in the right-hand margin.

*(ii) There are **NINE** questions in this paper.*

*(iii) Attempt **FIVE** questions in all.*

*(iv) Question No. **1** is compulsory.*

1. Choose the correct answer (any *seven*) : 2×7=14

(a) A transit theodolite can be used as a tacheometer, if it is fitted with an

(i) internal focussing telescope fitted with an anallactic lens

(ii) internal focussing telescope fitted with stadia diaphragm

(iii) external focussing telescope fitted with Ramsden's eye-piece

(iv) internal focussing telescope fitted with Ramsden's eye-piece

(b) Which of the following is not a means of linear surveying methods?

(i) Theodolite

(ii) EDM

(iii) Tape

(iv) Chain

(c) Hydrographic surveys deal with the mapping of

(i) large waterbodies

(ii) heavenly bodies

(iii) mountainous region

(iv) canal system

(d) According to Napier's rules of circular parts, sine of the middle part is equal to the

(i) product of tangent of adjacent parts

(ii) product of cosine of adjacent parts

(iii) product of tangents of opposite parts

(iv) product of sine of opposite parts

(e) Colatitude is the

(i) angular distance between zenith and the celestial pole

(ii) angular distance between zenith and the celestial body

(iii) angular distance between celestial pole and the celestial body

(iv) remaining angle when latitude is subtracted from 180 degrees

(f) Truly vertical aerial photographs do not represent the true map of the ground due to

(i) variation in the speed of the aircraft

(ii) tilt displacement

(iii) relief displacement

(iv) All of the above

(g) The term sounding in hydrographic survey refers to the

(i) determination of water surface levels using sound meter

(ii) determination of depth of water at different points

(iii) determination of horizontal control points in water

(iv) determination of vertical control points in water

(h) Aerial photographs are

(i) perspective projections

(ii) isometric projections

(iii) orthographic projections

(iv) None of the above

(i) In triangulation method, the whole area is divided into

(i) scale triangles

(ii) triangles

(iii) obtuse triangles

(iv) well-conditioned triangles

(j) Plane and geodetic surveying are classification of surveying based on

(i) earth's curvature

(ii) methodology

(iii) object of survey

(iv) instrument

2. (a) Define curve. State different types of horizontal circular curves. 6

(b) A curve of radius 800 m has a deflection angle of 40° between tangents. Calculate the radial and perpendicular offsets at 20 m intervals up to 100 m. 8

3. *(a)* What are different forms of a transition curve? Give reasons for introducing a transition curve between a tangent and a circular curve on road or railway. 7

(b) Describe principle of triangulation system and show schematically different sets of triangulation figures. 7

4. *(a)* Enumerate different types of EDM instruments and describe briefly the salient features of total station. 7

(b) What are the properties of electro-magnetic waves? Draw complete electromagnetic spectrum showing all wavelengths. 7

5. *(a)* Discuss *(i)* selection of triangulation station and *(ii)* reduction to centre in geodetic triangulation. 6

(b) Calculate the temperature correction for a 30 m long tap standardized at 28 °C, it was used to measure a distance of 211·65 m. The mean temperature during measurement was 14 °C. The coefficient of thermal expansion is 116×10^{-7}/°C. 8

6. *(a)* Determine the azimuth and altitude of a star from the following data : 8

Latitude of the observer = 48° N

Hour angle of star = 43°

Declination of star = 18°20′ N

(b) Explain the working of a geodimeter with the help of a block diagram. 6

7. *(a)* Explain the concept of strength of figure and the method used to calculate it. 6

(b) Two stations *A* and *B* are 72 km apart, the elevations of the stations *A* and *B* are 372 m and 458 m respectively. The intervening ground has a uniform elevation of 328 m. Find the height of the signal required at *B* if the line of sight has to pass at least 3 m above the ground at all points. 8

8. *(a)* Define the term hydrographic surveys. What are the main purposes for which it is carried out? 7

(b) What is the three-point problem in hydrographic surveys? Describe the mechanical solution. 7

9. Write short notes on any *four* of the following : 3½×4=14

(a) Sounding

(b) Infra-red EDM

(c) Hour angle

(d) Universal time

(e) Curvature correction

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