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**Printed Pages : 4** **TCE – 403**

(Following Paper ID and Roll No. to be filled in your Answer Book)

**PAPER ID : 0051** Roll No.

# B. Tech.

## (SEM. IV) EXAMINATION, 2006-07

## ADVANCE SURVEYING

*Time : 3 Hours]* *[Total Marks : 100*

***Note :*** *(1) Answer **all** questions.*

*(ii) All questions carry **equal** marks.*

*(iii) Assume data whenever not provided.*

**1** Attempt any **four** parts of the following : **5×4=20**

(a) What is triangulation? How is it different from traversing and trilateration? How the triangulation surveys are classified?

(b) What is meant by strength of figure? How is it determined?

(c) What is a satellite station? Discuss the method of reduction to centre.

(d) What are the functions of signals and towers? Describe their types.

(e) Determine the value of (D–C)/D for the following triangulation figures if all the stations have been occupied and all the lines have been observed in both directions. A braced quadrilateral, A four sided central point figure without diagonals.

(f) A cylindrical signal of diameter 4 m., was erected at station B. Observations were made on a signal from station A. Calculate the phase correction when the observations were made on the bright portion and on the bright line. The distance AB was 6950 m and the bearing of the sun and the station B as $315^{o}$ and $35^{o}$ respectively.

**2** Attempt any **two** parts of the following : **10×2=20**

(a) What do you understand by the angle condition and the side conditions? Take a suitable example to explain these conditions.

(b) Explain the relevance of weights in survey measurements. Describe the rules for assigning the weights to the survey measurements?

(c) A surveyor carried out levelling operations of a closed circuit ABCDA starting from A and made the following observations :

B was 8.164 m above A, weight 2

C was 6.284m above B, weight 2

D was 5.626 m above C, weight 3

D was 19.964 m above A, weight 3

Determine the probable heights of B, C and D above A by method of correlates.

**3** Attempt any **two** parts of the following : **10×2=20**

(a) Draw a neat sketch of a circular curve and show its various elements thereon. Work out the relationships between the elements of a circular curve.

(b) What is a transition curve? When and why it is used? Write a note on different types of transition curve. Explain its relationship with the super elevation.

(c) A transition curve is required for a circular curve of 250 m radius, the gauge being 1.5m and the maximum super elevation restricted to 15cm. The transition is to be designed for a velocity such that no lateral pressure is imposed ion the rail. The rate of gain of radial acceleration is 30 cm/sec$^2$/sec. Calculate the required length of the transition curve and the design speed.

**4** Attempt any **two** parts of the following : **10×2=20**

(a) What do you understand by hydrographic surveying? Describe the procedure and methods of taking 'Sounding'.

(b) Write in detail about the general requirements and specifications for engineering project surveys with an example.

(c) What are the different coordinate systems used in field astronomy ? Describe any one of them. Discuss about the relationship between different coordinate systems.

**5** Attempt any **four** parts of the following : **5×4=20**

(a) Describe the principle behind depth perception in stereoscopic vision and principle of stereoscope.

(b) What is relief displacement? A tower was photographed from an elevation of 800m above the datum. The radial distances of the top and bottom of the tower from the principal point is 112.2 mm and 81.6 mm. respectively. If the bottom of the tower has elevation of 250 m, determine the height of the tower above its bottom.

(c) Describe spectral, spatial and radiometric resolution of a satellite sensor.

(d) Describe various processes that occur when electromagnetic energy interacts with the atmosphere.

(e) Describe the concept of Geographical Information System (GIS), its components, various data formats and applications of GIS.

(f) Describe the principle of Global Positioning System (GPS), various methods of taking observations with GPS and its various applications including in the field of surveying.

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