Total No. of printed pages = 4

CE 181403

Roll No. of candidate 9 4/6/24

2024

B.Tech. 4th Semester End-Term Examination

ENGINEERING SURVEY – II

New Regulation (w.e.f. 2017-18) & New Syllabus (w.e.f. 2018-19)

Full Marks – 70 Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer question No. 1 and any *four* from the rest.

No IS Codes are allowed in the Examination.

1. Answer the following : (10 × 1 = 10)

(i) Which was the first microwave based EDM developed in the world

(a) Tellurometer (b) Distomats

(c) Total station (d) Theomat

(ii) The laws of accidental errors follow which of the following principle

(a) Normal equation (b) Laws of weights

(c) Probability law (d) Most probable value

(iii) The laws of accidental errors follow which of the following principle

(a) Normal equation

(b) Laws of weights

(c) Probability law

(d) Most probable value

(iv) The points that are set by using the method of tangents will lie on

(a) Parabola (b) Chord

(c) Tangent (d) Are of circle

[Turn over

(v) The degree of curve for a radius of 573 using 30 m chain is

(a) 1 (b) 2

(c) 3 (d) 5

(vi) Minimum inclination provided in tilted photography is

(a) 2° (b) 3°

(c) 5° (d) 10°

(vii) In a triangulation survey, the strength of figure in a triangulation system is more

(a) When any angle of a triangle is not less than 30° or more than 120°

(b) When the angles of triangle are very nearly equal to 60°

(c) In the method of trilateration

(d) When the error is the least when computing the length of the last line

(viii) Which of the following indicates the formula for converting slope distance (S) to horizontal distance (H)

(a) $S = H\sin(\theta)$ (b) $H = S \times S(\sin\theta)$

(c) $H \times H = S(\sin\theta)$ (d) $H = S(\sin\theta)$

(ix) In total station, data is stored in

(a) Pen drive (b) Microprocessor

(c) Data card (d) External hard drive

(x) The no. of satellites used in GPS is

(a) 4 (b) 6

(c) 24 (d) 48

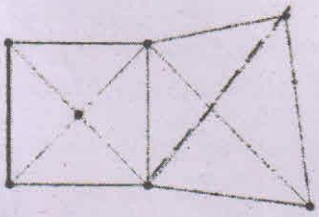
2. (a) The altitudes of two proposed stations A and B, 100 km apart are respectively 430 m and 700 m. The intervening obstruction situated at C. 75 km apart from A has an elevation of 480 m. Ascertain if A and B are intervisible and if necessary, find how much B should be raised so that the line of sight must nowhere be less than 3 m above the ground surface. (8)

(b) Describe how phase correction is done for different conditions with diagram. (7)

3. (a) Calculate the RL of the various station pegs on a vertical curve connecting two grades of +0.6% and –0.6%. The chainage and the RL of intersection point are 550 m and 325.5 m respectively. The rate of change of grade is 0.1% per 30 m. (Consider 60 m interval for tangent correction). (10)

(b) Draw three types of transition curve and show its components. (5)

4. (a) Compute the value of C and D-C/D for the net shown below. The heavy line is the base of known length. Directions are not observed where the lines are dotted. (5)



(b) Adjust the following angles of a triangle. (5)

A = 75°20'40" Wt.4

B = 60°45'32" Wt.3

C = 45°21'20" WL.2

(c) Two tangents intersect at a chainage of 1200 m, the deflection angle being 25°. Calculate the following quantities for setting a curve of 250 m radius. (i) Tangent length (ii) Length of long chord (iii) Length of curve (iv) Apex distance (v) Versed sine of curve. (5)

5. (a) The following are mean values observed for three angles. Calculate the most probable value using normal equation. (7)

A = 76°45'40.2" Wt.4

A + B = 134°30'35.6" Wt.3

B + C = 185°40'25.7 Wt.2

A + B + C = 262°20'10.4" Wt.1

(b) A vertical photograph of a flat area of average elevation 150 m was taken with a camera of 15 cm focal length. A line PQ, 500 m length measures 18 cm on the photograph. The distance between the image of top and bottom of the tower measures 0.5 cm on the photograph. The distance of the image of the top of the tower is 7.5 cm. Determine the height of the tower. (5)

(c) What are the main bands of electromagnetic spectrum where remote sensing is possible? (3)

6. (a) The following are observed values of an angle.

A = 40°21'35" Wt.3

A = 40° 25'30" Wt.2

A = 40°20'10" Wt.4

Calculate :

(i) Probable error of single observation of unit wt.

(ii) Probable error of weighted arithmetic mean. (5)

(b) The scale of an aerial photograph is 1 cm = 120 m. The photograph size is 20 cm × 20 cm. Determine the number of photograph required to cover an area of 150 sq km. Longitudinal lap = 60%, Side lap = 30%. (5)

(c) Discuss the phenomenon of parallax in aerial stereoscopic view. (5)

7. (a) Discuss how with the help of total station, distance and angles are measured. (5)

(b) Distinguish between active remote sensing and passive remote sensing. (5)

(c) Describe principal point, Nadir point and azimuth with diagram. (5)
