

B.E DEGREE EXAMINATIONS: APRIL/MAY 2011

Fourth Semester

CIVIL ENGINEERING

U07CE404: Surveying II

Time: Three Hours

Maximum Marks: 100

Answer All the Questions:-

PART A (10 x 1 = 10 Marks)

1. The multiplying constant is denoted by
(a) f/i (b) i/f (c) $i \times f$ (d) if
2. The subtense bar is used to measure
(a) Vertical distance (b) Horizontal distance (c) elevation (d) Area
3. The process of determining the elevation of stations from vertical angles and geodetic lengths at mean sea level is known as
(a) Levelling (b) Trigonometric levelling (c) Triangulation (d) Sounding
4. For the survey of India, the instrument used for measuring base was
(a) Colby apparatus (b) Jaderin's apparatus (c) Hunter's short bases (d) Theodolite
5. If a quantity of a given weight is multiplied by a factor, the weight of the result is obtained by dividing its given weight by
(a) Factor (b) the square of the factor
(c) the cube root of the factor (d) the square root of the factor.
6. Log sine correction is made in triangulation to satisfy
(a) apex condition (b) opposite angle (c) side condition (d) peripheral sum
7. A tropical year is equal to
(a) 365.2422 mean solar days (b) 365.2564 mean solar days
(c) 366 mean solar days (d) 366 mean sidereal days
8. Remote sensing can be defined as collecting information about a target
(a) Without seeing it (b) by touching it
(c) without a physical contact with it (d) from a ground station.
9. The branch of surveying which deals with water bodies is known as
(a) Aqueous surveying (b) topographic surveying
(c) hydrographic surveying (d) sea surveying
10. Aerial photographs are
(a) Perspective projections (b) Orthographic projections
(c) Isometric projections (d) Gnomonic projection

PART B (10 x 2 = 20 Marks)

11. Define tacheometry
12. What is subtense bar?
13. When the axis signal correction is applied in trigonometric levelling?
14. List any two characteristics of a good signal.
15. State the principle of least squares.
16. Define residual error.
17. Mention the two basic processes which involves in the remote sensing of earth resources.
18. Define declination.
19. Define focal length.
20. What is meant by nodal point?

PART C (5 x 14 = 70 Marks)

21. a) The following observations were made in a tacheometric survey

Inst. station	Height of axis	Staff station	Vertical angle	Hair readings	Remark
A	1.345	BM	-5 ⁰ 30'	0.905,1.455,2.005	RL of BM is 450.500m
A	1.345	B	+8 ⁰ 0'	0.755,1.655,2.555	
B	1.550	C	+10 ⁰ 0'	1.500,2.250,3.000	

Calculate the RLs of A, B and C and the horizontal distances AB and BC. The tacheometer is fitted with an anallatic lens and the multiplying constant is 100.

(OR)

- b) To find the RL of station B, two observations are taken by a theodolite from station A – one to a BM and the other to the station B. The records as follows

Inst. station	Staff station	Target	Vertical angle	Staff reading	Remark
A	BM	Lower	-10 ⁰ 0'	0.655	RL of BM is 510.500m
		Upper	-7 ⁰ 0'	2.655	
A	B	Lower	-5 ⁰ 0'	1.250	
		Upper	+4 ⁰ 0'	3.200	

22. a) (i) Two triangulation stations A and b are 3200.65 apart. Find the difference of elevation of the two stations for the following data:

Angle of depression at B to A = 2⁰18'16"

Height of instrument at B = 4.23m

Coefficient of refraction at B = 0.07

$$R \sin 1'' = 30.88$$

$$R.L \text{ of B} = 242.6 \text{ m.} \quad (7)$$

- (ii) Two triangulation stations A and B are 2800m apart. Observations were made for vertical angle of elevation from A to B and the mean angle observed was $1^{\circ}28^{\circ}32''$. The height of the instrument was 1.38m and the signal was 2.46 m high. If the reduced level of station A was 125 m and the coefficient of refraction was 0.07, calculate the reduced level of B. The radius of the earth is 6372 km. (7)

(OR)

22. b) A nominal distance of 30m was set out with a 30m steel tape from a mark on the top of one peg to mark on the top of another, the tape being in catenary under a pull of 100N and at a mean temperature of 70°F . The top of one peg was 0.25 m below the top of the other. The top of the higher peg was 460m above mean sea level. Calculate the exact horizontal distance between the marks on the two pegs and reduce it to mean sea level, if the tape was standardised at a temperature of 60°F in catenary under a pull of (i) 80N (ii) 120 N (iii) 100N.

Take radius of earth = 6370 Km

Density of tape = 7.86 g/cm^3

Section of tape = 0.08 sq.cm

Co-efficient of expansion = 6×10^{-6} per 1°F

Young's modulus of expansion = $2 \times 10^7 \text{ N/cm}^2$

23. a) Determine the most probable value of the angles of a triangle ABC, given by the following data:

$$A = 62^{\circ}14'12'' \quad \text{Weight} = 1$$

$$B = 48^{\circ}12'14'' \quad \text{Weight} = 3$$

$$C = 69^{\circ}33'28'' \quad \text{Weight} = 2$$

(OR)

- b) The following angles were measured at a station O so as to close the horizon:

$$AOB = 83^{\circ}42'28''.75 \quad \text{Weight} = 3$$

$$BOC = 102^{\circ}15'43''.26 \quad \text{Weight} = 2$$

$$COD = 94^{\circ}38'27''.22 \quad \text{Weight} = 4$$

$$DOA = 79^{\circ}23'23''.77 \quad \text{Weight} = 2$$

24. a) Find the azimuth and altitude of a star from the following data.

Latitude of the place = 46°

Hour angle of the star = $20^{\text{h}} 40^{\text{m}}$

Declination = $18^{\circ}38'S$

(OR)

b) Determine the declination and hour angle for the following data.

Star	Altitude of star	Azimuth of star	Latitude of observer
S1	22°	$50^{\circ}W$	$49^{\circ}20'N$
S2	22°	$150^{\circ}W$	$49^{\circ}20'N$
S3	22°	$50^{\circ}E$	$49^{\circ}20'N$

25. a) Explain the methods of locating sounding.

(OR)

b) Explain any two types of EDM instrument.
