KATHMANDU UNIVERSITY
End Semester Examination [C]
January, 2019

Marks Scored:

Level : B.E.
Year : II

Course : CIEG 207
Semester: II

Exam Roll No. :

Time: 30 mins.

F. M. : 10

Registration No.:

Date JAN 0 1 2019

SECTION "A"
[20 Q. × 0.5 =10 marks]

Choose and encircle the most appropriate answer.

1. If the radius of a simple curve is 300 m, the maximum length of normal chord for calculating offsets, is limited to
   a) 30 m b) 15 m c) 12.5 m d) 10 m

2. The direction of steepest slope on a contour is
   a) along the contour
   b) at right angle to the contour
   c) at an angle of 45° to the contour
   d) at an angle of 60° to the contour

3. Contours of different elevations unite to form one contour in the case of
   a) vertical cliff
   b) overhanging cliff
   c) ridge
   d) plateau

4. In a closed traverse, the sum of the north latitudes exceeds the sum of the south latitudes and the sum of west departures exceeds the sum of the east departures, then the closing line will lie in
   a) SW quadrant
   b) SE quadrant
   c) NW quadrant
   d) NE quadrant

5. Cubic parabola is a type of
   a) transition curve
   b) compound curve
   c) vertical curve
   d) simple curve

6. Which of the following methods of contouring is most suitable for a hilly terrain?
   a) Direct method
   b) Square method
   c) Cross-section method
   d) Tacheometric method

7. The staff intercept is kept constant in
   a) fixed hair method with staff vertical
   b) fixed hair method with staff normal
   c) movable hair method
   d) tangential system

8. In theodolite traversing the precision of linear measurement is 1:10000, then the allowable angular error shall be nearest to
   a) 0°20'26" b) 0°3'26" c) 0°0'40" d) 0°0'20"

9. The station from which no observations are made but angles to those stations are used for continuity of a triangulation series is known as
   a) Pivot station
   b) Satellite station
   c) Laplace station
   d) Subsidiary station

10. An instrument was set up at B and the angle of elevation of the top of an electric pole CD was 24°36'. The horizontal distance between B and C, the foot of the pole was 600 m. Determine the RL of the top of the pole, if the staff reading held on a BM (RL=1000 m) was 2.532 m.
    a) 1277.233 m b) 1272.169 m c)1000.532 m d)722.767 m

11. The most common method of tacheometry is
    a) movable hair method
    b) fixed hair method with staff normal
    c) fixed hair method with staff vertical
    d) tangential method

12. Beacon is a type of _____ signal used during triangulation surveying.
    a) Luminous b) Sun c) Night d) Opaque

13. _____ is a point where a plumb line dropped from front nodal point strikes the photograph.
    a) Focal point b) Principal point c) Nadir point d) Ground nadir point

14. A theodolite was set up at B and the angle of elevation to a target 3 m above the top of a tower was 12°15'. The horizontal distance between the instrument and the target was known to be 220 m. The RL of the top of the tower if the RL of the trunnion axis of the theodolite was 2650.602 m is
    a) 2695.369 m b) 2698.369 m c) 2701.369 m d) 2707.375 m

15. Axis method for balancing consecutive co-ordinates in the closed traverse is used when
    a) lengths are measured more accurately compared to angles
    b) angles are measured more accurately compared to lengths
    c) both lengths and angles are measured with same accuracy
    d) both lengths and angles are measured with less precision

16. A right handed circular curve with radius 400 m is inserted between two alignments with angle of intersection of 144°. The length of long chord will be
    a) 760.845 m b) 470.228 m c) 259.935 m d) 247.213 m

17. The minimum number of GPS satellites necessary in order to fix the vertical position of receiver is
    a) 3 b) 8 c) 4 d) 6

18. If apparent horizon is shown in the photograph then photograph is said to be
    a) high oblique c) tilted
    b) low oblique d) vertical

19. Global Positioning System consists of _____ segments.
    a) 2 c) 4
    b) 3 d) 6

20. Which of the following EDM uses visible light for distance measurement?
    a) Distomats b) Tellurometer c) Tacheometer d) Geodimeter

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SECTION "B"

Attempt *ALL* questions.

1. Describe the various methods of contouring. Mention the merits and demerits of each. [6]

2. Tabulate the necessary data for setting out circular curve with the following data: [5]
   Angle of intersection = 144°, Radius of curve = 300 m
   Chainage of point of intersection = 1490 m
   The curve is to be set out by offsets from chords produced with pegs at every 20 m of through chainage.

3. A gradient of +1% meets a gradient of +4% at the intersection point C, the chainage and RL of which are 600 m and 361.50 m respectively. A 200 m long vertical curve is to be inserted between the straights. Tabulate the chainages and R.L's of the station pegs at 25 m interval for setting out the vertical curve. [5]

4. To ascertain the RL and the horizontal distance between two inaccessible hills tops A and B, the following observations were made by a theodolite from the ends of a base CD 150 m long. [6]
   Angle ACD = 90°; Angle ADC = 40°; Angle BCD = 50°; Angle BDC = 78°
   Angle of elevation from C to A = 22°
   Angle of elevation from C to B = 19°
   RL of station C = 248 m, Height of instrument at C = 1.4 m.
   Calculate the RL's of A and B and also the horizontal distance AB.

5. To determine the distance between two points C and D, and their elevations, the following observations were taken upon a vertically held staff from two traverse stations A and B. The tacheometer was fitted with an anallatic lens. [6]

Traverse Station	Ht. of Inst. (m)	Co- ordinates (m)		Staff Station	Bearing	Vertical Angle	Staff Readings (m)
		N	E				
A	1.58	218.3	164.7	C	330° 20'	+12° 12'	1.255, 1.860, 2.465
B	1.50	518.2	207.6	D	20° 36'	+10° 36'	1.300, 1.885, 2.470

Calculate:

a) The distance CD.
b) The RL of C and D, if those of A and B were 432.550m and 436.865 m respectively.
c) The gradient from C to D.

6. A four sided traverse PQRS, has the following lengths and bearings: [6]

Side	Length, m	Bearing
PQ	500	Roughly East
QR	245	178°
RS	Not obtained	270°
SP	216	10°

Find the exact bearing of side PQ and length of RS.

7. Write short notes on any two: [3+3]
   a) Layouts of triangulation
   b) Photogrammetric surveying principle and its limitations
   c) GPS and its segments