KATHMANDU UNIVERSITY
End Semester Examination
February/March, 2018

Marks Scored:

Level : B.E.
Year : III

Course : GEOM 303
Semester: I

Exam Roll No.:

Time: 30 mins

F.M. : 10

Registration No:

Date : MAR 1 6 2018

SECTION "A"
[20 Q.× 0.5 = 10 marks]

Choose the most appropriate alternatives among the given choices:

1. In a dam construction surveys, vertical control survey is done by spirit levelling, which of the following will you choose?
   a. Precision levelling
   b. Single Tertiary
   c. Reciprocal levelling
   d. Simple levelling

2. Curvature correction to the computed volume is applied when
   a. The formation levels at the cross sections are at different levels
   b. The successive cross sections are not parallel to each other
   c. The distance between the successive cross sections are quite large
   d. Neither of the above conditions hold

3. In a building construction survey, the corners of the building marked by stakes or legs are lost during excavation process, what will you do for this problem?
   a. Set as property corners
   b. Set from the fixed points
   c. Set the points outside building
   d. Set a control points

4. On a mass haul diagram maximum and minimum ordinate occurs _____ respectively.
   a. At the end of a cut and embankment
   b. At the end of an embankment and cut
   c. Where cut and fill are balanced
   d. Where fill and cut are balanced.

5. The sum of latitude and departure in link traverse is given as
   a. $N_{last\ point} + N_{first\ point}$, $E_{last\ point} + E_{first\ point}$
   b. $N_{last\ point} - N_{first\ point}$, $E_{last\ point} - E_{first\ point}$
   c. $N_{first\ point} - N_{last\ point}$, $E_{first\ point} - E_{last\ point}$
   d. $N_{first\ point} + N_{last\ point}$, $E_{first\ point} + E_{last\ point}$

6. A reverse curve consists of
   a. Two circular arcs of different radii with their centers of curvature on the same side of the common tangent only.
   b. Two circular arcs of same radius with their centers of curvature on the same side of the common tangent only.
   c. Two circular arcs of different radii with their centers of curvature on the opposite side of the common tangent only.
   d. Two circular arcs of same or different radii with their centers of curvature on the opposite side of the common tangent.

7. Which of the following statement is true, regarding the advantages of transition curve?
   a. Do not allow higher speed at curves
   b. Increases the danger of overturning of vehicles
   c. Sudden transition of curvature from the tangent to a curve or from a curve to tangent
   d. Super elevation can be introduced in proportion to rate of change of curvature

8. A mass haul diagram indicates cutting if the curve _____ and indicates filling if the curve _____.
   a. Becomes horizontal in both cases
   b. Becomes vertical in both cases
   c. Rises, Falls
   d. Falls, Rises

9. Which of the following method best estimates the area of irregular and curved boundary?
   a. Trapezoidal Method
   b. Simpson's Method
   c. Average Ordinate Method
   d. Mid Ordinate Method

10. 1 hectare is equal to
    a. $1000\ m^2$ b. $708.549\ m^2$ c. 19.656 Ropani d. 16.956 Ropani

11. If g_1 and g_2 are the two gradients, r is the rate of change of grades (%) per chain, the length of the vertical curve will be
    a. $\left(\frac{g_1+g_2}{r^2}\right)$ b. $\left(\frac{g_2-g_1}{\sqrt{r}}\right)$ c. $\left(\frac{\sqrt{g_1+g_2}}{r^2}\right)$ d. $\left(\frac{g_1-g_2}{r}\right)$

12. What must be the value of deflection angle for apex distance and mid ordinate to be equal?
    a. 45^o b. 0^o c. 90^o d. 30^o

13. The component of hydropower that holds water as the load on the turbine decreases is called
    a. Surge Tank b. Draft Tube c. Trash Racks d. Penstock

14. The volume of water (reservoir capacity) between 175 and 195 m contour interval according to trapezoidal formula is:

Contour (m)	***175***	***180***	***185***	***190***	***195***
Area (m^2)	230	375	1250	1750	1975

    a. $44775m^3$ b. $47475.5m^3$ c. $22387.5m^3$ d. $22378.5m^3$

15. The command area delineation in canal surveying refers
    a. Discharge of water in canal
    b. Gradient of canal
    c. Total Irrigable land area
    d. Area of canal

16. Which of the following is at right angles to the cross cut in Mine surveying?
    a. Adit b. Drift c. Shaft d. Vein

17. The length of the radial offset from tangent for plotting circular curve by offset from tangent is given by
    a. $O_x = \sqrt{R^2 + x^2} - R$
    b. $O_x = R - \sqrt{R^2 - L^2/4}$
    c. $O_x = \sqrt{R^2 + 4x^2} - R$
    d. $O_x = R - \sqrt{R^2 + L^2}$

18. What is the distance of standard right of way (RoW) for 220kV transmission line according to Nepal Electric Authority (NEA)?
a. 7.5m b. 15m c. 25m d. 50m

19. The proposed location of the tower where the direction of the transmission line changes from one direction to another direction is known as
a. Sub station
b. Strip
c. Anchor point
d. Angle point

20. A third point C cannot be located using two points A and B of known locations by measuring
a. All the sides of triangle ABC
b. Two angles A and B and the length AB
c. All the angles of triangle ABC
d. The angle A, and the lengths AB and BC

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SECTION "B"

[6Q. × 4 = 24 marks]

Attempt *ANY SIX* questions. Assume suitable data where necessary.

1. Define prismoidal correction. Explain why prismoidal correction is always negative.
The Figure.1 shows the distribution of 12 spot heights with a regular 20 m spacing covering a rectangular area which is to be graded to form a horizontal plane having an elevation of 10.00 m. Calculate the volume of the earth. [2+2]

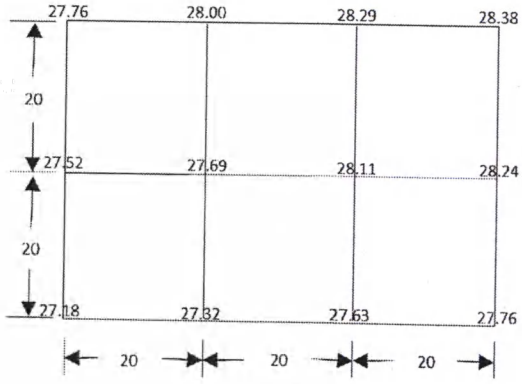


Figure.1

2. Why stake out is often termed as reverse surveying? With a neat sketch briefly explain how you would stake out a building with the help of tape and theodolite in the field. [1+3]

3. What is the specification of linear distance extent of upstream and downstream survey for suspension and RCC bridge? Mention the points that need to be taken into considerations while performing bridge site survey. [2+2]

4. Explain the process of centering theodolite as well as finding height difference inside mine with a neat sketch. If you are employed as Mine Surveyor in Mining & Construction Company, what would be your responsibility? [2+2]

5. Define transmission line survey. Mention different factors that are to be considered for selecting angle point in transmission line survey. [1+3]

6. Draw a schematic view of hydropower plant showing various components. What does a hydropower surveyor do? ***You have to explain from the surveying perspective.*** [2+2]

7. Explain the working principle of fathometers with a clear diagram. Mention any four uses of hydrographic surveying. [2+2]

8. How do you perform command area survey of a particular canal? ***Talk about both traditional and modern methods.*** What things should be taken into account for fixing canal alignment? [2+2]

SECTION "C"

[2Q. × 8 = 16 marks]

Attempt *ALL* questions. Assume suitable data where necessary.

9. Why is it necessary to partition a tract of land? As a Surveyor, if you have to partition a land parcel, how would you proceed?
An area defined by the lines of a traverse ABCDEA is to be partitioned by a line XY, X being on AB, and Y on CD having bearing 196°58'. Find the coordinates of X and Y so that the area of partitioned land XBCYX has to be $30,100m^2$. The coordinate of the traverse stations are expressed in meters and is given in table below:

Station	***A***	***B***	***C***	***D***	***E***
Easting (E)	610	1010	760	580	460
Northing (N)	760	760	260	380	510

[3+5]

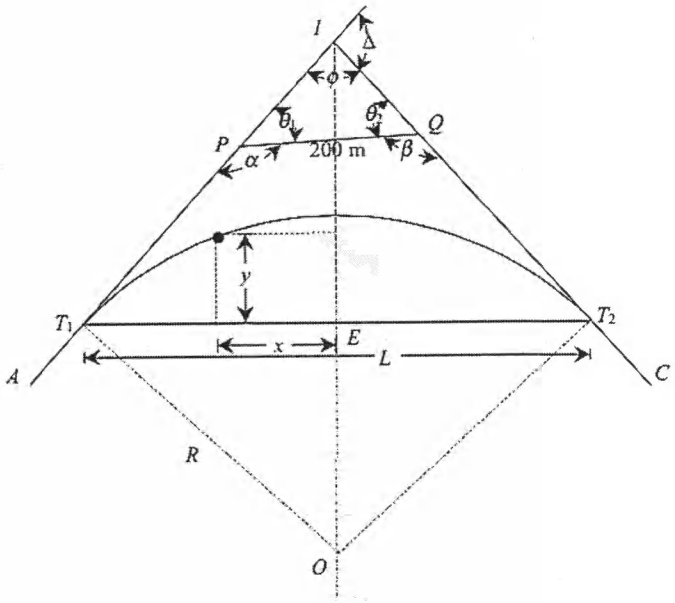
OR

A delayed survey work increases the cost of the project. What strategic detailing techniques do you think needs to be employed in order to complete the route (road) surveying detailing works in allocated time with desirable spatial and thematic accuracy?

Two straights AP and QC meet at an inaccessible point I as shown in figure. A circular curve of 500 m radius is to be set out joining the two straights. The following data were collected:

∠APQ = 157°22′, ∠CQP = 164°38′, PQ = 200 m.

Calculate the necessary data for setting out the curve by the method of offsets from long chord. The chain to be used is of 30 m length, and the chainage of P is (57 + 17.30) chains. [3+5]



10. Explain why the second differences of curve elevations are equal for a parabolic curve. Why are parabolic curves not generally used for horizontal highway curves?
A + 3.5% grade meets a -1.5% grade at station 60 + 10 and elevation 250m. An equal tangent parabolic curve 200m long has been selected to join the two tangents. Compute and tabulate the curve for stakeout at full stations. ***Candidates are also required to check by second differences.*** Assume 20m chain. [3+5]