

JK LAKSHMIPAT UNIVERSITY, JAIPUR

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Regular), April-May 2016

B. Tech in Civil Engineering, Semester IV

Roll No.....

CE408: Advanced Surveying

Time: 3 hours

Max. Marks: 100

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1A Objective type multiple choice questions (10 questions @ 1 mark)

10

- i. Basic levels GPS of accuracy of Real-Time Kinematic Float (RTK Float) is :
 - (a) 15 - 100 meters
 - (b) 0.5 - 5 meters
 - (c) 20 cm - 1 meters
 - (d) 1 cm - 5 cm
- ii. Hydrographic surveys deal with the mapping of
 - (a) large water bodies
 - (b) Movement of clouds.
 - (c) heavenly bodies
 - (d) mountainous region
- iii. An ideal vertical curve to join two gradients, is
 - a) circular
 - (b) parabolic
 - (c) elliptical
 - (d) hyperbolic
- iv. Cubic parabola is a type of curve
 - (a) compound curve
 - (b) simple curve
 - (c) reverse curve
 - (d) transition curve
- v. Different grades are joined together by a
 - (a) compound curve
 - (b) transition curve
 - (c) reverse curve
 - (d) vertical curve
- vi. The radius of curvature of a 120 m long are is given by the expression
 - (a) $R = 1146 / D$ meter
 - (b) $R = 540 / D$ meter
 - (c) $R = 1 / D$ meter
 - (d) none of the aboveWhere D is the degree of curvature.
- vii. Overturning of vehicle on a curve can be avoided by using
 - (a) transition curve
 - (b) vertical curve
 - (c) compound curve
 - (d) reverse curve



- viii Pick up the important characteristic of a target which facilitates its identification from the following:
- spectral variation
 - spatial variation
 - temporal variation
 - All of these
- ix Global Positioning Service (GPS) uses 24 satellites in:
- 9 Orbits
 - 8 Orbits
 - 7 Orbits
 - 6 Orbits
- x The latitude, longitude, and altitude displayed by a GPS receiver represent:
- an estimate of the receiver's antenna position
 - the height above MSL
 - the three dimensional position fix with millimeter accuracy
 - the height above the reference ellipsoid
- Q.2 Short answer type questions (4 questions @ 2.5 marks) 10
- Explain scale of vertical photograph.
 - What are the sensors used in IRS series
 - Write down the linear method of setting out a curve.
 - Mie Scattering
- Q.3A To straight line AC and CB, to be connected by 30° curve intersect at aching of 2760 m. The WCBs of AC and CB are $45^\circ 30'$ and $75^\circ 30'$ respectively. Calculate all necessary data for setting out a curve by the method of offsets from long chord. 05
- Q.3B What is function of aerial camera? Describe schematically its essential parts. 05
- Q.4A To determine the average scale of an aerial photograph, three points A, B and C were selected. Their elevations were obtained from a contoured map as 1400m, 900m, and 1100m. If the flying height of the aircraft above mean sea level is 3500 m and the focal length of the camera lens is 160 mm, calculate the average scale of the aerial photograph. 05
- Q.4B With the help of a neat sketch show the following elements on simple circular curve. 05
- Back tangent
 - Forward Tangent
 - Length of curve
 - Length of long chord
 - mid ordinate
- Q.5A Define "Image Enhancement" w.r.t. Digital Image Processing and explain the following Image Enhancement approaches: 05
- Spatial Domain Oriented Approach
 - Frequency Domain Oriented Approach
- Q.5B What is meant by scale of vertical photograph? Determine scale of photograph for terrain lying at elevation of 50 m and 200m if vertical photograph was taken at altitude of 1200 meters. Take focal length of camera as 15 cm. 05

Q.6A What are different methods of designation of a curve? Derive a relationship between the radius and the degree of curve. 05

Q.6B What is relief displacement? Derive an expression for the relief displacement in a vertical photograph. 05

OR

Q.6B A straight length of a highway AB appears to be 12.5 cm on a vertical air photograph of 15 cm focal length. The corresponding distance of the highway on a 1: 50,000 topographical map is 6.25 cm. Assuming the average elevation of the terrain as 1250 m above M.S.L., calculate the flying height of the camera above mean sea level. 05

Q.7A What do you understand by hydrographic surveying? Describe the procedure and method and method of 'Sounding'. 05

Q.7B Determine the offsets to be set out at 0.5 chain interval along the tangents to locate a 16- chain curve, the length of each chain being 20 m. 05

OR

Q.7B Define Radiometric corrections and explain any two common Radiometric corrections in Remotely sensed image to restore and rectify the image correctly. 05

Q.8A Two tangents intersect at chainage 59 + 60, the deflection angle being $50^{\circ}30'$. Calculate the necessary data for setting out a curve of 15 chains radius to connect the two tangents if it is intended to set out the curve by offsets from chords. Take peg interval equal to 100 links, length of the chain being equal to 20(100 links). 10

Q.9A The ground length of a line AB is known to be 545 m and elevations of A and B are respectively 500 m and 300 m above m.s.l. on a vertical photograph taken with camera having focal length of 20 cm include the image a and b of these points, and their photographs co-ordinates are : $(x_a = +2.65 \text{ cm}, y_a = +1.36 \text{ cm}); (x_b = -1.92 \text{ cm}, y_b = +3.65 \text{ cm})$ The distance ab scaled directly from the photograph is 5.112 cm. compute above the mean sea level. 10

Q.9B Explain the various mechanisms by which energy/heat can be transferred from one place to another, Give examples of each. Which mechanism is the basis of remote sensing? What type of media is required? 10

OR

Q.9B Explain the Global Positioning System (GPS) with the following subheadings: 10
(5+2.5+2.5)
(i) Major component of GPS
(ii) Factors affecting GPS accuracy
(iii) Types Geo-positioning

