Question Paper Code: R3106

B.E./B.Tech. DEGREE EXAMINATION, NOV 2025

Third Semester

R21UCE306 - SURVEYING

Civil Engineering

(Regulations R2021)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. Define Surveying.   CO1-U

2. Convert the following WCB system into RB system. WCB = 122^0 30' and 260^0 CO2-App
    30'

3. What is the relation between fundamental lines in theodolite?   CO1- U

4. What are the systems of Tacheometric survey?   CO1- U

5. Define well-conditioned triangle.   CO1- U

6. What are types of triangulation?   CO1- U

7. What is meant by EDM?   CO1-U

8. What are the accessories used in Total station?   CO1- U

9. What are the types of photogrammetric surveying?   CO1- U

10. List the main parts of aerial camera.   CO1- U

PART – B (5 x 16= 80 Marks)

11. (a) The following bearings were taken from closed compass traverse CO3-App   (16)

Line	Fore Bearing	Back Bearing
AB	191° 15'	10°15'
BC	120°45'	300° 45'
CD	349° 05'	169° 00'
DE	339° 35'	160° 40'
EA	296°00'	115°00'

Find the included angle.

Or

(b) The following staff readings were observed successively with a   CO2-App (16)
level, the instrument has been moved after third, sixth and eighth
readings: 3.185, 3.845, 2.165, 2.645, 2.780, 0.985, 2.645, 0.430,
1.465, 1.570, 0.790, 1.945, 0.650, 1.340, 0.530 meters. Enter the
above readings in a page of a level book & calculate the R.L. of
points by Rise & Fall method, if the first reading was taken with
a staff held on bench mark of 250.000 m. Apply the usual
checks.

12. (a) For Determining the multiplying constants of a tachometer the   CO2-App (16)
following observations were taken on a staff held vertically at
distances, measured from the instrument.

Observation	Horizontal distance	Vertical angle	Staff intercept
1	40	$+ 2^0\ 36'$	0.400 m
2	80	$+ 1^0\ 12'$	0.795 m
3	120	$+ 0^0\ 30'$	1.200 m

The focal length of the object glass is 20 cm and the distance
from the object glass to trunnion axis is 10 cm. The staff is held
vertically at all these points. Find the multiplying constant.

Or

(b) Given the cross-sectional areas of an embankment at 20 m   CO2-App (16)
intervals, estimate the total earthwork volume using: 40,000 m²,
60,000 m², 82,000 m², 1,10,000 m², 1,35,000 m² using
a) Trapezoidal Method,
2,500 m², 7,500 m², 14,500 m², 24,000 m², 37,500 m² using
(b) Prismoidal Formula.

13. (a) From a Satellite station S, 5.8 m from the main triangulation   CO4-App (16)
station A, whether all the lines are running in same direction the
following directions were observed:

A	0^0	0'	0"
B	132^0	18'	30"
C	232^0	24'	6"
D	296^0	6'	11"

The lengths AB, AC and AD were computed to be 3265.5 m,
4022.2 m and 3086.4 m respectively. Determine the direction of
AB, AC and AD.

Or

R3106

(b) In surveying, curves are essential for designing and aligning roads, railways, and other infrastructure projects. Suggest suitable curves? CO4-App (16)

14. (a) Given a drone flying autonomously using GPS, explain how the space, control, and user segments of the GPS system interact to help the drone accurately determine its real-time position and adjust its flight path accordingly. CO3- App (16)

Or

(b) Describe how GIS tools can be used to solve practical problems in agriculture, city planning, or during natural disasters. Provide real-world examples to support your explanation. CO3- App (16)

15. (a) An object 4.0 cm in size, is placed 25.0 cm in front of a concave mirror of a focal length of 15.0 cm.
(i) At what distance from the mirror should a screen be placed in order to obtain a sharp image?
(ii) Find the size of the image.
(iii) Draw a ray diagram to show the formation of the image in this case. CO4-App (16)

Or

(b) If you are assigned to survey an urban drainage system using drones, describe how you would plan flight paths, data acquisition and post-processing to identify waterlogging zones. CO4- App (16)

R3106