

# CBGS SCHEME

21CV32

USN

--	--	--	--	--	--	--	--	--	--

## Third Semester B.E. Degree Examination, June/July 2023 Geodetic Engineering

Time: 3 hrs.

Max. Marks: 100

- Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.  
2. Assume any missing data suitably and state the same clearly.

### Module-1

- 1 a. Explain briefly about i) Principles of surveying ii) Different types of meridians used for determining the bearings of lines. (08 Marks)  
b. The bearings of a closed traverse sides AB, BC, CD, DE and EA are as shown in Table. Q1(b). Calculate the interior angles of the traverse. (06 Marks)

Table Q1(b)

Side	Fore bearing	Back bearing
AB	107° 15'	287° 15'
BC	22° 0'	202° 0'
CD	281° 30'	101° 30'
DE	189° 15'	9° 15'
EA	124° 45'	304° 45'

- c. Explain briefly about advantages and disadvantages of plane table surveying. (06 Marks)

### OR

- 2 a. Explain briefly about i) Importance of surveying in Civil Engineering ii) Magnetic dip, Magnetic declination and Local attraction. (08 Marks)  
b. Determine the angle between the lines OA and OB, if their respective bearings are as described below for three different cases: (06 Marks)  
i) 32° 15' and 148° 45' ii) 16° 10' and 332° 18' iii) 126° 12' and 300° 15'  
c. Explain briefly with procedure about three point problem in plane table survey. (06 Marks)

### Module-2

- 3 a. Explain briefly about profile levelling and cross sectioning and their uses in Civil Engineering projects. (06 Marks)  
b. The following data as shown in Table Q3(b), were recorded from 4.00m levelling staff with dumpy level between two main stations 'A' and 'B'. The bench mark of station 'A' is 520.450m. Determine the reduced level of station 'B' and conduct the necessary arithmetic checks. (07 Marks)

Table Q3(b)

Sl.No.	Description about leveling staff reading
1.	First reading at 'A' = 0.585
2.	Reading before changing Dumpy level = 3.940
3.	Reading after changing Dumpy level = 0.960
4.	Reading before changing Dumpy level = 3.845
5.	Reading after changing Dumpy level = 0.955
6.	Reading at 'B' = 3.015

- c. The following perpendicular offsets were taken at 10.00m intervals from a survey line to an irregular boundary line : 3.82m, 4.37m, 6.82m, 5.26m, 7.59m, 8.90m, 9.52m, 8.42m and 6.43m. Determine the area enclosed between the survey line, irregular boundary line and the first and last offsets by i) Simpson's rule ii) Trapezoidal rule. (07 Marks)

OR

- 4 a. Explain briefly about i) Procedure for determining the area of an irregular figure by using planimeter ii) Temporary adjustments for levelling instruments. (08 Marks)
- b. The reduced level of the floor in a building is 100.595m. The reading recorded by placing leveling staff on the floor is 1.795m and placing the leveling upside down below the Soffit of the roof beam is 2.295m. Determine the reduced level of the soffit of the roof beam and height of the soffit of the roof beam with respect to floor level. (05 Marks)
- c. Determine the volume of earth embankment for the data given in Table. Q4(c) by Prismoidal rule and Trapezoidal rule. (07 Marks)

Table Q4(c)

Chainage along centre line of embankment in m.	Cross section area of embankment in m <sup>2</sup> .
0.00	0.00
30.00	150.00
60.00	155.00
90.00	153.00
120.00	156.00
150.00	148.00
180.00	152.00
210.00	154.00
240.00	157.00

**Module-3**

- 5 a. Explain briefly about measuring horizontal angle from theodolite by repetition method and state what errors will be eliminated by this method. (06 Marks)
- b. Theodolite was set over station 'P' which is a temporary bench mark of reduced level 832.000m. Height of horizontal axis of the theodolite above the temporary bench mark is 1.250m. The readings recorded through stadia hair of the theodolite by placing levelling staff at station Q in vertical position is 1.200m, 1.930 and 2.650 respectively with angle of elevation as  $9^{\circ} 30'$ . Determine the distance PQ and reduced level of station Q. Consider the multiplier constant as 100 and additive constant as 0.30 for the theodolite. (06 Marks)
- c. Determine the elevation of the top of the chimney point 'Q' from two instrument stations 'P' and 'R' spaced at a horizontal distance of 100m between them. The base of point 'Q' is inaccessible. Stations 'P', 'R' and the point 'Q' are in one single vertical plane. The angle of elevation of point 'Q' measured from the stations 'P' and 'R' were  $28^{\circ} 42'$  and  $18^{\circ} 6'$  respectively. The leveling staff was placed in the bench mark and the readings recorded from stations 'P' and 'R' were 2.870 and 3.750m respectively. The reduced level of the bench mark is 287.280m. Determine the elevation of the top of the chimney point 'Q'. (08 Marks)

OR

- 6 a. Explain briefly about temporary and permanent adjustments of theodolite. (06 Marks)
- b. Explain briefly about determining distance and elevations using Tacheometric method. (06 Marks)
- c. Determine the elevation of top of the building point 'Q' from two stations 'P' and 'R', spaced at 60.00m between them by double plane method. The horizontal angle measured at station 'P' between 'R' and 'Q' were found to be  $60^{\circ} 30'$  and angle of elevation measured from station 'P' to 'Q' was  $10^{\circ} 12'$ . The horizontal angle measured at station 'R' between 'P' and 'Q' were found to be  $68^{\circ} 18'$  and the angle of elevation measured from 'R' to 'Q' was found to be  $10^{\circ} 48'$ . Leveling staff was placed on bench mark having reduced level value of 435.065m. The readings recorded on leveling staff from the stations 'P' and 'R' were found to be 1.965m and 2.055m respectively. Consider the bore of Q as inaccessible. (08 Marks)

**Module-4**

- 7 a. Explain briefly about i) Different types of circular curves ii) Transition curves  
iii) Vertical curves along with their applications. (06 Marks)
- b. Calculate the required data for setting out a simple curve from the method of offsets from the long chord. The radius of the curve is 100m, deflection angle is  $60^\circ$  and consider the peg interval along the long chord as 10m. (06 Marks)
- c. Calculate the necessary data for setting out a simple circular curve of radius 600m to connect two straights intersecting at a chainage of 3605.00m by Rankine's method, using theodolite of one second accuracy. Consider the deflection angle as  $25^\circ$  and peg interval as 30m. (08 Marks)

OR

- 8 a. A transition curve is to be provided for a circular curve of radius 300m. Calculate the length of transition curve required for the condition of rate of gain in acceleration as  $0.50\text{m/s}^3$  and speed of the vehicle a 50 K.M.P.H. (04 Marks)
- b. Two tangents intersect at chainage 1190.00m. Calculate the data necessary for setting out a simple curve of radius 300m, having deflection angle of  $36^\circ$  by offsets from chords produced. Consider the peg interval as 30m. (06 Marks)
- c. Explain briefly about different components of a compound curve with the aid of neat figure and describe a detailed procedure for setting out the compound curve by Rankine's method. (10 Marks)

**Module-5**

- 9 a. Explain briefly about various methods used for plotting map details in aerial surveying. (06 Marks)
- b. Explain briefly about remote sensing and how it differs from photogrammetry survey. (07 Marks)
- c. Explain briefly about i) Total station ii) Electronic distance measuring systems, along with their applications. (07 Marks)

OR

- 10 a. Explain briefly about different applications of remote sensing. (06 Marks)
- b. Explain the terms : i) Spatial data ii) Raster iii) Vector iv) Geocoding, used in GIS. (07 Marks)
- c. Explain briefly what is GPS and what are its applications. (07 Marks)

\*\*\*\*\*