

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

THIRD SEMESTER B.TECH DEGREE EXAMINATION (S), MAY 2022

CIVIL ENGINEERING
(2020 SCHEME)

Course Code : 20CET205

Course Name: Surveying and Geomatics

Max. Marks : 100

Duration: 3 Hours

PART A

(Answer all questions. Each question carries 3 marks)

1. Define magnetic declination. The magnetic bearing of line PQ is $124^{\circ} 35'$. Find its true bearing, if the magnetic declination is $10^{\circ} 10' W$.
2. Elucidate the principle of levelling.
3. Sketch the mass diagram for a balanced, borrow and waste operation.
4. List any 6 factors to be considered while selecting a triangulation station.
5. Outline the checks in a closed traverse.
6. Summarize the types of errors.
7. With neat sketches briefly explain the classification of circular curves.
8. Demonstrate the concept of EDM.
9. Illustrate the principle of position determination by satellite ranging.
10. Give an example of map projection that preserves the specific property given under each case:
 - (i) Shape (ii) Area (iii) Distance

PART B

(Answer one full question from each module, each question carries 14 marks)

MODULE I

11. a) The following are the bearings of the traverse taken from a compass survey.

Line	Fore Bearing	Back Bearing
AB	$75^{\circ} 5'$	$254^{\circ} 20'$
BC	$115^{\circ} 20'$	$296^{\circ} 35'$
CD	$165^{\circ} 35'$	$345^{\circ} 35'$
DE	$224^{\circ} 50'$	$44^{\circ} 5'$
EA	$304^{\circ} 50'$	$125^{\circ} 5'$

(10)

- (i) Find the stations which are affected by local attraction.
 - (ii) Determine the corrected magnetic bearings.
 - (iii) If the declination was $10^{\circ} 10' E$
- b) Discuss the characteristics of contour with suitable sketches. (4)

OR

12. a) The following are staff readings taken while making levels of a field book. Station A is taken as B.M with R.L 81.000m. The instrument is shifted after 3th ,7th and 9th readings. Readings are 0.320, 0.990, 0.770, 1.030, 1.105, 1.110, 0.550, 1.400, 1.000, 0.330 and 1.200. Book these readings in the field book and find out the R.Ls. (10)
- b) Illustrate the principles of surveying. (4)

MODULE II

13. a) A railway embankment of formation width 10 m is to be built with side slope of 1 vertical to 2 horizontal. The ground is horizontal in the direction transverse to the centre line. Length of embankment is 150 m. The centre height of embankment at 25 m intervals are 1.8, 3.3, 3.6, 4.2, 2.9, 2.6 and 2.2 m. Calculate the volume of earth filling by using prismatic formula and trapezoidal formula. (10)
- b) Demonstrate the method of measurement of horizontal and vertical angles using a theodolite. (4)

OR

14. a) The following directions were observed from a satellite station S, 62.18m from station C. Following were the results.
 $\alpha A = 0^\circ 0' 0''$
 $\alpha B = 71^\circ 54' 32''$
 $\alpha C = 296^\circ 12' 02''$
 The approximate lengths of AC and BC were 8240.60 and 10863.60m. Calculate the angle ACB. (10)
- b) Illustrate the principle of stadia tacheometry. (4)

MODULE III

15. a) A four-sided traverse ABCD has the following length and bearings. Find the exact bearing of side AB.

Line	Length	Bearing
AB	500	Roughly East
BC	245	178°
CD	?	270°
DA	216	10°

- b) State the fundamental principle of least squares. Prove that the most probable value of an observed quantity is equal to the weighted arithmetic mean of the observed values. (7)

OR

16. a) The angles of a triangle ABC were recorded as follows
 $A = 77^\circ 14' 20''$ weight 4
 $B = 49^\circ 40' 35''$ weight 3
 $C = 53^\circ 04' 52''$ weight 2 (10)

Give the corrected values of the angles.

- b) Describe the procedure for balancing a closed traverse by graphical method. (4)

MODULE IV

17. a) Demonstrate with neat figures the procedure for setting out of curve using any two angular methods. (10)
b) List the advantages and applications of total station. (4)

OR

18. a) Comment on transition curve along with its functions. Summarize the methods to find the length of a transition curve? (10)
b) Briefly explain the principle and working of EDM. (4)

MODULE V

19. a) Illustrate with figure, the components of GPS along with their functions. (7)
b) What is resolution? Explain any 3 types of resolution (7)

OR

20. a) Explain spectral reflectance. With neat sketches justify the reflectance characteristics of vegetation, soil and water. (10)
b) Outline the Civil Engineering applications of GIS? (4)
