



- PART B
11. (a) (i) State and explain the principles of surveying. (9)  
(ii) Describe the construction and working of an optical square with a neat sketch. (7)

Or

- (b) (i) What do you mean by ranging? Explain the two methods of ranging. (9)  
(ii) A chain line AB crosses a river, M and N being on the near and distant banks respectively. A point P is measured 105 m at right angles to AB from M. At P, PA and PN are set out such that angle APN is  $90^\circ$ . AM measured is 85 m. Find MN, the width of the river. (7)
12. (a) Following bearings were taken in running a compass traverse. At what stations do you suspect local attractions? Find the corrected bearings and included angles. (16)

Line	F.B.	B.B.
PQ	N $46^\circ 10'E$	S $46^\circ 10'W$
QR	S $60^\circ 40'E$	N $61^\circ 20'W$
RS	S $10^\circ 30'E$	N $08^\circ 50'W$
SP	N $79^\circ 40'W$	S $80^\circ 40'E$

Or

- (b) Discuss the following in detail about plane tabling (6)  
(i) Errors. (6)  
(ii) Advantages and Limitations. (5)  
(iii) Method of Intersection (5)
13. (a) In running fly levelling from a BM of RL 100m, the following readings were taken.

Back Sights	3.125	1.030	1.295	1.855
Fore Sights	1.225	3.290	2.085	

From the last position of the instrument, 6 pegs at 25 m intervals are to be set out on a uniformly falling gradient of 1 in 250. The top of first peg is to have a RL of 99.205. Work out the staff readings required to set out the tops on the given gradient. Show the results as it is shown in a level book. (16)

Or

- (b) (i) State the different methods of contouring. Explain any two methods. (9)
- (ii) What are Contours? State and brief the characteristics of Contours. (7)

14. (a) Explain the various sources of errors in theodolite surveying. (16)

Or

- (b) Following lengths and bearings were recorded in running a theodolite traverse in the counter clockwise direction, the length of CD and bearing of DE having been omitted. Determine the omitted measurements. (16)

Line	Length in m	R.B.
AB	281.4	S 69°11'E
BC	129.4	N 21°49'E
CD	?	N 19°34'W
DE	144.5	?
EA	168.7	S 74°24'W

15. (a) (i) Explain the double theodolite method of setting out of a simple curve. (9)
- (ii) Draw a neat sketch showing a simple curve and its component features and define each of them. (7)

Or

- (b) Explain the various surveys to be carried out for the effective implementation of a highway project. (16)