



17310

21415

3 Hours/100 Marks

Seat No.

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- Instructions:** (1) **All** questions are **compulsory**.
(2) Answer **each** next main question on a **new page**.
(3) Illustrate your answers with **neat sketches wherever necessary**.
(4) Figures to the **right** indicate **full** marks.
(5) **Assume** suitable data, if **necessary**.
(6) **Use** of non-programmable Electronic Pocket Calculator is **permissible**.
(7) Mobile Phone, Pager and any other **Electronic Communication** devices are **not permissible** in Examination Hall.
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MARKS

1. A) Attempt **any six** of the following :

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- a) Write four uses of surveying.
- b) Differentiate primary classification of surveying with respect to extent of area and curvature of earth.
- c) Define Ranging and Chaining.
- d) Define :
 - i) Traversing
 - ii) Magnetic meridian.

P.T.O.



- e) Define local attraction. State two causes of local attraction.
- f) State two principles of plane table survey.
- g) Define horizontal line and vertical line.
- h) Define change point and its necessity in levelling.

B) Attempt **any two** of the following :

8

- a) Draw conventional symbols for :
 - i) Embankment
 - ii) Pond or Lake
 - iii) Tunnel
 - iv) Compound wall.
- b) What are the objectives of following one each ?
 - i) Topographic survey
 - ii) Cadastral survey
 - iii) Engineering survey
 - iv) Mine survey.
- c) Explain in brief linear measurement using :
 - i) Pacing
 - ii) Digital tape.



2. Attempt **any four** of the following :

16

a) Write the code of signals used in ranging with respect to :

- i) Correct position
- ii) Fix the ranging rod
- iii) Vertical position of ranging rod
- iv) Move slowly to left of observer.

b) Explain with sketch method of stepping of chaining on sloping ground.

c) A 20 m chain was found to be 6 cm too long after chaining a distance of 1059 m. It was found to be 9 cm too short after chaining at the end 1985 m. If the chain was correct before commencement of work. Find the true distance.

d) Define the terms :

- i) Survey station
- ii) Survey line
- iii) Offset
- iv) Triangulation.

e) i) State four instruments used for setting offsets.

ii) State principle of optical square.

f) Draw sketch and write the procedure for setting offset to the left or right side of survey line with open cross-staff.



3. Attempt **any four** of the following :

16

- a) i) Write three types of obstacles in chaining with examples.
ii) Draw sketches (two), how to overcome pond across the chain line.
- b) i) Define Dip and deflection of needle.
ii) Find the magnetic declination if the magnetic bearing of the sun at noon is $355^{\circ} 30'$.
- c) Write the functions of the following component of prismatic compass
- i) Prism
 - ii) Lifting pin
 - iii) Prism cap
 - iv) Agate cap.
- d) Define the terms :
- i) Fore bearing
 - ii) Open traverse
 - iii) Closing error
 - iv) Reduced bearing.
- e) i) State temporary adjustments of prismatic compass.
ii) Why zero is marked at south end on a graduated circle of prismatic compass ?
- f) Draw and explain graphical adjustment of closing error in compass traverse survey.



4. Attempt **any four** of the following :

16

a) i) Correct the following bearings :

Reduced bearing S $65^{\circ} 15'$ W and whole circle bearing 372° .

ii) Convert the following bearings :

R.B. to W.C.B. = N $30^{\circ} 15'$ W

and W.C.B. to R. B. = $119^{\circ} 45'$.

b) Define orientation. State two methods of orientation. Which method is accurate and why ?

c) Draw sketch and explain method of traversing of plane table surveying.

d) Write any four advantages of intersection method of plane tabling over radiation method of plane tabling.

e) i) State two advantages of telescopic alidade over simple alidade.

ii) State advantages of plane table survey one each with respect to booking and suitability.

f) State fundamental lines and their relationship with each other of dumpy level.

5. Attempt **any four** of the following :

16

a) i) Explain temporary adjustment. (only levelling with help of foot screws)

ii) Write two advantages of Auto level over dumpy level.

b) Draw sketch and explain how to find height of chajja or slab using dumpy level.

c) State the purpose of following methods of levelling :

i) Profile levelling

ii) Fly levelling

iii) Check levelling

iv) Reciprocal levelling.



- d) State the important points kept in mind while recording the staff readings in level pages with respect first reading, intermediate reading, last reading, change point, carry forward from one page to next page – Remarks.
- e) Write errors in levelling (two each) and corresponding precautions :
- i) Instrumental errors with respect to bubble tube, levelling staff.
 - ii) Manipulation errors with respect to parallax, levelling of instrument.
- f) Distinguish between 'H. I. method' and 'Rise and fall method' with respect to time, checks, application and simplicity.

6. Attempt **any two** of the following :

16

- a) Draw and calculate the area of plot ABCDEFA in m^2 , Are, Hectares, from given following data :

Offset points	A	B	C	D	E	F	A
Chainage (m)	12	35	57	88	72	57	12
Offset length and position	0	50 (L)	00	18 (R)	18 (R)	60 (R)	0

- b) i) Following are the F. B. and B.B. of a closed traverse ABCDA. Detect the stations affected by local attraction. Calculate corrected bearings. Show sample Calculations.

Line	F. B	B. B
AB	S 45° 30' E	N 45° 30' W
BC	N 60° 0' E	S 60° 40' W
CD	N 5° 30' W	S 5° 30' E
DA	S 55° 30' W	N 55° 30' E



- ii) The following bearings were taken in traversing with a prismatic compass. Calculate back bearings and interior angles in a closed traverse PQRS. Apply usual check.

Line	F. B
PQ	124° 30'
QR	68° 15'
RS	310° 30'
SP	200° 15'

- c) i) The following page of old level book having few staff readings missing. Find out the missing reading and rewrite the page. Apply usual checks.

Staff stn.	Staff readings			Rise	Fall	R.L. (m)	Remark
	BS	IS	FS				
1	X					450.00	B.M.1
2		1.650		0.500		X	
3	X		1.965		X	X	C.P.1
4			1.825	X		450.585	Last Reading

- ii) The following readings were taken with a dumpy level and 4 m staff over downward slope of hill 0.570 (First point) 1.925, 3.780, 0.430, 3.250 (last point). The R. L. of first staff station is 245.500 m. Prepare the level page, enter all the staff readings and calculate reduced levels by H. I. method. The staff interval is 20 m between two consecutive staff. Find gradient in percentage of a line joining first and last point. Apply usual checks.
