B.E (CIVIL ENGG.) 2nd YEAR 1st SEMESTER EXAMINATION, 2019 (OLD)
(1st / 2nd Semester /~~Repeat~~/ ~~Supplementary~~ / ~~Annual~~ /~~Biannual~~)

SUBJECT: SURVEYING-I

Time: ~~Two hours~~/Three hours/~~Four hours~~/ ~~Six hours~~

Full Marks ~~100~~
(50 marks for each part)

Use a separate Answer-Script for each part

No. of Question	Part-I	Marks
	Answer Question-1 and any *three* from the rest	
Q.1)	**Fill in the blanks with appropriate word(s):**	8*1=8
a)	A representation is called a plan when the scale is	
b)	Invar tape is made of an alloy of steel (64%) and	
c)	.... is the average distance of the fluctuating surface from the centre of the earth.	
d)	A perpendicular can be erected to a chain line at a point on it by .... method.	
e)	True bearing of a line is also called	
f)	Quadrantal bearings are observed by	
g)	The coordinates of any point with reference to a common origin are called	
h)	.... method of plane table surveying involves drawing of ray from the preceding station to the station to be occupied by the instrument.	
Q.2) a)	**"Surveying should be carried out from whole to part and not from part to whole"**- justify this statement	3
b)	Discuss with the help of pertinent expression on the **"Slope Correction"** in connection with distance measurement.	·3
c)	A steel tape was exactly **30m** long at **20°C** when supported throughout its length under a pull of **15Kg**. A line was measured with a pull of **11Kg** applied to the tape at a mean temperature of **13°C** and found to be **810m** long. Given, the cross sectional area of the tape=**0.033cm²**; total weight of the tape=**0.67Kg**; α for steel=**11*10⁻⁶/°C**; E for steel= **2.1*10⁶ Kg/cm²**. Mean elevation of the line above mean sea level is **941m**. Radius of Earth is **6371 km. Compute the true length of the line if the tape was supported during measurement at every 15m.**	8

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Full Marks ~~100~~
(50 marks for each part)

No. of Question	Part-I	Marks
Q.3) a)	Discuss with the help of a neat sketch the following terms in the context of Chain Surveying: i) Base Line ii) Oblique Offset	(2+2)
b)	Discuss with the help of a neat sketches the methods followed to measure **horizontal distance across a river.**	5
c)	Deduce the necessary expression for calculating the **limiting length of** the offset when the error is in both length and direction.	5
Q.4) a)	State the **Transit Rule** of adjustment of closing error in a closed traverse. Explain the method of graphical adjustment of closing error with the help of a neat sketch.	(3+5)
b)	The following were the observed fore and back bearings of different sides of a closed traverse ABCDEA: AB= 292°15′/11°45′, BC= 221°45′/41°45′, CD= 90°05′/270°00′, DE= 80°35′/261°40′ and EA=37°00′/216°30′, Find the true bearings of all the sides for the area where the magnitude of magnetic declination is given as 8°35′W.	(4+2)
Q.5) a)	State the major **advantages** of **Plane Table Surveying.**	4
b)	State the "Three Point Problem" of establishing the position of instrument station. Explain with neat sketches the solution of the problem	(2+8)

B.E. CIVIL ENGINEERING SECOND YEAR FIRST SEMESTER EXAM 2019 (Old)

Subject: SURVEYING I (OLD)   **Time: Three Hours**   **Full Marks: 100 (50 for Each Part)**

Part: PART-II

Use a Separate Answer-Script for Each Part
Answer any 3 (three) questions (Two Marks for Neatness)

1. (a)   A fly level was run from a Benchmark (BM) with RL = 384.705 and following readings were   10
obtained (Figures in brackets indicate respective station no.): BS Readings: 3.215 (BM), 1.030 (1),
1.295 (2), 1.855 (3); FS Readings: 1.225 (1), 3.290 (2), 2.085 (3). From the last instrument
position, 6 pegs are to be set at 25m interval on a uniformly falling gradient of 1 in 100. If the
desired RL of the top of the first peg = 384.500, work out the staff readings for setting all the peg
tops on the given gradient.

1. (b)   With neat diagrams wherever necessary, describe different characteristics of contours.   6

2. (a)   With the help of a neat diagram explain the errors due to 'Curvature' and 'Refraction' and write   3
down the equations to express them.

2. (b)   The observation ray between two triangulation stations A and B just grazes the sea. If the heights   3
of A and B are 8000m and 2000m respectively determine the approximate distance between them.
Diameter of Earth = 12880km.

2. (c)   The following staff readings are taken during reciprocal leveling for two points A and B on   10
opposite sides of a river (notation in brackets denotes staff positions): Instrument near A: 2.642
(A), 3.228 (B); Instrument near B: 1.086 (A), 1.664 (B). Distance between P and Q is 1010m and
the RL of P is 126.386. Find the true difference in levels of A and B. Also calculate the combined
error due to curvature and refraction, and the collimation error, if the distance between AB = 500m.

3. (a)   With neat diagrams deduce the expressions for calculating area using (a) Latitudes and Meridian   8
Distances (MD) and (b) Latitudes and Double Meridian Distances (DMD) for closed traverse.

3. (b)   The corrected latitudes and departures for the sides of a closed traverse ABCD are as follows;   8
Latitudes: AB = 108 (N), BC = 15 (N), CD = 123 (S), DA = 0 (N); Departures: AB = 4 (E), BC =
249 (E), CD = 4 (E), DA = 257 (W). Calculate the enclosed area using MD and DMD methods.

4. (a)   With neat diagrams deduce the expressions for calculating cross-sectional areas for (a) Two- Level   8
Section (b) Side Hill Two-Level Section and (c) Three-Level Section.

4. (b)   A railway embankment 400m long is 12m wide at the formation level and has the side slope 2:1.   8
The ground levels (RL) at every 100m along the centre line is as follows (reading in brackets
denotes distances): 204.8 (0), 206.2 (100), 207.5 (200), 207.2 (300), 208.3 (400). The formation
level at zero chainage is 207.00 and the embankment has a rising gradient of 1 in 100. The ground
is level across the centre line. Calculate the volume of earthwork using 'Trapezoidal Rule' and
'Prismoidal Rule'.