Ref. No.EX/CE/T/213/2018 (OLD)(S)

B.CIVIL ENGG 2ND YEAR 1ST SEM. Supplementary EXAM. 2018

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

Part: HALF-I

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

1. (a)	With a neat diagram briefly explain the following terms in relation to 'Levelling': Level Surface, Datum, Benchmark and Change Points	4
1. (b)	The following readings are taken for 8 stations from an old level book (readings in brackets indicate respective station no.): BS Readings: 3.125 (1), 1.620 (6); IS Readings: 2.320 (3), 3.625 (7); FS Readings: 2.655 (5), 3.205 (6); Rise: 1.325 (2); Fall: 0.055 (3), 2.165 (6); RL: 125.005 (2), 125.350 (4), 122.590 (8); Remarks: BM (1), TP (2), TP (5), TP (6), TBM (8). Reconstruct the page, enter the missing readings and apply usual checks. Also calculate the corrected RL of the TBM if the instruments has an elevated collimation error of 30″. Average BS distance = 40m and average FS distance = 90m.	12
2. (a)	With the help of a neat diagram explain the errors due to 'Curvature' and 'Refraction' and write down the equations to express them.	3
2. (b)	The following staff readings are taken during reciprocal leveling for two points P and Q (notation in brackets denotes staff positions): Instrument near P: 1.824 (P), 2.748 (Q); Instrument near Q: 0.928 (P), 1.606 (Q). Distance between P and Q is 1010m and the RL of P is 126.386. Find the true RL of Q and determine the errors due to curvature, refraction and improper adjustment of line of collimation.	7
2. (c)	With neat diagrams wherever necessary, describe different characteristics of contours.	6
3. (a)	With neat diagrams deduce the expressions for calculating areas using regular interval offsets to a baseline using (a) Trapezoidal Rule and (b) Simpson's One-Third Rule.	6
3. (b)	A series of offsets were taken from a chain line to a curved boundary line at intervals of 15 meters in the following order: 0, 2.65, 3.80, 3.75, 4.65, 3.60, 4.95, 5.85m. Compute the area between the chain-line, the curved boundary and the end offsets by (a) Mid-ordinate Rule, (b) Average-ordinate Rule, (c) Trapezoidal Rule and (d) Simpson's One-Third Rule.	10
4. (a)	With neat diagrams deduce the expressions for calculating cross-sectional areas for (a) Side Hill Two-Level Section and (b) Three-Level Section.	5
4. (b)	What is a 'Prismoid'? With neat diagram deduce the 'Prismoidal Formula' for calculating the volume.	5
4. (c)	A railway embankment 400m long is 12m wide at the formation level and has the side slope 2:1. 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'.	6

Form A: Paper –Setting Blank Ref No. Ex/CE/T/213/2018(S)(OLD)

B.E (CIVIL ENGINEERING) 2nd YEAR 1st SEMESTER (SUPPLEMENTARY) EXAMINATION, 2018
(~~1st~~ / ~~2nd~~ Semester /~~ Repeat /~~ Supplementary / ~~Annual / Biannual~~) (OLD)

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-II	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

Form A: Paper –Setting Blank

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B.E (CIVIL ENGINEERING) 2nd YEAR 1st SEMESTER (SUPPLEMENTARY) EXAMINATION, 2018

(~~1st~~ / 2nd Semester / ~~Repeat~~ / Supplementary / ~~Annual~~ / ~~Biannual~~) (OLD)

SUBJECT: SURVEYING-I

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

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

No. of Question	Part-II	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)