Ref. No. : Ex/CON/T/212/2018(S)

B.E. CONSTRUCTION ENGINEERING SECOND YEAR FIRST SEMESTER SUPPLEMENTARY EXAM – 2018

Subject: SURVEYING **Time: 3 Hour** Full Marks : 100

Instructions:

1. All questions are compulsory.
2. Illustrate your answers with neat sketches wherever necessary.
3. Figures to the right indicate full marks.
4. Assume suitable data if necessary.
5. Preferably, write the answers in sequential order.

1. (i) Define latitude and departure. (ii) What is northing and southing? (iii)What is easting and westing? (iv) Define closing error. (v) What are methods of balancing the traverse? (vi) What is the use of Gale's traverse table? (vii)Explain the different method of ranging with neat sketch (viii) What are the accessories for a chain survey? Explain the functions of each.

OR

The consecutive readings taken during a leveling operation are as follows: 0.685, 1.315, -1.825, -0.635, 1.205, 1.235, 2.631, 1.355, -2.015. The instrument was shifted after the third and sixth readings. The third reading was taken to benchmark of assumed elevation 100.00. Find the reduced levels of other points **with necessary checks**. Explain the differences between the HI and the rise and fall method of reduction of levels. **(15)**

2. A 30m steel tape was standardized on the flat and was found to be exactly 3mm under no pull at 66°F. It was used in catenar to measure a base of 5 bays the temperature during the measurement was 92°F and the pull exerted during the measurement was 10kg. The area of the cross section of the tape was 0.08 sq.cm and the specific weights of steel is 7.86 g/cc. α = 0.0000063 per 1°F and e = 2.109 x 10 6 kg/sq.cm. Find the true length of the line.

OR

A survey line AB crosses a river obliquely. P and Q are two points selected on the line one at each end of the river. Another line EPF is run parallel to the centre line of the river and point E is such that angle QEP is right angle and EP = PF = 100 m. A third point G is set at a distance of 150 m from P such that angle GFP is also right angle. Compute the distance PQ. **(10)**

3. a. From the given data calculate only the deflection angles of the Transition curve for setting out purpose with **NECESSARY CHECKS**? Minimum peg interval = 1.5 m Velocity = 65km/hr Radius = 250m α = rate of change of radial acceleration = 1.01m/sec^3 Meter age at intersection point = 3000m I=Intersection angle = 36^{0}34'30".

b. Explain the characteristics of contours. c. Explain the methods of locating contours

OR

a. Explain the interpolation of contours with neat sketch. b. Explain the uses of contours maps.

c. The following observation were made using a tacheometer fitted with an anallatic lens, the multiplying constant being 100.

Inst. station	Height of axis	Staff station	WCB	Vertical angles	Hair readings	Remarks
O	1.550	A	30°30′	4°30′	1.155, 1.755, 2.355	RL of O = 150.00
		B	75°30′	10°15′	1.250, 2.00, 2.750	

Calculate the distance AB, and the RLs of A and B. Find also the gradient of the line AB.

(25)

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B. Construction Engg. 2nd Yr 1st Semester Supple. Exam. 2018

Surveying
(Part – II)

Answer Q.no.1 and any two from the rest.

1. Choose the correct answer from the following questions: 1 x 10

(a) In setting up a plane table, the operation which is done first is:
- (i) Levelling
- (ii) Centring
- (iii) Orientation
- (iv) Resection

(b) Three-point problem can be solved by
- (i) Lehmann's method (ii)Bessel's method (iii) Mechanical method
- (iv) All the above.

(c) The graduations in a prismatic compass
- (i) are inverted
- (ii) have zero at south
- (iii) are from 0^0 to 360^0
- (iv) All the above.

(d) The vertical angle between the longitudinal axis of a freely suspended magnetic needle and the horizontal line is called
- (i) Declination
- (ii) Dip
- (iii) Azimuth
- (iv) None of the above

(e) The quadrantal bearing of a line is determined by a
- (i) Prismatic compass
- (ii) Surveyor's compass
- (iii) Celestial observations
- (iv) None of the above

(f)The determination of the area of a figure bounded by straight lines, the figure is generally converted into a network of
(i) squares (ii) triangles (iii) rectangles (iv) polygons.

(g)Pick up the incorrect statement:
- (i) In case of general irregular boundaries, Simpson's rule is more accuratethan the trapezoidal rule
- (ii) In Simpson's rule, the first and last ordinates are omitted if they are zero.

(iii) The median distance of any line is equal to the meridian distance of its mid-point.

(iv) The area of a closed traverse is equal to the algebraic sum of the products of the latitudes and meridian distances of various lines.

(h) The vertical distance between a minimum point on the mass-haul diagram and the next maximum point is equal to the

(i) volume of the cutting

(ii) volume of the filling

(iii) zero

(iv) none of the above.

(i) Haul is equal to the volume of the material moved

(i) multiplied by the average distance moved

(ii) divided by the average distance moved

(iii) plus the average distance moved

(iv) none of the above.

(j) Local attraction on a magnetic compass is due to

(i) metallic objects

(ii) gravity

(iii) A.C. current

(iv) All the above.

2. a) State and explain the graphical construction of closing a traverse by Bowditch's rule.

b) Distinguish between magnetic declination and dip angle.

c) Three ships A, B and C started sailing from Bombay at the same time in three directions. The speed of all the three ships was the same i.e., 30 km/h. their bearings were measured to be $N70^0E$, $S60^0E$ and $S10^0E$. After an hour, the captain of ship B determined the bearings of the other two ships with respect to his own ship. After that he found out the distances. Calculate the value of bearings and distances which might have been determined by the captain of ship B. 5+5+10

3. (a) What is orientation? State and briefly explain the various methods.

(b) Mention the various methods of plane table traverse. Explain any one of them giving neat sketch.

(c) Illustrate with neat sketch the three point problem of orientation of plane table survey. 5+5+10

4.(a) Define the following terms:

(i) Free-haul distance

(ii) Limit of economical haul

(iii) Overhaul

(iv) Balancing line

Given below are the areas of cut and fill at various chainages of a road, partly in filling and partly in cutting.

Chainage (m)	Area of cut(m^2)	Area of fill (m^2)
100.0	-	175.50
109.0	-	40.15
120.5	12.45	9.64
128.0	55.14	-
136.0	185.25	-

Compute the volumes of cut and fill in the transitional area from chainage 100.0 to 136.0. 8+12