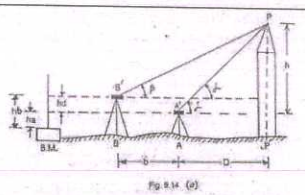
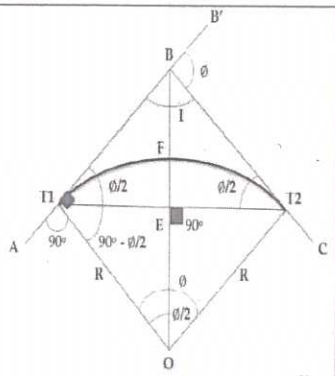
QID-8891 (82) April-24 PageNO-7

SCHEME OF VALUATION

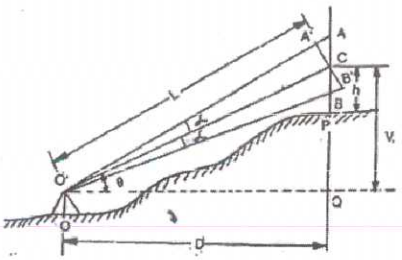
(Scoring Indicators)

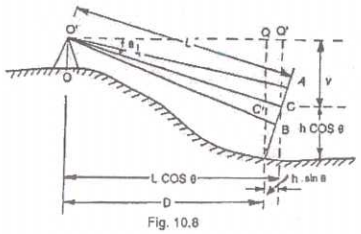
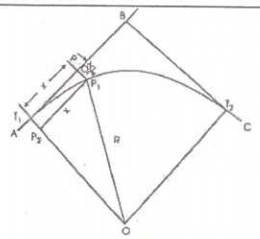
Revision: 2015 **Surveying II**		**Course code: 3012**		
Q. no	**Scoring indicator**	**Split up**	**Sub total**	**Total**
I. 1.	**Part A** It is the process of turning the telescope about the vertical axis in a horizontal plane.	2	2	10
2.	The latitude of survey line may be defined as its coordinate length measured parallel to an assumed meridian direction. True north or magnetic north or any other reference direction	2	2	
3.	The Bowditch Rule is a mathematical procedure used to bring the coordinates together. The relative error determined is then distributed to each coordinated point to compensate for the overall error.	2	2	
4.	A curve made up of two or more circular arcs of successively shorter or longer radii, joined tangentially without reversal of curvature, and used on some railroad tracks and highways	2	2	
5.	A geographic information system (GIS) is a system designed to capture, store, manipulate, analyze, manage, and present all types of geographical data. The key word to this technology is Geography – this means that some portion of the data is spatial	2	2	

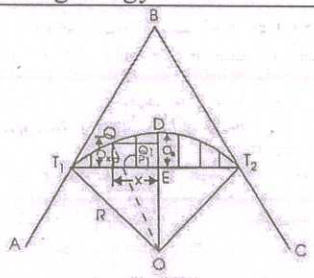
II. 1.	**Part B** Setting up – Levelling up – Centering – Elimination of parallax	6	6	
2.	The horizontal angle is measured a number of times and the average value is taken. a) Errors due to eccentricity of verniers and centres by measuring both vernier readings. b) Errors due to line of collimation not being perpendicular to the horizontal axis of the telescope. c) Errors due to horizontal axis of telescope not being perpendicular to the vertical axis	6	6	
3.	Sometimes it becomes very difficult to measure all bearing and measurements due to field condition like a river or some other obstacles and for this some reading may be omitted. a) Length of one line is omitted. b)Length of two lines are not measured. c) Length of one line and bearing of other line are not measured. d) Bearing of one line is missing. e) Bearing and length of same line are missing. f) Bearing of two lines are missing.	6	6	
4.	 $h = D \cdot$ ... ... (i) $h - h_d = (D + b) \tan \beta$ ... ... (ii) Putting the value of h from (i) in (ii), $D \tan \alpha - h_d = (D + b) \tan \beta = D \tan \beta + b \tan \beta.$ or $D \tan \alpha - D \tan \beta = b \tan \beta + h_d$ or $D = \frac{b \tan \beta \; h_d}{\tan \alpha - \tan \beta}$ Put this value of D in (i), then $h = \frac{b \tan \beta + h_d}{\tan \alpha - \tan \beta} \tan \alpha$ ... ... (Eqn. 9.1.) Height of the object above the B.M., $H = h + h_a$ ... ... (Eqn. 9.2.)	6	6	30

5.	Electronic distance measuring instrument is a surveying instrument for measuring distance electronically between two points through electromagnetic waves. Electronic distance measurement (EDM) is a method of determining the length between two points, using phase changes, that occur as electromagnetic energy waves travels from one end of the line to the other end	6	6	
6	 Length of tangent, T=RtanI2 External distance, E= RsecI2 – R Middle ordinate, m= R – RcosI2 Length of long chord, L=2RsinI2 Length of curve, Lc=πRI180◦	6	6	
7	Land Use Mapping - Weather Forecasting – Environmental Study - Study of Natural hazards - Resource exploration	6	6	
III a)	**Part C** a) A transit theodolite is one in which the line of sight can be reversed by resolving the telescope through 180° in a vertical plane. b) Line of collimation or line of sight is an imaginary line passing through the cross-hair at the diaphragm and the optical centre of the object glass and its continuation. c) Axis of level tube is the straight line tangential to the horizontal curve of the level tube at its center. d) It is the smallest value that can be measured by a theodolite. V = d n Where, v=Value of smallest division of vernier Scale d= Value of the smallest division of main scale n= no of small divisions on vernier scale	2× 4	8	

b)	1. Set up the theodolite at Q and level it accurately. 2. with both plate clamped, the Vernier A reading 3600 take back side on p (i.e. bisect ranging rod at exactly) 3. Transit the telescope to direct the line of sight produced by PQ. 4. Loose the upper plate and turn to telescope clockwise to take fore side on R. the mean of two Vernier reading give the approximate value of deflection angle at Q. 5. Loose the lower clamp and turn the telescope horizontally to Backsight on P. the Vernier will read the same reading as in above step and the telescope inverted. 6. Transit the telescope unclamped the plate and again bisect R read both Vernier. Find the mean of final Vernier reading.	7	7	
IV a)	Set the instrument at a point, level it and center it. Set vernier A to zero. Loose the lower clamp, and point the telescope to the first point. Tight it and loose the upper lamp and sight the next point. Read both the verniers. Loose the lower clamp and swing the telescope clockwise and again sight the first point. Repeat the procedure for minimum of three. The last reading divided by the number of repetition gives the horizontal angle.	7	7	15
b)	The line of collimation or line of sight should coincide with axis of the telescope. The line of sight should also be perpendicular to the horizontal axis at its intersection with the vertical axis. Also, the optical axis, the axis of the objective slide, and the line of sight should coincide.	8	8	
V a)	$A = \frac{1}{2}[y1(x1 - x4) + y3(x3 - x1) + y4(x1 - x3)]$ $\therefore A = 29221\ m^2$	10	10	15
b)	When we calculated traverse and there is bearing or length of one line is missing then it is known by using the method that is as follows. • First a traverse is ABCDEF that is closed traverse.	5	5	

	• There is length of the line FA is missing or bearing of line FA is missing or both bearing and length is not measured. • We can calculate the ΣL' and ΣD' for the five sides that we know. • Therefore we can calculate ΣL' and ΣD' for AB, BC, CD, DE and EF.			15
VI a)	Length of DA = 303.5 m Bearing of DA = 307°50′	2× 4	8	
b)	**Closed traverse**: Either originates from a station and returns to the same station completing a circuit, or runs between two known stations. Open traverse: neither returns to its starting station, nor closes on any other known station. **Checks** – The sum of the measured interior angles should be equal to (2N – 4) right angles. The sum of the exterior angles should be (2N + 4). The algebraic sum of exterior angle should be 360°.	7	7	15
VII a)	 Fig .10.5 A'B' = ABcos D = Lcos $= \frac{f}{i}$ (A'B') cos + (f + d) cos $= \frac{f}{i} \times S \cos^2 + (f + d) \cos$ ... ... Eqn. 10.3 And V = L sin $= \frac{f}{i} \times S \sin \cos + (f+d) \sin$ $= \frac{f}{i} S \frac{\sin 20}{2} + (f + d) \sin$ ... ... Eqn.10.4 Also V = D tan 0 ... Eqn. 10.4 (a)	7	7	15
b)	RL of A = 177.062 m	8	8	

VIII a)	 Fig. 10.8 $V = L\sin\theta = (ks + C)\sin\theta$ Elevation = Elevation of instrument station $= h - V - r\cos\theta$	8	8	15
b)	RL of instrument axis = RL of BM + h_1 + V_1 = 105.6094 m RL of B = RL of instrument axis + $V_2 - h_2$ = 126.2874 m Distance of AB = 146.6458 m	7	7	
IX a)	 Fig. 11.11 (b) (i) Locate the tangent points T_1 and T_2. (ii) Measure equal distances, say 15 or 30 m along the tangent from T_1.	8	8	15
	(iii) Set out the offsets calculated by any of the above methods at each distance, thus obtaining the required points on the curve. (iv) Continue the process until the apex of the curve is reached. (v) Set out the other half of the curve from the second tangent.			
b)	Photogrammetry is the art, science and technology of obtaining reliable information about physical objects and the environment through the process of recording, measuring and interpreting photographic images and patterns of electromagnetic radiant imagery and other phenomena. **Applications** - topographic	7	7	

	mapping, architecture, engineering, manufacturing, quality control, police investigation, cultural heritage, and geology.			
X a)	 Fig. 11.8 Join OQ cutting T_1T_2 in P_1. From the ΔOQQ_1, $OQ^2 = QQ_1^2 + OQ_1^2$ But $OQ = R$; $QQ_1 = x$ and $OQ_1 = OE + EQ_1 = (R - Q_3) + O_x$ $R^2 = x^2 \{(R - O_0) + O_0\}^2$ or $(R - O_0) + O_x = \sqrt{R^2 - x^2}$ Hence $O_x = \sqrt{R^2 - x^2} - (R - O_0)$ (Exact) ... ...(Eqn. 11.10) Where $O_0 = ED = OD - OE$ $= R - \sqrt{R^2 \left(\frac{L}{2}\right)^2}$ ... ...(Eqn. 11.10, a)	8	8	15
b)	The **GPS** (Global Positioning System) is a "constellation" of approximately 30 well-spaced satellites that orbit the Earth and make it possible for people with ground receivers to pinpoint their geographic location. The location accuracy is anywhere from 100 to 10 meters for most equipment. **Applications** – • A space shuttle that navigates by itself using GPS • A tractor that ploughs fields by itself using GPS • An airplane that lands itself using GPS • A football coach who tracks players on the field using GPS • A hiker who loses her way and returns to safety using GPS • Tracking a species of animal using GPS	7	7	