



# Model Curriculum

## 1. Surveyor

**SECTOR: Construction**  
**SUB-SECTOR: Real Estate and Infrastructure Construction**  
**OCCUPATION: Surveying**  
**REF ID: CON/Q0902, V1.0**  
**NSQF LEVEL: 6**





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# Surveyor

## CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “Surveyor”, in the “Construction” Sector/Industry and aims at building the following key competencies amongst the learner

<b>Program Name</b>	<b>Surveyor</b>		
<b>Qualification Pack Name &amp; Reference ID</b>	CON/Q0902, v1.0		
<b>Version No.</b>	1.0	<b>Version Update Date</b>	23-08-2017
<b>Pre-requisites to Training</b>	ITI/Diploma in civil / land surveying with 15 years site experience in same occupation for Non trained worker/ 10 years site experience as a certified Assistant Surveyor for Trained worker		
<b>Training Outcomes</b>	<p><b>After completing this programme, participants will be able to:</b></p> <ul style="list-style-type: none"> <li>• <b>Carry out temporary adjustment of survey instruments by standard methods:</b> to perform temporary adjustment of survey instruments with concepts of permanent adjustments</li> <li>• <b>Conduct linear measurements using survey instruments and tools:</b> - to perform linear measurements using conventional and modern methods</li> <li>• <b>Carry out levelling and cross sectioning survey :-</b> to conduct and complete cross sectional surveys and levelling works across multiple work environments</li> <li>• <b>Carry out setting out works:-</b> to set out various layouts (of buildings and components) on ground</li> <li>• <b>Carry out topographic survey:</b> to conduct a topographical survey of an area and prepare resulting contour maps</li> <li>• <b>Plan, arrange and manage resources for execution of relevant work:-</b> arrange for and manage required resources in optimum manner</li> <li>• <b>Manage workplace for safe and healthy work environment:-</b> to ensure safety of self and subordinates</li> </ul>		

This course encompasses 7 out of 7 National Occupational Standards (NOS) of “Surveyor” Qualification Pack issued by “Construction Skill Development Council of India”.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	<p><b>Introduction</b></p> <p><b>Theory Duration</b> (hh:mm) 48:00</p> <p><b>Practical Duration</b> (hh:mm) 00:00</p>	<ul style="list-style-type: none"> <li>• Introduction to the training of surveyor job role</li> <li>• Description of work details and course outline</li> <li>• Responsibility of surveyor</li> <li>• Environments in which surveyor operates/ areas in which surveying is required</li> <li>• Career progression and progression requirements</li> <li>• Various terms used in surveying works               <ul style="list-style-type: none"> <li>○ concept of bench mark, types, its importance in surveying, ideal conditions for selecting a bench mark</li> <li>○ terminologies used in the levelling operations</li> </ul> </li> <li>• Tools and equipments used in surveying               <ul style="list-style-type: none"> <li>○ different types of chains and tapes based upon their length, material and storage</li> <li>○ different instruments used for leveling</li> <li>○ different parts and components of the levelling instruments</li> <li>○ serviceability of various tools and tackles</li> <li>○ how to maintain and store the various tools and tackles</li> <li>○ type of reflective staff/prism used in survey</li> <li>○ different types of instruments and their operation in conducting topographic surveying</li> <li>○ temporary and permanent adjustments of various equipments</li> </ul> </li> <li>• Total Station:               <ul style="list-style-type: none"> <li>○ principal and standard procedure of operation</li> <li>○ various applications of total station</li> <li>○ how to feed and retrieve data from and into the total station</li> <li>○ Transferring data from instrument to computer</li> </ul> </li> <li>• Principles of surveying</li> <li>• Different types of drawings and maps and their interpretation (and understand</li> </ul>	<ol style="list-style-type: none"> <li>1. Classroom having seating requirement for 30 people.</li> <li>2. Projector</li> <li>3. Toilet/Urinals (Separate for gents and Ladies)</li> <li>4. Blackboard</li> </ol>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<p>the layout plan, alignment diagram, and other drawings)</p> <ul style="list-style-type: none"> <li>• Angular and liner calculations</li> <li>• Latitudes and longitudes (computation and use)</li> <li>• Signalling- hand and modern methods</li> <li>• Computer Literacy               <ul style="list-style-type: none"> <li>○ Various parts</li> <li>○ Operation of computer</li> <li>○ download Field Data through various sources like; Data Cable, Data Card, CD, Pen Drive etc</li> <li>○ operation of software's required for plotting of topographic maps</li> </ul> </li> </ul>	
2	<p><b>Carry out temporary adjustment of survey instruments by standard methods</b></p> <p><b>Theory Duration</b> (hh:mm) 34:00</p> <p><b>Practical Duration</b> (hh:mm) 37:00</p> <p><b>Corresponding NOS Code</b> CON/N0903</p>	<p><b>Theory:</b></p> <ul style="list-style-type: none"> <li>• Knowledge of errors in the surveying instruments</li> <li>• concepts and procedures for carrying out temporary adjustments for various instruments like               <ul style="list-style-type: none"> <li>○ dumpy level,</li> <li>○ auto level,</li> <li>○ theodolite,</li> <li>○ transit level,</li> <li>○ total station etc.</li> </ul> </li> <li>• concepts and types of permanent adjustments, its purpose and importance</li> <li>• Difference between temporary and permanent adjustments</li> <li>• Importance of adjustments and errors that might occur if adjustments are not done</li> </ul> <p><b>Practical:</b></p> <ul style="list-style-type: none"> <li>• Perform setting up and centring of the               <ul style="list-style-type: none"> <li>○ dumpy level,</li> <li>○ auto level,</li> <li>○ theodolite,</li> <li>○ transit level,</li> <li>○ total station etc</li> </ul>               including the following operations               <ul style="list-style-type: none"> <li>○ identification of station mark and bench mark</li> <li>○ mounting the instrument on tripod and adjusting the height of the tripod</li> <li>○ centring the instrument over station mark</li> </ul> </li> <li>• Carry out levelling of the survey instrument ( for All 5 types) by conducting appropriate adjustments of the screws as per standard practice.</li> </ul>	<ol style="list-style-type: none"> <li>1. dumpy level,</li> <li>2. auto level,</li> <li>3. theodolite,</li> <li>4. transit level,</li> <li>5. total station</li> </ol>
3	<p><b>Conduct linear measurements using survey</b></p>	<p><b>Theory:</b></p>	<ol style="list-style-type: none"> <li>1. Pegs</li> <li>2. Setting out Boards,</li> <li>3. Total station</li> </ol>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	<p><b>instruments and tools</b></p> <p><b>Theory Duration</b> (hh:mm) 78:00</p> <p><b>Practical Duration</b> (hh:mm) 88:00</p> <p><b>Corresponding NOS Code</b> CON/N0904</p>	<ul style="list-style-type: none"> <li>• Knowledge about selection of tools and instruments based upon the work requirements.</li> <li>• Knowledge of different types of errors in the linier measurements, their causes and impact on project measurement</li> <li>• Knowledge to avoid errors in linier measurements</li> <li>• Information about various difficulties that may be faced during survey and procedure to overcome the same</li> <li>• Knowledge of different types of liner measurements and their procedures</li> <li>• Knowledge of different hand signals, their interpretations and applications</li> <li>• Knowledge of entering data into field books for various types of liner measurements including symbols and representations</li> <li>• Selection of station points, ideal conditions for selection of station points</li> <li>• Knowledge of standard procedure for conducting liner measurements with total station</li> <li>• Knowledge of concept of as built drawings, procedure for conducting measurements, recording and plotting as built measurements.</li> </ul> <p><b>Practical:</b> <b>Liner Measurements using chains and tape:</b></p> <ul style="list-style-type: none"> <li>• Determine and describe the scope and goal of survey.</li> <li>• Selection of suitable tools and equipments and in required quantity for the survey based upon the scope of survey</li> <li>• Instruct, Observe and correct the subordinates for proper selection of tools and materials and using them as per standard practice.</li> <li>• Check the tools and equipments for damage and serviceability.</li> <li>• Identify and instruct the starting point for survey</li> <li>• Fix the ranging rod properly at the start point</li> <li>• Guide the subordinate in the direction of second station point and align him w.r.t the ranging rod using hand signals</li> </ul>	<ol style="list-style-type: none"> <li>4. Dumpy Level</li> <li>5. Measuring staffs</li> <li>6. Engineers chain</li> <li>7. Measuring tape</li> <li>8. tripods</li> <li>9. plumb bob</li> <li>10. optical plume</li> <li>11. Laser pointer</li> <li>12. Arrows</li> <li>13. ranging rods</li> <li>14. Safety Helmet</li> <li>15. Safety goggles</li> <li>16. Safety shoes</li> <li>17. Cotton gloves</li> <li>18. Dust mask</li> </ol>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul style="list-style-type: none"> <li>Instruct and ensure that the subordinate (leader) fixes the arrows/pegs at all station point and the follower collects each of them</li> <li>Note the chainages and measured distances into the field book and represent objects using standard symbols</li> </ul> <p><b>Liner Measurements using Total Station</b></p> <ul style="list-style-type: none"> <li>Identify the scope of the survey and the area in which the survey is to be done</li> <li>Identify the materials required for conducting the survey and instruct the sub ordinate to collect the same</li> <li>Set up the instrument at appropriate location, carry out the temporary adjustments and input primary data such as project code, file name, temperature, station point, type of measurement etc.</li> <li>Correctly identify and locate the staff points in order to obtain readings</li> <li>instruct the subordinate to hold the staff exactly at the staff point</li> <li>Obtain all the reading by bisecting the reflective prism mounted on the staff accurately with the telescope</li> <li>Remove the data card and transfer the collected readings into the computer.</li> </ul>	
4	<p><b>Carry out leveling and cross sectioning survey</b></p> <p><b>Theory Duration</b> (hh:mm) 113:00</p> <p><b>Practical Duration</b> (hh:mm) (Recommend that this practical is done in industry set up) 125:00</p> <p><b>Corresponding NOS Code</b> CON/N0905</p>	<p><b>Theory:</b></p> <ul style="list-style-type: none"> <li>Understanding the scope of the survey and deciding upon the station points and staff locations</li> <li>concept and principles of levelling, different types of levelling, their application</li> <li>selection of station points, staff measurement locations, ideal location for etc.</li> <li>computation of Reduced levels through rise and fall method and height of collimation method</li> <li>standard procedure for conducting levelling works</li> <li>importance of levelling in various sub sectors of the construction industry</li> <li>Identification of errors, understanding their source and rectifying the same</li> <li>different causes of errors in the leveling works, their impact on the project</li> </ul>	<ol style="list-style-type: none"> <li>Pegs</li> <li>Setting out Boards,</li> <li>Total station</li> <li>Measuring staffs/prism</li> <li>tripods</li> <li>plumb bob</li> <li>optical plume</li> <li>Laser pointer</li> <li>Arrows</li> <li>Safety Helmet</li> <li>Safety goggles</li> <li>Safety shoes</li> <li>Cotton gloves</li> <li>Dust mask</li> </ol>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul style="list-style-type: none"> <li>procedure for laying slopes and gradients for roads, bridges, pipelines, canals etc</li> <li>errors in slope alignment and their implications, identification &amp; rectifications</li> <li>procedures for making entries in the field book and make necessary calculations</li> </ul> <p><b>Practical:</b> Perform leveling works using a total station by performing the following:</p> <ul style="list-style-type: none"> <li>understanding the scope of the survey and identifying the station points, benchmarks and staff points.</li> <li>Set up and adjust (temporary) the total station at station point</li> <li>Obtain RL of the station point</li> <li>Obtain the RL, slope and gradient at the staff points</li> <li>Transfer the reading into computer</li> <li>Perform trouble shooting in case of errors in surveying</li> </ul>	
5	<p><b>Carry out setting out works</b></p> <p><b>Theory Duration</b> (hh:mm) 113:00</p> <p><b>Practical Duration</b> (hh:mm) (Recommend that this practical is done in industry set up) 125:00</p> <p><b>Corresponding NOS Code</b> CON/N0906</p>	<p><b>Theory:</b></p> <ul style="list-style-type: none"> <li>Instructions, specifications, quality requirements and operational details required for setting out works</li> <li>Knowledge of setting out techniques and Sequences</li> <li>Identification of the sequence of setting out</li> <li>Application and requirements for line, level and plumb in construction projects</li> <li>basic mathematical techniques associated with setting out</li> <li>site isolation and traffic control responsibilities and authorities</li> <li>types, characteristics, technical capabilities and limitations of setting out devices</li> </ul> <p><b>Practical:</b> <u>Performing the setting out works:</u></p> <ul style="list-style-type: none"> <li>understand the work requirements and specifications</li> <li>identify and collect the required tools, instruments and materials and stack them appropriately</li> <li>identify and locate the first station point, boundary and control point</li> <li>locate the first building line from the boundary</li> <li>determine the corner of building on set building line to true measurement</li> </ul>	<ol style="list-style-type: none"> <li>Pegs</li> <li>Setting out Boards, hurdles etc.</li> <li>Profiles</li> <li>Strings</li> <li>Markers</li> <li>Total station</li> <li>Dumpy Level</li> <li>Measuring staffs</li> <li>Engineers chain</li> <li>Measuring tape</li> <li>tripods</li> <li>plumb bob</li> <li>optical plume</li> <li>Laser pointer</li> <li>Arrows</li> <li>ranging rods</li> <li>Safety Helmet</li> <li>Safety goggles</li> <li>Safety shoes</li> <li>Cotton gloves</li> <li>Dust mask</li> </ol>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<p>from adjacent boundary and mark the same</p> <ul style="list-style-type: none"> <li>install hurdles/profiles at required distance</li> <li>carry out accurate measurement of the building lines and mark them on the hurdle using nails</li> <li>recheck all the measurements accurately using TS or triangulation methods</li> </ul>	
6	<p><b>Carry out topographic survey</b></p> <p><b>Theory Duration</b> (hh:mm) 68:00</p> <p><b>Practical Duration</b> (hh:mm) (Recommend that this practical is done in industry set up) 75:00</p> <p><b>Corresponding NOS Code</b> CON/N0907</p>	<p><b>Theory:</b></p> <ul style="list-style-type: none"> <li>Concept of topographic survey, its importance and different methods of conducting topographic survey using modern and conventional instruments.</li> <li>Knowledge of application of topographic survey in various sectors</li> <li>Concepts of contours, calculations required for plotting contours,</li> <li>Interpretation and importance of contours</li> <li>Knowledge of scale and key while plotting a contour map</li> <li>how to plot the collected data to represent topography of the area in required scale</li> <li>different methods of computing levels, angles, bearing and distances using modern and conventional instruments</li> </ul> <p><b>Practical:</b></p> <ul style="list-style-type: none"> <li>understand the scope of the survey and establish the boundary for survey</li> <li>set up the instrument at location such that maximum points of measurement are visible</li> <li>carry out all temporary adjustments</li> <li>fix the location of the instrument by measuring liner and angular distances from permanent features</li> <li>take back sight from instrument and obtain RL at instrument</li> <li>obtain readings at various locations previously identified by operating total station</li> <li>complete the survey and transfer the data into a compatible computer</li> <li>segregate the information in desired formats</li> <li>decide the scale for plotting the survey data</li> <li>plot different points such as boundary marks, staff points, station points etc. with appropriate angles, and distances</li> </ul>	<ol style="list-style-type: none"> <li>Pegs</li> <li>Setting out Boards,</li> <li>Total station</li> <li>Measuring staffs</li> <li>tripods</li> <li>plumb bob</li> <li>optical plume</li> <li>Laser pointer</li> <li>Arrows</li> <li>ranging rods</li> <li>Safety Helmet</li> <li>Safety goggles</li> <li>Safety shoes</li> <li>Cotton gloves</li> <li>Dust mask</li> </ol>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<p>converted to scale using computer aided design system</p> <ul style="list-style-type: none"> <li>confirm that the coordinates of all the points</li> <li>store and save the map</li> </ul>	
6	<p><b>Plan, arrange and manage resources for execution of relevant work</b></p> <p><b>Theory Duration</b> (hh:mm) 23:00</p> <p><b>Practical Duration</b> (hh:mm) 25:00</p> <p><b>Corresponding NOS Code</b> CON/N7001</p>	<p><b>Theory:</b></p> <ul style="list-style-type: none"> <li>concept of productivity and manpower requirements</li> <li>concept of critical activities and work priorities</li> <li>different check to evaluate progress and quality of relevant works</li> <li>importance of daily productivity report and attendance register</li> <li>calculating quantum of work for various types of survey</li> <li>calculating and optimising the resources required for survey works</li> </ul> <p><b>Practical:</b></p> <ul style="list-style-type: none"> <li>compute the quantum of work and estimate the man power, tools, equipments, materials etc. required for the same</li> <li>allocate and extract work by providing clear set of instructions</li> <li>optimise the use of resources by provide clear instructions and continuous monitoring.</li> <li>record daily attendance and productivity report</li> </ul>	
6	<p><b>Manage workplace for safe and healthy work environment</b></p> <p><b>Theory Duration</b> (hh:mm) 23:00</p> <p><b>Practical Duration</b> (hh:mm) 25:00</p> <p><b>Corresponding NOS Code</b> CON/N9002</p>	<p><b>Theory :-</b></p> <ul style="list-style-type: none"> <li>Know about the methods for safe handling and stacking of formwork material</li> <li>Knowledge of proper housekeeping at work place</li> <li>Knowledge &amp; use of Safety PPE</li> <li>Know about safe handling of tools and tackles relevant to surveying works</li> <li>Identification of hazards and reporting procedures</li> <li>Know about proper reporting in case of emergency</li> <li>Know about use of Fire extinguishers based on the types of fire</li> </ul> <p><b>Practical :-</b></p> <ul style="list-style-type: none"> <li>Demonstration of housekeeping Standard procedures</li> <li>Ensure/check/inspect proper handling and stacking of materials at workplace/stores</li> </ul>	

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul style="list-style-type: none"> <li>• Know about various kind of hazards associated with surveying work and in general in construction sites</li> <li>• Safety, its importance and protective measures</li> <li>• Demonstrate correct uses of tools and tackles</li> <li>• Personal Protective Equipments (PPE's)               <ol style="list-style-type: none"> <li>1. Head protection (Helmets)</li> <li>2. Ear protection</li> <li>3. Fall protection</li> <li>4. Foot protection</li> <li>5. Face and Eye protection</li> <li>6. Hand &amp; body protection</li> <li>7. Respiratory protection</li> </ol> </li> <li>• Ensure and check of organizational Policies related to Health, Environment and Safety:               <ol style="list-style-type: none"> <li>1. Methods of receiving or sourcing information</li> <li>2. Dealing with accidents and emergencies associated with the work and environment</li> <li>3. Reporting</li> <li>4. Emergency evacuation</li> <li>5. Fire risks an</li> <li>6. safe exit procedures</li> </ol> </li> <li>• Able to maintain entrances &amp; exit from confined spaces , excavated pits and other location in concurrence with safety parameters or instruction form safety personals</li> <li>• Ensure the proper reporting procedure to the concerned authority in emergency situations</li> <li>• Demonstrate and explain use of Fire extinguishers based on the types of fire</li> </ul>	
	<p><b>Total Duration</b></p> <p><b>Theory Duration</b> <b>500:00</b></p> <p><b>Practical Duration</b> <b>500:00</b></p>	<p><b>Unique Equipment Required:</b> Work shop for practical assessment, Toilet/Urinals (Separate for gents and Ladies), Pegs, Setting out Boards, Total , Auto level, Dumpy Level, Measuring staffs, Engineers chain, Measuring tape, Strings, Markers, Paints etc. , tripods, plumb bob, optical plummet, Laser pointer, Arrows, ranging rods, Survey hurdles/ profiles, Safety net, Safety Helmet, Safety goggles, Safety shoes, Safety belt, Cotton gloves, Ear plugs , Dust mask, Fire Prevention kit</p>	

Grand Total Course Duration: **1000 Hours, 0 Minutes**  
Recommended **250:00 Hours of on job training**

*(This syllabus/ curriculum has been approved by Construction Skill Development Council of India)*

## Trainer Prerequisites for Job role: “Surveyor” mapped to Qualification Pack: “CON/Q0902, v1.0”

Sr. No.	Area	Details
1	<b>Description</b>	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack “CON/Q0902”.
2	<b>Personal Attributes</b>	Aptitude for conducting training, and pre/ post work to ensure competent, employable candidates at the end of the training. Strong communication skills, interpersonal skills, ability to work as part of a team; a passion for quality and for developing others; well-organised and focused, eager to learn and keep oneself updated with the latest in the mentioned field
3	<b>Minimum Educational Qualifications</b>	ITI/Diploma/BE in civil / land surveying
4a	<b>Domain Certification</b>	Trainer/Assessor-80% in each NOS of Qualification Pack “MEP/Q0102” or “MEP/Q0104” and Lead trainer/Lead Assessors- 90% in each NOS of Qualification Pack “MEP/Q0101” or “MEP/Q0103”
4b	<b>Platform Certification</b>	Trainer/Assessor-50% in each NOS of Qualification Pack “MEP/Q0102” or “MEP/Q0104”& 80% overall, Lead trainer/ Lead Assessors- 50% in each NOS of Qualification Pack “MEP/Q0101” or “MEP/Q0103”and overall 90%
5	<b>Experience</b>	<ul style="list-style-type: none"> <li>i. Technical Degree holder with minimum three years of Field experience and preferably two years of teaching experience or,</li> <li>ii. In case of a Diploma Holder five years of field experience and preferably two years of teaching experience or,</li> <li>iii. In case of ITI/12<sup>th</sup> pass minimum eight years of field experience and preferably two years of teaching Experience.</li> </ul>



## **CRITERIA FOR ASSESSMENT OF TRAINEES**

<b><u>Job Role</u></b>	Surveyor
<b><u>Qualification Pack</u></b>	CON/Q0902
<b><u>Sector Skill Council</u></b>	Construction

### **Guidelines for Assessment**

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.
2. The assessment for the knowledge part will be based on knowledge bank of questions created by Assessment Bodies subject to approval by SSC
3. Individual assessment agencies will create unique question papers for knowledge/theory part for assessment of candidates as per assessment criteria given below
4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on assessment criteria.
5. The passing percentage for each QP will be 70%. To pass the Qualification Pack, every trainee should score a minimum of 70% individually in each NOS.
6. The Assessor shall check the final outcome of the practices while evaluating the steps performed to achieve the final outcome.
7. The trainee shall be provided with a chance to repeat the test to correct his procedures in case of improper performance, with a deduction of marks for each iteration.
8. After the certain number of iteration as decided by SSC the trainee is marked as fail, scoring zero marks for the procedure for the practical activity.
9. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack within the specified timeframe set by SSC.
10. Minimum duration of Assessment of each QP shall be of 4hrs/trainee.



Assessment outcomes	Assessment Criteria for outcomes	Total Mark	Marks Allocation		
			Out Of	Theory	Skills Practical
CON/N0903: Carry out temporary adjustment of survey instruments by standard methods	PC1. locate the station mark on the ground surface	100	4	2	2
	PC2. fix the instrument on the tripod head using bottom screws		4	2	2
	PC3. use plumb bob, optical plummet or laser pointer as available in the instrument to place the instrument accurately over the station mark		5	2.5	2.5
	PC4. approximately level the instrument by adjusting the legs of tripod both circumferentially and side ways		5	2.5	2.5
	PC5. check that the instrument is still centered accurately over the station mark after approximate leveling is done		5	2.5	2.5
	PC6. press the legs of the tripod in the ground so as to avoid accidental movement of the instrument		5	2.5	2.5
	PC7. ensure that the legs of tripod are sufficient distance apart to provide stability to the instrument		5	2.5	2.5
	PC8. ensure that the height of instrument is such that it is convenient to take readings		5	2.5	2.5
	PC9. confirm that the instrument is properly centered and approximately leveled		4	2	2
	PC10. allow the free movement of the instrument about its vertical axis		5	2.5	2.5
	PC11. swing the instrument such that the horizontal bubble tube is parallel to any 2 foot/leveling screw		5	2.5	2.5
	PC12. using both hands turn the screws in same direction( i.e. either towards or away from each other) to bring the bubble in exact center of the bubble tube		5	2.5	2.5
	PC13. turn the instrument by 90° in clock wise direction so that the bubble tube is parallel to the third foot screw		5	2.5	2.5
	PC14. turn the third screw such that bubble is brought to the center		5	2.5	2.5
	PC15. rotate the instrument to bring back the bubble tube in original position and bring the bubble in the center		5	2.5	2.5
	PC16. repeat the procedure until the bubble is in center for both orientations		5	2.5	2.5
	PC17. rotate the instrument by 180° and check that the bubble is still in center		5	2.5	2.5
	PC18. confirm that the instrument is properly centered and approximately leveled		4	2	2
	PC19. check that the cross hairs are visible in the telescope		5	2.5	2.5
	PC20. hold a white paper or cloth in front of the telescope and adjust the eye piece till the cross hairs are clearly visible		5	2.5	2.5
	PC21. sight any object and turn the focusing screw such that the image is clear and sharp		4	2	2
	<b>Total</b>	<b>100</b>	<b>50</b>	<b>50</b>	



<p>CON/N0904: Conduct linear measurements using survey instruments and tools</p>	PC1. read and understand site drawings, layout plans, boundary maps etc	<b>100</b>	3	1.5	1.5
	PC2. estimate the optimal length of chain required for measuring the required distance		3	1.5	1.5
	PC3. select suitable tools and instruments for conducting required works based upon the scope of work and requirements		3	1.5	1.5
	PC4. identify the start point for measurement as per work requirement		3	1.5	1.5
	PC5. monitor subordinates while they unfold the chain or tape as per standard practice		3	1.5	1.5
	PC6. check that the subordinates have collected appropriate tools such as arrows, pegs etc. in required number		3	1.5	1.5
	PC7. check that the ranging rods are vertical and of appropriate length to avoid any errors in ranging		3	1.5	1.5
	PC8. observe that the chain or tape is placed at the exact point for measuring the required distance		3	1.5	1.5
	PC9. observe that the chain or tape is stretched appropriately to avoid any errors due to sagging of the same		3	1.5	1.5
	PC10. provide direction to second point of measurement to subordinate		3	1.5	1.5
	PC11. ensure that ranging rod is properly fixed at start point		3	1.5	1.5
	PC12. align the leader with respect to ranging rod fixed at terminal station so that the line of measurement is as straight as possible		3	1.5	1.5
	PC13. ensure that the peg is fixed at all station points of the survey		3	1.5	1.5
	PC14. make representations using appropriate symbols on the field book		3	1.5	1.5
	PC15. note the chainages or measured distance as applicable for respective points in the field book as per standard practice		3	1.5	1.5
	PC16. instruct subordinates to use appropriate tools like plumb bob for transferring points on ground in case of measuring distance on sloping surface		3	1.5	1.5
	PC17. identify the location of master control points & secondary control points to set up the instrument		3	1.5	1.5
	PC18. identify the suitable benchmark as a reference to obtain a back-sight at station point		3	1.5	1.5
	PC19. locate the exact position of the instrument w.r.t the back-sight and foresight points		3	1.5	1.5
	PC20. setup the instrument exactly over the station point		3	1.5	1.5
	PC21. carry out temporary adjustments of the instrument		3	1.5	1.5
	PC22. input data regarding temperature and pressure bars into the total station		3	1.5	1.5
	PC23. create job file in the instrument as per project requirements		3	1.5	1.5

	PC24. input the data regarding survey job, station point, type of measurement etc. as required by the instrument		4	2	2
	PC25. identify the location of staff point for measuring the horizontal distance as per the drawings or co-ordinates		3	1.5	1.5
	PC26. instruct the subordinate to hold the staff exactly at the staff point		4	2	2
	PC27. bisect the reflective prism mounted on the staff accurately by rotating the telescope in horizontal and vertical plane		3	1.5	1.5
	PC28. make fine adjustments in bisecting with help of fine tune screw		3	1.5	1.5
	PC29. operate the keypad to instruct the instrument to compute slop distance between 2 points		4	2	2
	PC30. check the display of the instrument to confirm that data displayed is as per requirement as well as recording of the data		4	2	2
	PC31. remove the data card from the instrument and transfer the same into compatible computer		3	1.5	1.5
	PC32. inform the superiors for the completion of task and data collected		3	1.5	1.5
		<b>Total</b>	<b>100</b>	<b>50</b>	<b>50</b>
CON/N0905: Carry out leveling and cross sectioning survey	PC1. interpret the scope of survey and data to be collected	<b>100</b>	6	3	3
	PC2. identify and locate the first station point to set up the instrument		6	3	3
	PC3. identify and locate the benchmark on the field as instructed by the surveyor		6	3	3
	PC4. setup the instrument exactly over the station point		6	3	3
	PC5. carry out temporary adjustments of the instrument		4	2	2
	PC6. input data regarding temperature and pressure bars into the total station		4	2	2
	PC7. input the data regarding survey job, station point, type of measurement, RL of benchmark etc. as required by the instrument		4	2	2
	PC8. instruct the subordinate to hold the reflective staff exactly over the benchmark of known elevation		4	2	2
	PC9. bisect the reflective prism mounted on the staff with the help of tangent screw and fine tune screw		6	3	3
	PC10. bisect the prism using the input panel on the total station to compute the reduced level at the station point from the RL earlier fed in the instrument using the telescope		6	3	3
	PC11. identify the direction and position of the terminal point		6	3	3
	PC12. locate the first staff point and along the identified direction of terminal station at a fixed distance from the instrument		6	3	3
	PC13. obtain the RL of the staff point by bisecting the reflective prism and instructing the instrument to calculate the RL		6	3	3

	PC14. follow the standard procedure to obtain readings at multiple staff points at fixed interval		4	2	2
	PC15. transfer the instrument to the next point as per requirement and take a back sight reading at the previous intermediate point or staff point		6	3	3
	PC16. also take staff readings at fixed interval on multiple points normal to the center line on both sides		4	2	2
	PC17. check the display of the instrument to confirm that data displayed is as per requirement		6	3	3
	PC18. remove the data card from the instrument and transfer the same into compatible computer		6	3	3
	PC19. inform the superiors for the completion of task and data collected		4	2	2
		<b>Total</b>	<b>100</b>	<b>50</b>	<b>50</b>
CON/N0906: Carry out setting out works	PC1. identify and obtain work instructions, including plans, specifications, quality requirements and operational details	<b>100</b>	5	2.5	2.5
	PC2. plan the sequence to be adopted for setting out works		5	2.5	2.5
	PC3. identify the required tools and instruments and check the same for their servisiability		5	2.5	2.5
	PC4. report any errors or faults observed in the instruments or tools to the seniors		5	2.5	2.5
	PC5. estimate the requirements of materials such as rails and profiles and ensure that they comply with work requirements		5	2.5	2.5
	PC6. locate and identify the survey pegs marking the boundary or control point and connect them with string or line dori to correctly demark the boundary		6	3	3
	PC7. refer site drawings to calculate the distance and direction of first building line from the boundary or base line as applicable		5	2.5	2.5
	PC8. carry out liner and angular measurements to locate the first building line on field from the boundary or baseline as applicable		6	3	3
	PC9. ensure that enough space is available for erection of hurdles/profiles		5	2.5	2.5
	PC10. oversee the erection of profile/ hurdles such that it is wide enough for marking out footings in accordance with site drawings on both the ends of the line		6	3	3
	PC11. mark the location of line with nails on the profile and connect the nails with strings or dori so as to represent the true alignment of line w.r.t boundary or baseline		6	3	3
	PC12. determine the corner of building on set building line to true measurement from adjacent boundary and mark the same with peg in accordance with job drawings and specifications		6	3	3
	PC13. set out right angle to the building line from the identified corner point using TS, theodolite or triangulation principals		6	3	3
	PC14. install hurdles/profiles at required distance from the line at approximate level of other hurdles and string/dori is set taut to right angled alignment		6	3	3

	PC15. hurdles for other offsets/ building lines of the building are installed to appropriate locations, approximately level with established hurdles		6	3	3
	PC16. carry out accurate measurement of the remaining building lines and mark the same on the hurdle using nails, connect the nails using strings/dori		6	3	3
	PC17. recheck all the measurements accurately using TS or triangulation methods and confirm the same with drawings		6	3	3
	PC18. remove any excess materials or tools on site and record the same		5	2.5	2.5
		<b>Total</b>	<b>100</b>	<b>50</b>	<b>50</b>
CON/N0907: Carry out topographic survey	PC1. identify the boundaries of the area to be surveyed	<b>100</b>	4	2	2
	PC2. establish control points to initiate the survey		4	2	2
	PC3. identify a suitable location for setting up a total station such that maximum points or features are visible from this point		4	2	2
	PC4. set up the instrument at identified point and carry out necessary adjustments		4	2	2
	PC5. measure distances and angles to nearing permanent objects or control points to fix the instrument location		5	2.5	2.5
	PC6. identify or locate a temporary or permanent bench mark		4	2	2
	PC7. take the back sight from instrument point to BM and set the readings as 0 for this point		5	2.5	2.5
	PC8. instruct the subordinate to place the staff at all relevant feature points like corners of buildings, trees, pillars etc		5	2.5	2.5
	PC9. bisect the reflective prism mounted on the staff with the help of tangent screw and fine tune screw in clockwise direction from the BM		5	2.5	2.5
	PC10. with the telescope exactly bisecting the prism use the input panel on the total station to compute the angles, distance and elevation at respective points		5	2.5	2.5
	PC11. check the display of the instrument to confirm that data displayed is as per requirement		5	2.5	2.5
	PC12. remove the data card from the instrument and transfer the same into compatible computer		4	2	2
	PC13. inform the superiors for the completion of task and data collected		5	2.5	2.5
	PC14. transfer the data from the instrument to a compatible computer		4	2	2
	PC15. obtain approval from seniors regarding correctness of the collected data		4	2	2
	PC16. segregate the required information in desired formats using available software		4	2	2
	PC17. decide the scale for plotting the survey data		4	2	2
	PC18. plot different points such as boundary marks, staff points, station points etc with appropriate angles, and distances converted to scale using computer aided design system		5	2.5	2.5
	PC19. provide necessary information like dimensions, angles, distances, RL's etc. as per instruction		4	2	2



	PC20. confirm that the coordinates of all the points is in confirmation with survey data		4	2	2
	PC21. get approval from senior for confirming the correctness of the map		4	2	2
	PC22. store and save the map as per organizational norms		4	2	2
	PC23. report to seniors after completion of work		4	2	2
		<b>Total</b>	<b>100</b>	<b>50</b>	<b>50</b>
CON/N7001: Plan, arrange and manage resources for execution of relevant work	PC1. determine quantum and nature of work under assigned activity	<b>100</b>	5	2.5	2.5
	PC2. calculate requirement of manpower for assigned activities		8	4	4
	PC3. submit manpower requirement to superiors		5	2.5	2.5
	PC4. allocate and extract work as per plan		8	4	4
	PC5. provide clear instructions to workmen for execution of work		8	4	4
	PC6. ensure optimum utilization of manpower resources		8	4	4
	PC7. record the daily labour attendance		8	4	4
	PC8. record the daily productivity report		8	4	4
	PC9. estimate quantity of assigned work		8	4	4
	PC10. estimate requirement for material, components and fixtures		8	4	4
	PC11. estimate equipment, tools and accessories required		8	4	4
	PC12. submit material, equipment and tool requirement to superiors		8	4	4
	PC13. allocate material , equipment and tools to workmen and extract the work as per plan		8	4	4
	PC14. provide clear instructions for optimized use of resources		8	4	4
			<b>Total</b>	<b>100</b>	<b>50</b>
CON/N9002: Manage workplace for safe and healthy work environment	PC1. ensure proper housekeeping at workplace	<b>100</b>	5	2.5	2.5
	PC2. implement safe handling , stacking methods at workplace / store		5	2.5	2.5
	PC3. insure that health and safety plan is followed by all subordinates		5	2.5	2.5
	PC4. identify any hazard in workplace and notify them to appropriate authority		5	2.5	2.5
	PC5. ensure that all safety and protection installation are correctly placed & adequate		5	2.5	2.5
	PC6. ensure safe access is available at work place for movement of workers & materials		5	2.5	2.5
	PC7. ensure safe use of tools and tackles by the workmen as per applicability		5	2.5	2.5

PC8. ensure appropriate use of following Personal Protective Equipment (PPE) as per applicability:			
<ul style="list-style-type: none"> <li>• Head Protection (Helmets)</li> <li>• Ear Protection</li> <li>• Fall Protection</li> <li>• Foot Protection</li> <li>• Face and Eye Protection,</li> <li>• Hand &amp;Body Protection</li> <li>• Respiratory Protection</li> </ul>	10	5	5
PC9. maintain entrances & exit from confined spaces , excavated pits and other location in concurrence with safety parameters or instruction form safety personals.	5	2.5	2.5
PC10. ensure organizational policies and procedures are followed for health , safety and welfare, in relation to:			
<ul style="list-style-type: none"> <li>• methods of receiving or sourcing information</li> <li>• dealing with accidents and emergencies associated with the work and environment</li> <li>• reporting</li> <li>• stooping work</li> <li>• evacuation</li> <li>• fire risks and safe exit procedures</li> </ul>	10	5	5
PC11. follow procedures for accident recording and reporting as per organizational and statutory requirements	5	2.5	2.5
PC12. ensure effective adherence to response to emergency procedures / protocols	7.5	3.75	3.75
PC13. report any case of emergency / risks to the concern people at the construction site	7.5	3.75	3.75
PC14. report any perceived risk hazards to the superiors / concerned EHS	7.5	3.75	3.75
PC15. demonstrate the use of fire protection equipments for different type of fire hazard	7.5	3.75	3.75
PC16. implement control measures to reduce risk & meet legal requirement as per organizational policies	5	2.5	2.5
<b>Total</b>	<b>100</b>	<b>50</b>	<b>50</b>