

## SCHEME OF VALUATION

### Scoring Indicators

Revision: 2015		Course code: 5012		
Course Title: CONSTRUCTION MANAGEMENT AND SAFETY ENGINEERING				
Qst No.	Scoring indicator	Split up score	Subtotal	Total
I.1	<ol style="list-style-type: none"> <li>1. Brief history with reference to the reference project</li> <li>2. Object, necessity and utility of the project with reasons</li> <li>3. Nature of soil, sub soil conditions, topography of land</li> <li>4. Climatic conditions</li> <li>5. Availability of construction materials</li> </ol>	2 x 1		2
I.2	Is an offer in writing to execute some specified work or to supply specified articles at certain rates with in a fixed time under certain conditions of contract and agreement, between the contractor and the department or owner or party.	1 x 2		2
I.3	They are typically used to break up rock, pavement, and concrete.	1 x 2		2
I.4	<ol style="list-style-type: none"> <li>1. Improving working conditions at site</li> <li>2. Improving wages of workers</li> <li>3. Promoting welfare activities such as health plans, life insurance, provident fund etc</li> <li>4. Providing legal assistance to workers</li> <li>5. Establishing cordial relationship between employers and workers</li> </ol>	2 x 1		2
I.5	<ol style="list-style-type: none"> <li>1. For persons engaged in handling corrosive materials adequate equipment should be provided.</li> </ol>			

	<p>2. Workers employed on mixing asphatic materials and stone breakers should be provided with protective foot wear and goggles.</p> <p>3. Suitable face masks should be supplied for the use of workers when paint is applied in the form of spray particularly lead paints</p>	2 x 1		2
II.1	<p>Before starting a new project, it is very important to convince the government by submitting report giving the reasons for starting the project, necessity of project and also by educating the people to realize the need for national development</p>	1 x 6		6
II.2	<p>Regular establishment: - Both temporary and permanent employees of the department are included in the regular establishment. Their salaries and allowances are drawn monthly on regular pay bills from the treasury. The salary is met from the budget grant under the head establishment. The permanent establishments are not liable for retrenchment and they are entitled for leave, permissions and other amenities as per service rules. The temporary establishments are employed when the work is increased and their services can be terminated at any time with proper notice as per service rules</p> <p>Work charged establishment: - Are the employees who are employed direct on the work for the actual execution of a specific work or for the supervision of the departmental labour, stores machineries etc. Usually work supervisors, mistries are employed as work charged establishment. Their pay is charged direct to the work for which provision is made in the estimate of the work by adding 2% to 3 % over the estimated amount of the work.</p>	3 x 2		6

II.3	<ol style="list-style-type: none"> <li>1. Tendering is the process by which bids are invited from interested contractors to carry out specific packages of construction work.</li> <li>2. Open tendering is the main tendering procedures employed by both the government and private sector</li> <li>3. The work is tendered for the person who quoted the lowest amount.</li> <li>4. The work order is given before commencement of the construction</li> </ol>	6		6
II.4	<p>Listing of Types of contract – Item rate contract – Percentage contract – Cost plus percentage contract – Lump sum contract – Piece work system</p> <p>Explanation of types of contract</p>	4 x 1/2 4 x 1	2 4	6
II.5	<ol style="list-style-type: none"> <li>1. EE has to check all the stocks under their division at least once in a year.</li> <li>2. All stores should be inspected by AEE.</li> <li>3. All articles of stock which are not likely to be required during the following twelve months should be reported to EE by AEE, if the stock is not with in the power of EE he may take SE order for approval for disposal</li> </ol>	3 x 2		6
II.6	<ol style="list-style-type: none"> <li>1. Dormitories with basic amenities</li> <li>2. Locker facilities for storing clothing not used while at work</li> <li>3. Screening films on educational industrial, safety measures and social topics</li> <li>4. Supply of food stuffs and other provisions at concessional rates</li> <li>5. Transport arrangement to and from worksite</li> <li>6. Insurance facility</li> </ol>	6		6

II.7	Managerial style	Entrepreneurial style																																																																																																																
	Takes up the task after an industry is launched	Starts an industry without any experience																																																																																																																
	Experience makes balanced attitude	Over all confidence																																																																																																																
	Conventional methods are followed	Being an innovation introduces something new																																																																																																																
	Thinks of existing condition	Searches for a new market																																																																																																																
	Ambition normal	Has fairly strong ambition																																																																																																																
	Has to consult somebody before executing and implementing any decision	Need not consult anybody while taking decision																																																																																																																
III.a			6 x 1	6																																																																																																														
	<ol style="list-style-type: none"> <li>1. Conceptual stage</li> <li>2. Study and evaluation stage</li> <li>3. Design stage</li> <li>4. Awarding of contract for construction stage</li> <li>5. Construction stage</li> <li>6. Utilization and maintenance stage</li> </ol>		8	8																																																																																																														
III.b	<p>Resource leveling is the smoothening of resource usage to increase project efficiency.</p> <p>It is performed to realize a tradeoff between project duration and project cost.</p>		7	7																																																																																																														
IV.a	<table border="1"> <thead> <tr> <th>Activity</th> <th>Activity duration</th> <th>EST</th> <th>EFT</th> <th>LST</th> <th>LFT</th> <th>Total float</th> <th>Free float</th> <th>Independent float</th> <th>Interfering float</th> </tr> </thead> <tbody> <tr><td>1-2</td><td>7</td><td>0</td><td>7</td><td>0</td><td>7</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>1-3</td><td>6</td><td>0</td><td>6</td><td>5</td><td>11</td><td>5</td><td>0</td><td>0</td><td>5</td></tr> <tr><td>2-4</td><td>4</td><td>7</td><td>11</td><td>7</td><td>11</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>2-5</td><td>4</td><td>7</td><td>11</td><td>12</td><td>16</td><td>5</td><td>0</td><td>0</td><td>5</td></tr> <tr><td>3-5</td><td>5</td><td>6</td><td>11</td><td>11</td><td>16</td><td>5</td><td>0</td><td>5</td><td>5</td></tr> <tr><td>4-6</td><td>7</td><td>11</td><td>18</td><td>11</td><td>18</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>5-6</td><td>2</td><td>11</td><td>13</td><td>16</td><td>18</td><td>5</td><td>5</td><td>0</td><td>0</td></tr> <tr><td>5-7</td><td>8</td><td>11</td><td>19</td><td>17</td><td>25</td><td>6</td><td>6</td><td>1</td><td>0</td></tr> <tr><td>6-7</td><td>7</td><td>18</td><td>25</td><td>18</td><td>25</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>7-8</td><td>3</td><td>25</td><td>28</td><td>25</td><td>28</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> </tbody> </table> <p>Critical path- 1-2, 2-4, 4-6, 6-7, 7-8</p>		Activity	Activity duration	EST	EFT	LST	LFT	Total float	Free float	Independent float	Interfering float	1-2	7	0	7	0	7	0	0	0	0	1-3	6	0	6	5	11	5	0	0	5	2-4	4	7	11	7	11	0	0	0	0	2-5	4	7	11	12	16	5	0	0	5	3-5	5	6	11	11	16	5	0	5	5	4-6	7	11	18	11	18	0	0	0	0	5-6	2	11	13	16	18	5	5	0	0	5-7	8	11	19	17	25	6	6	1	0	6-7	7	18	25	18	25	0	0	0	0	7-8	3	25	28	25	28	0	0	0	0	8	8
Activity	Activity duration	EST	EFT	LST	LFT	Total float	Free float	Independent float	Interfering float																																																																																																									
1-2	7	0	7	0	7	0	0	0	0																																																																																																									
1-3	6	0	6	5	11	5	0	0	5																																																																																																									
2-4	4	7	11	7	11	0	0	0	0																																																																																																									
2-5	4	7	11	12	16	5	0	0	5																																																																																																									
3-5	5	6	11	11	16	5	0	5	5																																																																																																									
4-6	7	11	18	11	18	0	0	0	0																																																																																																									
5-6	2	11	13	16	18	5	5	0	0																																																																																																									
5-7	8	11	19	17	25	6	6	1	0																																																																																																									
6-7	7	18	25	18	25	0	0	0	0																																																																																																									
7-8	3	25	28	25	28	0	0	0	0																																																																																																									

IV.b	<p>Administrative sanction(AS): - AS denotes the formal acceptance by the department concerned of the proposal and the AS is given by engineering department (P.W.D) take up the work and prepared detailed designs, plans and estimate then executes the work. The engineering department prepares approximate estimate and preliminary plans and submits to the department concerned for the AS</p> <p>Technical sanction(TS): - The sanction of the detailed estimate, design calculations, quantities of works, rates and cost of the work by the competent authority of the engineering department. After the TS of the estimate is given, then only the work is taken up for construction.</p>	2 x 3.5		7
V.a	<p>1.First &amp; final bill-KPW Form 22- This form should be used for making payments both to contractors for work and suppliers, when a single payment is made for a contract, i.e., on its completion. A single form may be used for making payments to several payees, if they relate to the same work (or to the same head of account in the case of supplies) and are billed for at the same time</p> <p>2.Running Account Bill (Secured advance)-KPW Form 23 A: - This form is intended for contractors for work only. It should be used in all cases, in which secured advances are to be made or are already outstanding, in respect of the same work, against the contractor. When this form is used it should also be utilised for making on account payment, if any, in respect of the work.</p> <p>3.Running Account Bill- KPW Form 23: - This form is used both for contractors for work and for suppliers. It is intended to be used for contracts for work when only on account payments are made. It is not to be used if a secured</p>			

V.b	<p>advance is to be made or if such an advance in respect of the work is outstanding against the contractor.</p> <p>4.Hand Receipt- KPW form 24: - is a simple form of voucher intended to be used for small miscellaneous payments and advances for which none of the above forms is suitable. This is a simple form of voucher intended to be used for all miscellaneous payments and advances for which none of the special K.P.W. Forms 22 and 23 are suitable. No agreement is necessary for payments made through Hand receipt form.</p> <ol style="list-style-type: none"> <li>1. Every work has to be properly supervised to ensure that it is carried out in accordance with the required specifications.</li> <li>2. Effective supervision shall be insisted for maintaining quality of all items of work.</li> <li>3. Every officer and subordinate controlling the construction of the work shall be fully conversant with these specifications.</li> <li>4. Any deviation from the standards prescribed shall be reported forth-with by the Assistant Engineer to the Assistant Executive Engineer.</li> <li>5. The overseer in charge of a work shall be responsible for maintaining quality of all items of work</li> </ol>	4 x 2		8
VI.a	<ol style="list-style-type: none"> <li>1. The execution of work is done by calling tenders</li> <li>2. The work is awarded to the contractor who quoted the lowest amount</li> <li>3. The agreement is executed by certain conditions</li> <li>4. The site is handed over to the contractor</li> <li>5. The part bills are issued parallel to the work proceeds</li> </ol>	7		7

VI.b	<p>6. The contractor executes the work within the time period and get the completion certificate from the AE and has to be attached with the Final bill</p>	8		8
VII.a	<ol style="list-style-type: none"> <li>1. The measurement book in the form given in Appendix 2100E1(PWD Manual) is the original record of actual measurements.</li> <li>2. for quantities of work paid on level basis, all measurements are recorded in the measurement book.</li> <li>3. Works for which the Assistant engineer has accorded TS the Overseer shall record the measurements.</li> <li>4. The measurements shall be checked by an officer higher in rank to the officer who has recorded the measurement, but not by an officer below the rank of an Assistant Engineer.</li> <li>5. If an Assistant Engineer holds full additional charge of a Sub division, the Executive Engineer shall nominate another officer under his Division, not below the rank of an Assistant Executive Engineer to check the measurements recorded by the Assistant Engineer, who holds additional charge.</li> <li>6. All measurements shall be recorded directly in the measurement book or in the field book and the description shall be clear to enable easy identification and check.</li> </ol> <p>1) Planning 2) Selection</p> <p>Internal source of recruitment</p> <p>Present employees Employee referrals Former employees Previous applicants</p> <p>External source of recruitment</p> <p>Employment exchange Advertisement</p>	7		7

	<p>Employment agencies</p> <p>Campus recruitment</p> <p>3) Orientation</p> <p>4) Training/development</p> <p>5) Performance management</p> <p>6) Compensation and benefits</p> <p>7) Career</p>			8
VII.b	<p>i) MAS :-</p> <p>In the case of minor works in which transactions relating to the materials at site are not likely to be heavy an account in the separate form should be maintained at all departmental materials brought on to the site of work. This should clearly show the sources and quantities of all receipts and of their issues to the work, it includes all the transactions.</p> <p>The detailed account of the material issued to the work is known as "Material at Site Account"</p> <p>All the departmental materials brought on to the site of work for use on that work for use on that work from any should be entered as receipts in the " Material at site accounts",giving a reference to the 'M Book No'</p>			8
VIII.a	<p>ii) Indent :-</p> <p>Withdrawal of material from the stock is on the basis of indents.Particulars regarding head of account,name of division,name of work and contractor firm whom the value is recoverable.Description and quantity of items required should be written in full in the indent.</p> <p>Training program: -</p> <ol style="list-style-type: none"> <li>1. Process designed to maintain or improve current job performance</li> </ol>	2 x 3.5		7

VIII.b	<ol style="list-style-type: none"> <li>2. Upgrading and improving an employee's abilities or skills</li> <li>3. Focuses on short term skills</li> </ol> <p>Developmental program: -</p> <ol style="list-style-type: none"> <li>1. Process designed to develop skills necessary for future work activities</li> <li>2. Focuses on long term abilities</li> </ol>	4 x 2		8
IX.a	<ol style="list-style-type: none"> <li>1. use of equipment available with the organization</li> <li>2. suitability for job condition with special reference to climatic and operating conditions</li> <li>3. uniformity of type</li> <li>4. size of equipment</li> <li>5. use of standard equipment</li> <li>6. country of origin</li> <li>7. unit cost of production</li> </ol> <p>Excavation work</p> <ol style="list-style-type: none"> <li>1. By not providing support for the side even for the shallow trenches it causes many accidents.</li> <li>2. The sides of trenches should be supported by batters held in position by cross members.</li> <li>3. Besides this fencing and crossing gang ways should be provided wherever necessary.</li> </ol> <p>Scaffolding</p> <ol style="list-style-type: none"> <li>1. The material for scaffolding must be sound material and should be properly constructed and so braced as tied to the building that there will be no collapse of structure should happen</li> <li>2. Platforms of proper width and handrails must be provided</li> </ol> <p>Roofs</p>	7 x 1		7

IX.b	<p>1. Accidents due to falls from or through covered with fragile material such as asbestos sheet can be prevented by the use of crawling boards and roof ladders</p>	8		8
X.a	<p>1) Entrepreneurs are frequently thought of as national assets to be cultivated, motivated, and remunerated to the greatest possible extent.</p> <p>2) Great entrepreneurs have the ability to change the way we live and work.</p> <p>3) If successful, their innovations may improve standards of living, and in addition to creating wealth with entrepreneurial ventures, they also create jobs and contribute to a growing economy.</p>	7		7
	<p>1. Total quality management (TQM) is a theory of management the purpose of which is to improve an organisation's ability to deliver quality to its customers on a continuously improving basis.</p> <p>2. There are several differences between TQM and a traditional management system. TQM is a process-oriented as opposed to a result-oriented approach, and prioritises quality, flexibility and services rather than cost and technical efficiency.</p> <p>3. TQM involves a more horizontal organisational structure rather than the traditional vertical management structure. TQM presumes that profits follow quality and not vice versa.</p>			

X.b	<p>4. As a philosophy, TQM is more associated with manufacturing and service industries, although has also been applied to construction as clients increasingly demand a high standard of delivery for large and complex buildings.</p> <p>5. Although in construction, delays and defects can arise that are unavoidable, far more so than in a more controlled manufacturing environment, the application of TQM requires that the employee's mindset be shifted from one of just monitoring to continually looking for opportunities to make improvements.</p>			
	<p>6. TQM can be applied in construction as a way of approaching the conception, visualisation and achievement of goals to ensure quality and productivity, with an emphasis on innovation and new technology</p>	8		8
	<p>1. He enforces the safety measures at site</p> <p>2. He must ensure a safe working environment</p> <p>3. He must inspect and do the maintenance of all tools and equipment</p> <p>4. He should be able to provide efficient first aid service to the injured persons and the first aid box should be made available at the site</p> <p>5. He should maintain suitable rescue equipment</p> <p>6. He must take care to keep clean all construction areas and storage yards</p>			
	<p>7. Conduct Orientation and Training of Employees</p>	7 x 1		7