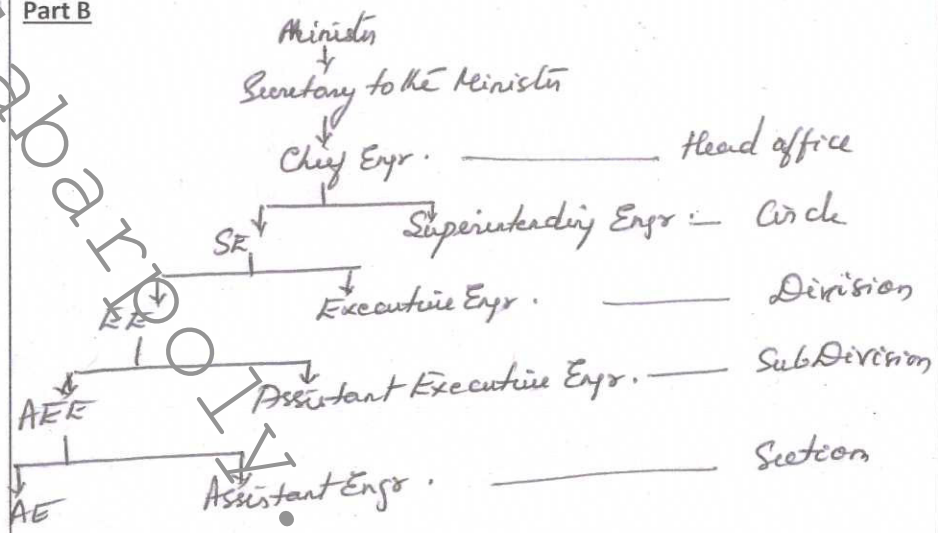
SCHEME OF VALUATION

(Scoring Indicators)

Revision:- 2015 Course Code:- 5012

Course Title:-Construction Management & Safety Engineering

Ques No:	Scoring Indicators	Split up score	Sub Total	Total
I	**Part A**			
1.	**Engineering organisations in Kerala:- Public works Department(buildings/ irrigation), Public health engineering dept, Kerala water authority, Kerala housing board, Kerala Harijan welfare corporation, Kerala state electricity board, Kerala rural works dept.**	2		
2.	**EMD is the earnest money deposit, actually 1% of the estimated cost, to be deposited by all the tenderers while submitting their tender. The EMD will be refunded after the execution of the work.**	2		
3.	**Draglines, shovels, Hoes, Bull dozers, Tractors, Trailers, etc**	2		
4.	**Quality assurance:- includes all those planned and systematic actions necessary to provide adequate confidence that a product will satisfy the given**	2		
5.	**requirements for quality.** **Pre-measurement is the measurement taken well before the commencement of the work. In this case the work can be started only after the check measurement and re-measurement are made.**	2		10
II.	**Part B**			
1.		Chart 5 Officenames-1		6
2.	**Item rate contract:- here the contractor quotes his rate per unit item of construction. The details of the quality of construction of all possible items are worked out and put up on the tender form. Against each item the contractor fills up his own rate and arrives at the final cost of work in the form of schedule of quantities. This form of contract is useful when the quality of the work and not the exact quantity is previously known. All public works are done under this contract.**			
	Lumpsum contract:- here the complete work as per plans and specifications are carried out by the contractor for a definite amount of money. The owner supplies the required informations to the contractor and on the basis of this data the contractor arrives at a certain amount. This form of contract is useful when the exact quantities of the work to be done is workable and when the			

number of items are limited

2. Percentage contract:- here the contractor agrees to complete the structure for a certain fee for his services . this method is adopted when
   - Both the quantity and quality of the work is not previously known.
   - Unsettled market conditions and no contractor turns up for unit price basis.
3. Piece work contract:- this is an agreement by which the contractor agrees to execute a particular work at mutually agreed rates without reference to the total quantity of work or the time taken for the work . Only petty works, regular maintenance works, or construction of small jobs are carried out by this type of contract.

1.5×4

4. Labour contract:- when the materials are purchased by the owner, tenders are invited for labour only. The contractor puts up the rate for labour per unit item of execution. The rate includes-
   - Use of contractors plants and equipments
   - All necessary frame works.
   - Contractors supervision.
   - Contractors profit.

6

3. Methods of training:-
   1. Individual instruction:- giving personal attention to an employee to teach him a complicated skill.
   2. Group instruction:- explaining to a group of workers a new method for doing a job.
   3. Lecture method:- most effective method for giving trainees the basic information on a specific subject.
   4. Demonstration method:- employed to help trainees to grasp manual skill.
   5. Written instructional method:- used to give trainees the important information in a permanent form.
   6. Oral instructions:- the method used when it is required to give information needed at once in a short form.
   7. Conferences:- helps solving problems or changing attitudes.
   8. Meeting:- are held to exchange information, solve immediate problems or to get ideas of a group.

6 pts

6×1

6

4. The following requirements in engineering safety may be adopted.
   - Provide ample space around individual machines or process unit for normal operation.
   - Arrange machines and units in logical sequence to give a direct flow of materials.
   - Install sufficient number of units to permit necessary time for ordinary adjustments and repairs without hampering the progress.
   - Provide ample and direct approaches, stairs etc free from obstruction.
   - Select central locations for elevators, tool cribs, wash rooms, emergency room etc.
   - Provide a power system with least potential energy exposure.
   - Provide means for the safe and quick cut-off of mechanical power , electric current, steam, gas and liquids.
   - Provide adequate material and artificial lighting whenever employees congregate.

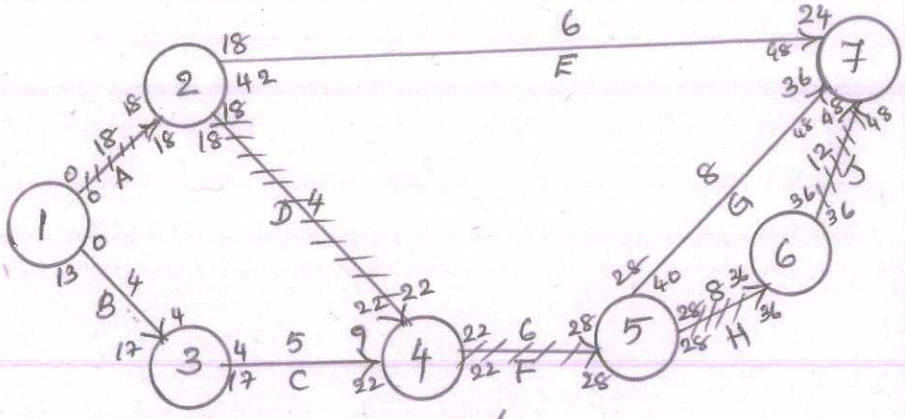
	Provide for proper house-keeping. Provide for the safe routing of outside / inside traffic, both pedestrian and vehicular.	6pts		
5.	Elements of TQM 1. Leadership:- the first step towards excellence is the major decision to provide leadership for quality as a basic strategic goal. 2. Leadership commitment:- this is considered as the key factor in implementing TQM. Top management members must lead the TQM efforts. 3. Recognition and rewards:- this shows acknowledgement of employee's outstanding perfomance. It is essential as people need to be accepted by others and recognition helps to find themselves in a winning role. 4. Education and training:- education and training of all the employees from top to bottom are the fundamental building blocks for the successful implementation of TQM. 5. Customer orientation:- the customer is the king. The customer is the purpose of existence of our business. The customer needs value at a reasonable price. 6. Team work:- the purpose of team work is to have all people involved in a process, working to acheive a common goal. Inter-departmental conflicts must be eliminated. 7. Feed back mechanisms:- for the success of the TQM program, feed back mechanism for both external and internal customers need to be developed. 8. Statistical process control:- variation is the law of nature. Understanding the nature of variations helps the organisation to reduce inspection and improve the quality.	6×1 6pts 6×1		6 6
6.	Functions:- Planning the type of materials, their actual quantities and the time of delivery. Sorting of the type of materials to be purchased and that has to be made internally. Provision of proper storage so that loss due to theft and deterioration could be kept minimum. Arranging transportation in the most economic way. Quick disposal of excess stock and waste materials. Adopting various cost reduction techniques. To develop a co- ordination between various departments.	6pts 6×1		6
7.	1.Lawful subject matter:- the court shall not enforce an agreement which violates the provisions of the law. - contracts involving crime, fraud, gambling etc - construction of a building without getting its plan approved by the concerned authority. 2. Legally competent parties:- the legally incompetent parties are:- - minors ---age < 18 years - idiots having IQ < 25 - lunatics--- persons with unsound mind - intoxicated persons. 3. Free consent:- the terms and conditions of the contract should be agreed upon with free consent and should be clearly understood by the parties. 4. Valid consideration:- the law assumes that the work done under a contract are not free of charge, hence to make a contract legal, it must consist of paying a definite amount of money. 5. Provisions of the law with regard to form:- the law requires that the contract must be in writing and signed by the parties concerned, so as to facilitate the process in case of disputes. It should contain:-	5pts		6

- Nature of services to be performed.
- Quality of materials and workmanship.
- Time limit for the completion of work.
- Drawings and specifications.
- Terms and conditions of the contract.
- Signature of the parties concerned.

III

PART-C

Module - I



Network - 5
Calculation - 5
Critical path - 5

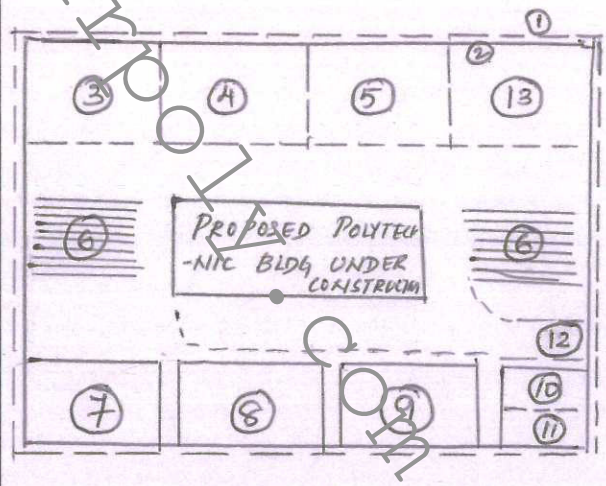
Project length = 48 weeks
Critical path - A-D-F-H-J.

15

OR

IV

(a)



1. Property line
2. Fence
3. Cement godown
4. Electric store & office
5. Plumbing store & office
6. Reinforcement godowns.
7. Wood store & power saws
8. Bricks & tiles store
9. Aggregates
10. Ware House
11. Office.
12. Entrance.
13. Surplus soil.

fig - 10
Naming - 5

10

(b) (Please turn to last page.)

Module - II

V a)

The attendence of daily engaged labourer is worked on a form known as Muster Roll. The muster roll is the basic record of payment made to the

2

DEL. It is a roll of the daily attendence of the labourers showing their names, particulars, workdone and the amount payable to them for the execution of the work.

Rules for writing and maintaining NMR.

1. One or more NMR can be used for the same work.
2. NMR should never be prepared in duplicate for the same work.
3. The attendence is marked as 'X' for presence of labourers and 'A' for the absence at the start of work on each day.
4. There should be no overwriting.
5. Attendence is checked at least once daily.
6. Generally payments are made fortnightly, after each payment it is essential to open a separate NMR for further payments.
7. At the closure of NMR a certificate must be recorded by the AE as follows:-

   ' Certified that the workers mentioned in the NMR were actually employed by me on government work and were actually paid on my identification in my presence.'

5

7.

b)

1. Basic establishment:- division of the executive engineer is the main unit. The division is organised to look after all the works of public buildings, dams, canals etc. Since the requirement does not change from time to time, it is a basic / regular establishment.

This is again divided into

Permanent establishment:- this consists of all the permanent staff and their posts are sanctioned by the government. The salaries are drawn from the treasury in the pay bill of permanent establishment.

Temporary establishment:- due to the increase in work load of a division say , on account of projects taken from time to time additional staff is recruited to handle the increased work load. This is a temporary staff and thus the establishment becomes temporary.

Quasi permanent establishment:- when the work of the temporary staff is found satisfactory for 3 years they are absorbed into the staff as quasi permanent establishment. It is a class between temporary and permanent establishments.

4

1. Work charged establishment:- the establishment recruited primarily for the work asociated with a project is termed as work charged establishment. All personnel employed in addition to the basic establishment come under this category. For example:- daily labourer, casual labourer, contingent staff (consists of security staff, messengers etc.) Since the allotment to the WCE is on deputation basis the WCE is not entitled to pension, TA, except when the journey is performed in connection with the project work. Their services can be terminated at anytime without prior notice.

4

8

OR

VI a) Testing of River sand:- Laboratory tests - physical & chemical - are conducted for organic matter - Sieve analysis is conducted for uniformity and grain size.
Testing of bricks:- Bricks are tested for toughness, hardness, uniform size, water absorption, Compressive strength & shape.
Testing of broken stone:- Sieve analysis, uniformity, grain size, Compressive & abrasive tests.
Testing of cement:- Initial & Final setting times, fineness, sp. gravity.
- Materials supplied to the work should be inspected before their use. Regular inspection should be made at all stages of works.

any 4 materials + tests 4+3

7.

b). - Tender notice is published
- Furnished tenders are opened at prescribed time & date.

- List out the Contractors
- The tenders are verified for
  - Validity of EMD.
  - Whether furnished all items
  - Any special conditions quoted.
  - Whether late tender or not
- List out the acceptable tenders.
- After scrutiny, the rates quoted & tabulated.
- Select the Contractor who quoted the lowest rate and award the work.

List the order.

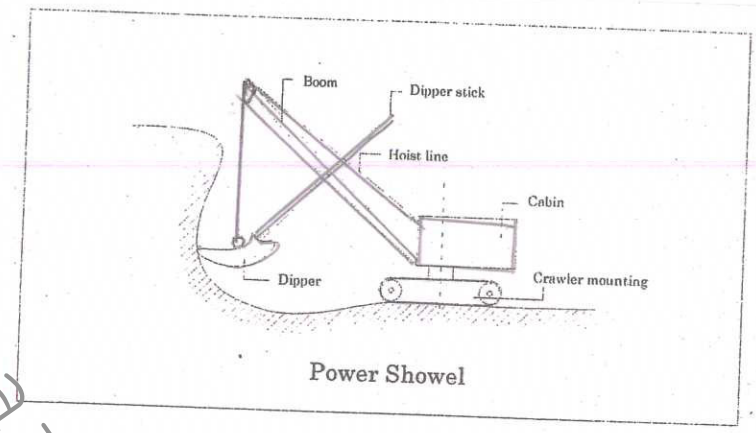
8.

Module – III (7)

VII a) Personnel management may be defined as the planning, organising, directing and controlling of the procurement, development, compensation, integration and maintenance of people / employees for the purpose of contributing to the organisational goals. 2

Planning:- ability to think, analyse, reach decisions.
Organising:- designing the structure of relationships to attain company objectives.
Directing:- getting employees to go to work willingly and effectively.
Controlling:- regulating activities.
Procurement:- obtaining proper kind and number of personnel necessary. 5
Development:- increasing employees' skill through training to achieve goals.
Compensation:- remuneration to the personnel's for their contribution.
Integration:-co-operation within the employees.
Maintenance:- sustaining and improving the conditions – health and safety measures. 7.

b)



Power Showel

fig 5
naming 3

8

Power showel
OR

VIII a) During verification the following general rules are to be obeyed:-

1. Verification is done as a whole and not as part.
2. Verification is done without any previous notice.
3. Half yearly checking is done by the subordinate in charge of the section.
4. Special stock verifying officers are appointed in the case of large concentration of stores. 3
5. After verification action should be taken in the case of surplus stores, shortages and unserviceable goods.

Accounting of surpluses and shortages:-
Surpluses :- stores which are found surplus during stock verification are classified into :- 2

1. Serviceable ie, stores which can be reused.
2. Unserviceable ie, stores which cannot be reused due to normal wear and tear.

All serviceable surplus stores should be immediately taken into account in the register with the remarks 'excess found on stock verification', treating it as receipt. If not required, they may be transfered to other units where there is need for the same.
All unserviceable articles are reported giving particulars of date of purchase, period of storage, causes of deterioration etc. These should be sold in public auction with the sanction of the competent authority and the sale amount of the articles is remitted to the revenue account.

Shortages:- if any shortage is noticed during verification the book balance is set right immediately by treating the shortage as issue. Pending further investigation of the shortage , the cost of the article is debited to a suspense head. After the loss has been investigated the suspense head is cleared under the orders of the competent authority.

2.

7

b)

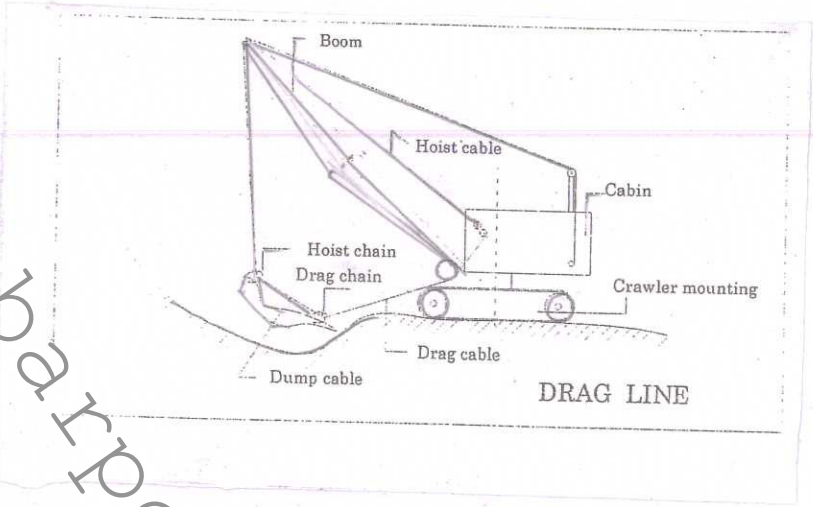


fig 5
any 3

8

Dragline
Module - IV

IX a) General causes of accidents are as follows:-
Accidents due to machines:- these accidents occur from defective machines, tools, materials, fixtures, belts, pulleys, gears, electric motors etc.
Unsafe physical conditions:- it includes improper guards, improper illumination, improper ventilation, unsafe clothing etc.
Moving objects:- sometimes moving objects or falling objects causes accidents like parts of cranes etc.
Personal factors:- accidents due to individual carelessness, fatigue, inexperience, ignorance etc.
Unsafe acts:- it is the violence of the commonly accepted safe procedure.
These include-

- Working at unsafe speed.
- Loading beyond capacity.
- Not using safety devices.

any 3

3

- Adopting unsafe procedure.

Electrical causes:- some of them are:-

- By not providing protecting devices.
- Not obeying proper instructions.
- Not following safety precautions.
- Failure to use insulated pliers, screw drivers and rubber gloves.

Accidents due to fire:- these are accidents caused due to inflammable materials.

Effects of accidents:-

Loss of human lives.
Loss or damage of materials.
Temporary or permanent injury to the workers.
Loss or damage of equipments or machineries.
Loss of time or loss in production.
Depletion in capital due to workmen compensation.

1

Prevention of accidents:- accidents result not only in the injury of the workers but also in a great loss to the organisation. In any construction work accidents can be greatly reduced if the following precautions are taken-

Accidents due to machines:- this can be prevented by providing proper safe guard to the machines. Moving parts of machines can be fenced when it is not possible to provide safe guards.

Physical conditions:- scientific illumination and ventilation should be provided to prevent accidents. Floors should be free from oil and should be kept clean.

Moving objects:- moving objects like hoists, cranes and lifts must be of sound construction and they must be tested periodically.

Personal factors:- caution, persuasion, conviction, appeal and education.

Unsafe acts:- workers should be trained about the correct procedures and they should be educated about the safety precautions.

any 3

Prevention of electric accidents:- is done by the following-

- Electrical insulations should be periodically tested.
- Proper tools must be used for testing and repairing.
- Repair works should be done only after switching the power off.

Fire hazards:- in order to avoid this danger inflammable materials should be kept away from general storage at a safe distance. Fire extinguishers should be kept at suitable places.

3

b)

Entrepreneur style Vs Managerial style

The two terms namely an entrepreneur and a manager are considered as synonym ie, meaning the same. In fact the two terms are two economic concepts meaning two different meanings.

Points	Entrepreneur	Manage

(10)

b) **Entrepreneur style Vs Managerial style**

The two terms namely an entrepreneur and a manager are considered as synonym ie, meaning the same. In fact the two terms are two economic concepts meaning two different meanings.

Points	Entrepreneur	Manager
Motive	The main motive is to start a venture by setting up an enterprise. He understands the venture for his personal gratification.	The main motive is to render his services in an enterprise already set up by someone else.
Status	He is the owner of the enterprise.	He is the servant in the enterprise owned by the entrepreneur.
Risk bearing	He has to undertake all risks and uncertainty involved in running the enterprise.	Being a servant does not bear any risk involved in the enterprise.
Rewards	His reward is his profit from his enterprise which is highly uncertain.	He gets his salary as reward for the services rendered , it is fixed and certain.
Innovation	He himself thinks over what and how to produce goods to meet the changing demands of the customer.	He simply executes the plans prepared by the entrepreneur, ie, converts an entrepreneur's ideas into practice.
Qualifications	He should possess qualities like – firm determination, foresight, risk bearing ability etc.	He should have sound knowledge in management theory and practice.

6 pts

8

Agencies promoting small scale industries:-

X a) **State financial corporations (SFCs):-** state financial corporations grant term loans for the purchase of land , contruction of factory premises, puchase of machinery and equipments for the setting up of new industries or for expansion or modernisation of the existing units.

2

National small scale industries corporation(NSIC) and Small scale industries corporation (SSIC):- these supply machinery on hire purchase basis to small scale industries , the value of which should not exceed Rs 35 lakhs inclusive of the value of machinery and equipments already installed. The payment is made directly to the suppliers. The hire purchase value is generally recovered in 13 half yearly instalments and a rebate of 2% is allowed if the instalments are paid before the due date.

3

NSIC supplies both imported and indigenous machinery , while SSICs supply only

indigenous machinery.

Assistance programme for small enterprises:-
The various assistance measures taken by the central and state governments and other concerned organisations for the development of small scale enterprises have had their impact on all aspects of production , management and marketing. 2

7

b) Merits of ISO9000:-

1. It is prepared by people who are very well conversant with the problems and failures occurring in industries. The notes in the standard are not compulsory and no supplementary comments are required.
2. These are the standards , where in specifications for quality system is provided.
3. It never provides a condition. In most cases it requires the company to establish its own procedures.
4. These standards have gone to great extent from the traditional confines of metal cutting industry to food process, service industries , hospitals, financial institutions etc. Any 4pts
5. ISO 9000 standards mention quality-cost, product-safety and many other considerations , where no reference is made in any of the current operating standards. 4

Demerits of ISO9000:-

1. ISO9000 series of standards for quality assurance were not written for any specific industry. Therefore each individual system has to interpret these guidelines to their own system's requirements.
2. These models are generic in nature and are intended to apply to all industries or to every activity. Any 4pts
3. These standards dictate the method of implementing the requirements.
4. The present version of ISO9000 series of standards states servicing as a compulsory requirement. 4
5. These standards expect suppliers to demonstrate machine perfomance and process capabilities as per design specifications.

8

IV (b) Functions of Construction Management:-

Planning & scheduling - involves preparing workplans for acheiving objectives, finally selecting a suitable plan.
Scheduling shows the duration and order of constn activities.
Organising:- division of work into sections and systematically arranging various operations.
Staffing:- provision of people to fill the positions created. Recruiting the right people in the right job. 5pts.
Directing:- Training the staff to carryout the assigned task - motivate people individually or groups. 5
Controlling:- Constant review of the work plan - effective steps in management. 5
Co-ordinating:- Effective communication - Arrangement for the staff wages and salaries - Sound the clock communication between the office & site.