

**DIPLOMA EXAMINATION IN
ENGINEERING/TECHNOLOGY/
MANAGEMENT/COMMERCIAL PRACTICE, APRIL – 2025**

CIVIL ENGINEERING
Construction management and safety engineering- answer
key

PART-A

(9 x 1 = 9 Marks)

1.	<ul style="list-style-type: none"> DETAILED PROJECT REPORT 	.5x2	1
2.	<ul style="list-style-type: none"> Line or military organization Functional organization <p>Line and staff organization</p>	1	1
3.	<p>Event</p> <ul style="list-style-type: none"> <i>Instant in time when certain activity has been started or completed</i> <i>It is represented by a circle</i> <p>Activity</p> <ul style="list-style-type: none"> <i>An activity is a part of the project denoted by an arrow on the network.</i> 	.5x2	1
4.	Increase in cost per unit of time saved.	1	1
5.	Tender in construction refers to placing the bids and reviewing the different contractors' estimates.	1	1
6.	bull dozer, angle dozer, excavator, power shovel, forklift, tower crane, back hoe, back hoe loader, gantry crane, slip form paver, grader	.5x2	1
7.	<ul style="list-style-type: none"> Materials management is the process of planning and controlling material flows. 	1	1
8.	<ul style="list-style-type: none"> Loss of human life Temporary or permanent injuries to workers. 	.5x2	1
9.	<ul style="list-style-type: none"> Safety is a cost item and no worth while programme can be developed without providing funds for it. Safety measures should start at the planning and designing. 	.5x1	1

PART-B

(8 x 3 = 24 Marks)

1.	<p><u>1.Minister</u></p> <ul style="list-style-type: none"> • Look after one or two engineering Departments • One member from a state <p><u>2. Secretary</u></p> <ul style="list-style-type: none"> • Every dept. will have a secretary as IAS Officer on behalf of Govt. • He is the administrative head who reports to the minister <p><u>3. Chief engineer</u></p> <ul style="list-style-type: none"> • Administrative head of the department. • He manages to prepare annual budget estimation relating to works and administers the grants allotted. • Controls expenditure and progress of works • Inspects major works and solves bottlenecks in works. <p><u>4. Superintending engineer</u></p> <ul style="list-style-type: none"> • Responsible to the chief engineer. • Exercises Financial control. • Exercises execution of original and repair works. • Inspects the work progress periodically. <p><u>Executive engineer</u></p> <ul style="list-style-type: none"> • Head of each division • Ensures that works are done as per sanction • Gives technical sanction • according to rules and regulations • Must Prepare completion report for works and close the account for such works <p>Guidance to deputy executive engineer, overseer, Assistant engineers</p>	1x3	3
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2.	<p>Nature of the project : Describes the type of project</p> <p>Construction methods : Construction can be either cast in-situ or by precast elements. If it is to be of precast elements, then provision for casting yard should be included in the job layout.</p> <p>Availability of resources : Various types of resources are used in executing a project such as labor, plant and equipment material etc.</p> <p>Medical Facilities: If it is a big and complex type of project then it is desirable that a field medical facility is provided.</p> <p>Contractors and Site engineer's offices: These should be located preferably in a noise free area for better co-ordination.</p> <p>Provision for temporary roads.</p>	1x3	3
3.	<p>enough authority to accomplish the task.</p> <p>Specialization Effective organization must include Specialization. Precise division of work facilitates specification. Personal ability Organization structure must encourage management development programme and ensure optimum use of human resources. Flexibility</p> <ul style="list-style-type: none"> It should be adaptable to changing circumstances. It should not be rigid or inelastic 	1x3	3
4.	<ul style="list-style-type: none"> Inventories are classified into three categories in the decreasing 	1.5x2	3

	<p>order of their criticality.</p> <ul style="list-style-type: none"> Accordingly, inventories are classified into vital, essential, and desirable. 		
5.	<p>. TOTAL FLOAT</p> <ul style="list-style-type: none"> <i>The difference between the maximum time allowed for an activity and its estimated duration is called total float. It is the duration of time by which the activity can be started late, without disturbing the project schedule. It is generally denoted by TF.</i> <p>FREE FLOAT</p> <ul style="list-style-type: none"> <i>The duration of time by which the completion time of an activity can be delayed without affecting the start of succeeding activities is called free float. It is generally denoted by F.F</i> <p>independent</p> <ul style="list-style-type: none"> Difference between total float and free float 	1x3	3

6.	<p>Suitability for Job Conditions: The Equipment must meet the requirement of the work, climate and working conditions.</p> <p>Size of Equipment</p> <p>Past Performance</p> <p>Operating Requirements</p> <p>Reliability of Equipment</p> <p>Economical Aspects</p> <p>Service Support</p> <p>Use in Future Projects</p>	.5x6	3
7.	<p>The tenders should be in the prescribed form which can be downloaded from site www.etenders.kerala.gov.in.</p> <p>The tender fee should be submitted online.</p> <p>The tender form without prescribed tender fee will be summarily rejected.</p> <p>The cost of tender forms once paid will not be refunded.</p> <p>I. There are 6 files which are mandatory for uploading a tender.</p> <ol style="list-style-type: none"> 1. Notice inviting tender (NIT) - PDF format. 2. Tender document –PDF format. 3. Agreement form – PDF format. 4. E_payment form – PDF format. 5. Bill of quantity (BOQ) – Excel format. 6. Etender data sheet – Word /PDF format. 	3	3
8.	<p>The parties and arbitrators meet in person to conduct the hearing in which the parties present arguments and evidence in support of their respective cases. After the conclusion of the hearing, the arbitrators deliberate the facts of the case and render a written decision called an award.</p> <p>Industrial disputes can be resolved by way of adjudication i.e. settlement of an industrial dispute by labour court or industrial tribunal. The appropriate government may refer a dispute to adjudication depending on the failure of conciliation proceedings.</p>	3	3
9.	<ul style="list-style-type: none"> • Loss of human life • Temporary or permanent injuries to workers. • Loss or damage of materials and equipments. • Loss of time in completion as work. <p>Loss due to workmen compensation insurance and cost involved is redoing the work.</p>	3	3
10.	<ul style="list-style-type: none"> • Always wash your hands after using any unsafe material. • Store materials properly, as directed on their labels. • Flammable chemicals should be stored in a cool, dry place away from heat and sunlight. • Some chemicals like acids must be stored separately from each other. • . 	3	3

PART-C

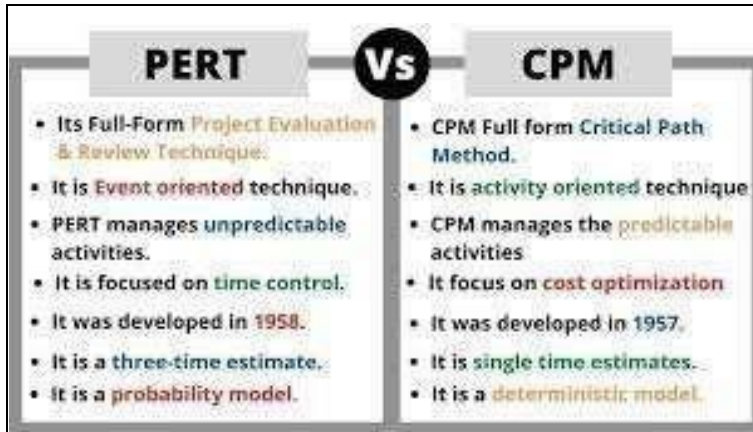
(6 x 7 = 42 Marks)

III.	<p>Line or military organization</p> <ul style="list-style-type: none"> • Simplest type of organization • The responsibility distributed from top to bottom. <p>2. Line and staff organization</p> <ul style="list-style-type: none"> • This organization is a combination of line and functional organization. • This type of organization is preferred for medium and large scale industries. • It is applied to automobile and other intermittent industries. 	2X3.5	7
IV.	<p>OR</p> <p>Claims of contractor against client.</p> <ul style="list-style-type: none"> • Claims for refund of money wrongly deducted • Claims for extra amount on petty grounds. • Claims for compensation for losses suffered by the contractor due to the delay in supply of construction materials, delay in sanction etc. • Interest on delayed payments. <p>Claims of client against contractor.</p> <ul style="list-style-type: none"> • Claims for defective work done by the contractor. • Claims for over payments made to the contractor. • Claims for liquidated damages for delays caused by contractor in completing the work. • Interest on amounts claimed by the client. • Other compensation claims for delays caused by the contractor. 		
V.	<p>Normal cost - Normal cost is the cost associated when the project is completed within the normal time.</p> <p>Crash cost - Crash cost is the cost associated when the project is completed with crash time of the project.</p> <p>Normal time: Normal time is the time required to complete the activity at normal conditions and cost.</p> <p>Crash time: Crash time is the shortest possible activity time; crashing more than the normal time will increase the direct cost.</p> <p>Cost Slope Cost slope is the increase in cost per unit of time saved by crashing. A linear cost curve is shown in Figure 8.27.</p>	7	7

VI.	<p style="text-align: center;">OR</p> <ol style="list-style-type: none"> 1. <i>Direction of arrow should be from left to right</i> 2. <i>No event can be completed before the activity which precedes is completed</i> 3. <i>No activity can be started until the event which precedes it has been reached</i> 4. <i>No set of activities can form a circular loop.</i> 5. <i>Avoid crossing the activities as much as possible</i> 6. <i>All activities should be straight</i> 7. <i>Avoid denting activity.</i> 		
VII.	Identify different modern equipment used in construction projects bull dozer, angle dozer, excavator, power shovel, forklift, tower crane, back hoe, back hoe loader, gantry crane, slip form paver, grader	7	7
VIII.	<p style="text-align: center;">OR</p> <p>are the important types of contract for execution of Civil Engineering works</p> <p>Item rate contract</p> <p>Percentage rate contract</p> <p>Lump-sum contract</p> <p>Labour contract</p> <p>Materials supply contract</p> <p>Cost plus percentage rate contract</p> <p>Cost plus fixed fee contract</p> <p>Cost plus sliding or fluctuating fee-scale contract</p> <p>Target contract</p> <p>Negotiated contract</p>	1X7	7
IX.	<p>The Laws Affecting Construction Companies in India. The Labour Code, 1995. The Contract Labour (Regulation and Abolition) Act 1988. The Factories Act 1993. Contract Law in India</p> <p>The Minimum Wages Act, 1948, These laws are applicable for the construction workers employed in the organised sector. 5.</p> <p>The laws relating to Wages i.e. The Payment of Wages Act, 1936,</p>	7	7

	OR		
X.	<p>Supervising and instructing the construction team as well as subcontractors.</p> <p>Educating site workers on construction safety regulations and accident protocol.</p> <p>Enforcing site safety rules to minimize work-related accidents and injuries.</p> <p>Handling site accidents in accordance with established accident protocol.</p> <p>Supervisors are responsible for maintaining a safe work environment.</p> <p>They must routinely inspect the workplace, identify unsafe actions or conditions, and take immediate corrective action. Should an issue be beyond their authority or ability to rectify, they must escalate it to the Departmental Manager.</p>		
		7	7
XI.	<p>The process of land acquisition was previously governed by the provisions of the Land Acquisitions Act, 1894.</p> <p>As per this Act, only the landowners were supposed to receive compensation during land acquisition.</p> <p>The Act does not address compensating other individuals that are affected.</p> <p>Procedure;</p> <p>Publication of preliminary notification and appointment of officers.</p> <p>Preliminary survey of land. Hearing of objections.</p> <p>Preparation of Rehabilitation and Resettlement Scheme by the Administrator and its review thereafter.</p>		
XII.	<p>Major causes of accidents at project site</p> <ul style="list-style-type: none"> • Planning defect and effects in designing. • Unsuitable time limits. • Selecting incompetent contractors. • Defective supervision of work. • No coordination between different trades. • Carelessness • Not following the instructions. • Negligence. • Unskilled or untrained operatives. <p>In adequate instruction.</p>		

XIII.		7	7



OR

XIV.

- It is one of the best and popular techniques of inventory control.
- Divides materials in to three catogories.
- A, B, C- according to value.

Class A:

- Low value (5-10%), high quantity (50-60%) These items have 70 to 80% of purchase value but less in quantity about 10 to 20%.
- The capital should not be blocked in these items.
- They can be ordered frequently and consumed immediately.
- They require special attention in stores.
- Monitored by top management
- Rigid estimate of requirements

B

They have about 15 to 20% purchase value and 20 to 30% quantity to purchase.

- Medium valued items therefore large inventory of them is not necessary.
- They can be ordered frequently but at the same time the quantity ordered should be such that it will be economic to purchase and its shortage should not be there.
- They are less valued than A items
- Managed by middle level of management

C

- They have the least purchase cost about 5 to10%.

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| | <ul style="list-style-type: none">• They are required in large quantity about 50 to 60%.• They can be purchased in bulk to avail large discounts and fewer prices to pay.• This will also reduce the cost of ordering and purchasing.• They can be purchased once or twice in a year. They are least-valued items | |
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