



# MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION

(Autonomous)  
(ISO/IEC-27001-2005 Certified)

**Subject Code: 12220**

**WINTER-12 EXAMINATION**

**Model Answer**

Page No: 01/

Q1 A) Attempt any three-

(12)

a) In Public Works Dept. there are basic four methods for carrying out works:

- **Employing labour on daily basis**-In this method, labourers like Mazdoor, carpenter etc are engaged by Asst.Engineer and their wages are drawn as per NMR.
- **Rate List** -works costing upto rs.25000/- can be carried out by rate list method. PWD has list of petty contractors to carry out small jobs of repair /maintenance .An undertaking is taken from petty contractors to under take a work at specific conditions
- **Piece work- FOR** small/routine works of less cost ,this method is advisable.. the contractor agrees to execute the work at certain agreed rates without consideration of total quantity or duration .
- **Day work-** system of costing for valuing a work which can not be measured accurately on the basis of materials /labour used for completion.
- **Contract-** the agreement between PWD and contractor for execution of work under specific terms and conditions for certain amount of money.

(any four) (4 x 1=04)

b)

- i) **Administrative approval**- for any work or project require by a dept. an approval of the competent authority of the dept. w.r.t. Cost is necessary at the first instance .this approval authorizes the engg.dept. to take up the work in hand. (1/2)

The administrative approval denotes the formal acceptance of the concerned dept. for the said proposal. (1/2)

Engg. Dept. prepares the preliminary plans and approximate estimate and submit to concerned dept for administrative approval.. (1/2)

The engg.dept. takes up the work and prepare plans, detail designs and estimates and then execute the work only after administrative approval is given by concerned dept. (1/2)

- ii) **Budget provision**- for any work or project it is necessary to provide finance.Originally the estimates are prepared by PWD and sent to the secretary of the dept.and consequently to the finance dept,. (01)

The assurance of finance dept. for allotment of funds to the estimates, fully or partly , submitted above in writing is known as budget provision. Engg. Dept takes up execution

of work thereafter.

(01)

c)

i) **Executive engineer (civil) –works**

- Organize and supervise execution of works economically with specified quality
- Prepare estimates of proposed works
- Invite tenders for sanctioned works
- Expenditure control of works executed
- Control on measurement, stores ,accounts

(01/2x4=2)

ii) **Junior engineer (civil)-works-**

- Supervise day to day progress of work under his control for drawings and specifications.
- Take detailed measurements of works during progress, record in MB and prepare bills thereof.
- Maintain accounts of materials, tools and plants ,labour
- Issue departmental materials through stores and recover the charges from R.A.bills for the same.
- Report supervisors about progress of work by filling various prescribed forms and then submitting to the higher officials.

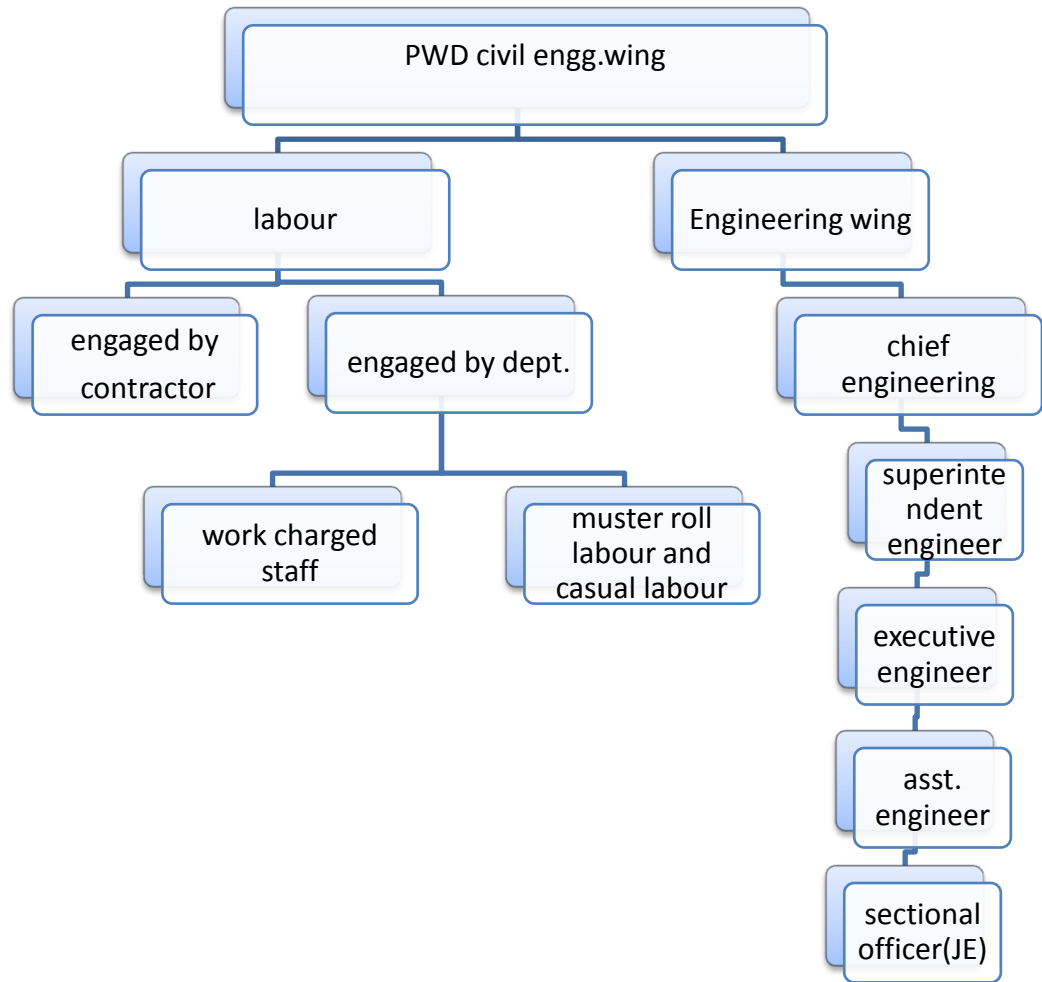
(01/2x4=2)

d) Written undertaking for execution of work /supply of materials under specific terms and conditions for certain amount of money from owner /government. (01)

Requirements-

- It should be in writing
- Parties competent to contract
- Free consent of the parties
- Definite proposal and acceptance
- Can be enforced in court of law
- Attested by witnesses.

(6 x ½ = 03)

**B) Attempt any one****a) Organization structure for state PWD**

**b) i) Lump sum contract-****Advantages-**

- Owner knows actual cost beforehand.
- Detailed measurements are not required.
- Excellent management with efficient planning.
- Quick completion of the work.

(3 x ½ = 1 ½)

**Disadvantages-**

- Dispute can arise due to quality of work
- Difficulty in intermediate payment
- Not suitable for considerable additions / variations

(3 x ½ = 1 ½)

**ii) Negotiated contracts-****Advantages-**

- Rates can be negotiated
- Economy in expenditure
- Less chances of dispute

(3 x ½ = 1 ½)

**Disadvantages-**

- Quality cannot be ascertained.
- Speed of work not assured.
- Not suitable for high quality works.

(3 x ½ = 1 ½)

**Q2 Attempt any four-****(16)****a) Essential documents required for registration of contractor-**

- Proof for financial status such as bank guarantee or solvency certificate.
- Professional capability /experience
- Income tax clearance
- List of technical persons employed with qualification.
- List of machinery owned.
- Attested copies of partnership if any.
- Registration fee receipt.

(4 x 1/2 = 2)

Class of contractor	Financial limit
I	No Limit
II	750 Lacs
III	300 Lacs
IV	150 Lacs
V	50 Lacs
VI	15 Lacs
VII	07 Lacs
VIII	03 Lacs
IX	02 Lacs

(02)

b)

i) **Item rate contract**- in this type of contract, the contractor agrees to carry out the work as per drawing, bill of quantities and specifications against payment made on basis of actual measurements taken item wise. (01)

**Suitability**- accuracy in quantities with ensured quality. (01)

ii) **Percentage rate contract**- in this type of contract the contractor agrees to carry out the work as shown in drawings and specifications at certain % below or above the estimated rates in the bill of quantities. (01)

**Suitability**- no possibility of unbalanced tender and scrutiny simplicity (01)

c) **Objects of contract**-

- To make agreement legal and valid
- possible to go in court of law for justice
- Documentation for quality and quantity.
- Balancing of conditions to safe guard both parties. (01 x4= 4)

d) **BOT** is a form of project planning and financing where in private contractor is given the responsibility of construction of facility such as road, bridge etc. with total financial liabilities for a specified period. After this period is over the ownership is transferred back to government.

During the contract period, the contractor is permitted to collect the money from the users of the facility in terms of TOLL entailing him to recover his investment. (02)

**Advantages-**

- Govt. does not have financial liability in initial stages.
- Quality of construction is good. (2 x ½ = 01)

**Disadvantages-**

- User requires to pay the toll for usage of the facility.
- Undue advantage may be taken by contractor of charging the toll even if recovery period is completed. (2 x ½ = 01)

e) i) **Cost plus percentage rate contract**- In this type of contract, the contractor is paid actual cost of work plus an agreed % for profit. (01)

it is adopted when labour and material rates are liable to fluctuate ,urgent execution of work is needed. However close supervision is necessary. (01)

ii) **Cost plus fixed fee contract**- In this type, contractor is paid an agreed fixed lump sum over and above actual cost of work. (01)

As the fixed fee cover the contractors profit and overheads, speedy execution is possible as contractor tries to complete work as the earliest. (01)

Cost plus fixed fee contract is considered instead of cost plus fixed rate.

**Q.3. Attempt any four of the following.****(16)****a)**

i) **Definition of tender:** Tender is a written offer submitted by the contractor in pursuance of the notification given to execute certain work or to supply some specific article or material or to transport material/article at certain rate with the terms and conditions specified in the tender document. (02)

ii) **Meaning of tender notice:** It is very important. It should stipulate:

- Reasonable time limit for completion of the work.
- It should be in standard form of department.
- It should be displayed in daily local news papers/notice board.
- It should be in tabular form containing essential information about name of authority inviting tender, specification of contractors, name of work and location, estimated cost, price of tender, earnest money and security deposit, last date and accepting authority. (4 x ½ = 02)

**b)**

<b>Earnest Money</b>	<b>Security Deposit</b>
Intention for work acceptance	Intention for quality of work
Charged on % of estimated cost	Charged on % of bill
Limit is 1 to 2% of estimated cost	Limit is 5 to 10 % of bill
Not refundable	Refundable amount

(4 x 1 = 04)

**c) List of different tender documents:**

- The notice inviting tenders in standard form of the department.
- Tender form with standard conditions of contract (printed form).
- Schedule of quantities of work to be done.
- Material, tools and machines or plants to be supplied by the department.
- Special terms and conditions.
- Complete specifications of the work to be executed.
- Special specification and additional conditions of contract.
- One set of approved drawings.
- Lead rate chart.
- Conditions of contract.

(Any eight points) (8 x ½ = 4)

**d) Meaning of****i) Time Limit:**

- 10 days for works costing up to 1 lakhs.
- 2 weeks for works costing from 1 to 10 lakhs.
- 3 weeks for works costing from 10 to 20 lakhs.
- Greater than 3 weeks for works costing more than 20 lakhs.

(4 x ½ = 02)

ii) **Escalation cost:** For huge work, completion period is long. So cost of materials and labour become more and more causing uninterest of contractor to carry out the work. To overcome this drawback, CPWD has provided the price escalation clause to increase the cost in standard form given by:

- Material cost-  $V_m = \frac{70}{100} [0.88V - C + S] \times \frac{W_1 - W_{10}}{W_{10}}$
- Labour cost-  $V_L = \frac{30}{100} [0.88V - C + S] \times \frac{1-10}{10}$

(Meaning:  $1\frac{1}{2}$ , Formula:  $\frac{1}{2}$ )

e) Use of-

- **Schedule A:** To know the list of material supplied by department
- **Schedule B:** To know the list of items of works to be carried out.
- **Schedule C:** To know the specifications of items of work.
- **Schedule of Rate:** To facilitate preparation of estimate.

(4 x 1=04)

Q.4. A) Attempt any THREE

(12)

a) **Nominal Muster Roll:** It is the form which provides (Form no.21) columns for recording attendance of labour for a month.

(01)

**Form of Nominal Muster Roll:**

Date:

Sr.No.	Name of Labour	Date of work		Rate per day	Amount	Payees acknowledgement	Initials of officer making payment
		1, 2, 3...	Total				

(01)

Uses of nominal muster roll in government- These are as –

- Recording the labours
- Finding total no. of labours.
- For payment of labours.
- To know labour cost.
- To know labour capacity of work.
- To have financial record for labour cost. (any four) (1/2 x4 = 02)

b) i) Different account forms used in PWD are :

- Stock account forms – Form no. 7,8,9,10,11,16,35,37.
- Tools and plants account forms: Form no. 13, 14, 15.
- Sale account forms: Form no. 18 and 19.
- Bills forms: Form no. 24,25,26,27A, 27B, 28 (4 x 1/2= 02)

ii) Explanation any one form with format of above one form: (02)

c) i) **Indent:** It is a material form prepared by SDO or AE in charge of civil work to issue materials from stock. It is in triplicate form- counter foil, indent and invoice. (01)

ii) **Invoice:** It is one part of indent used for receipt of issued material. Initially, it is sent in blank format to issuing officer. (01)

- iii) **Bill:** It is account of work done or supply of material made and includes particulars and quantities of work done or material supplied, their rates and amount due. (01)
- iv) **Cash book:** It is the book in which all the transactions related to actual receipt and payment of cash is recorded in a register made by PW Acc. Form no. 1. (01)

- d) i) **Running account bill:** This form is used for making on account payment or running payment for measured works or supplies. Payments of first and second running bill etc. of measured works or supply are made in this form. (01)
- PWD form no. 27 (white)** is used for accounting. (01)

- ii) **First and Final Bill:** This form is used for making payment to the contractor for works and supplies. When a single payment is to be made on completion of whole work or supply as the final payment. (01)
- PWD form no. 24** is used for the accounting. (01)

**Q.4. B) Attempt any one. (06)**

- a) **Valuation:** It is the technique of estimating or determining the fair price or value of property. (02)

**Necessicity of Valuation:**

- Buying or selling property.
- Taxation purpose.
- Rent fixation.
- Security of loans.
- Compulsory acquisition.
- Valuation of property (any two) (02)

**Factors affecting value of property:**

- Location of the property
- Clear and marketable title of property.
- Age of property
- Quality of property. (any two) (02)

- b) Meaning of: i) **Book Value:** It is the amount shown in the account book after showing necessary depreciation.
- ii) **Scrap Value:** It is the value of dismantled materials.
- iii) **Salvage Value:** It is the value at the end of utility without being dismantled.
- iv) **Market Value:** It is the amount which can be obtained at any particular time from open market if the property is put for sale.
- v) **Distress Value:** In case of property is sold at a lower price than the market value at that time, it is said to have a distress value.
- vi) **Sentimental value:** It is the amount which can be obtained by the sentiments attached with the property at any particular time from open market when property is put for sale.
- (6 x 1 = 06)



**Q.N.5. Attempt any TWO.****(16)****a)****Tender Notice No**

Sealed tenders are invited for the following work by the Executive Engineer, PWD -----  
 Division from the registered contractor's of Government of Maharashtra. Black tender forms are  
 available at the office of Executive Engineer from date 05/012/2012 to 20/12/1012 during office  
 hours. Tender forms filled in will be accepted upto 20/12/2012 upto 3.00 pm and if possible will  
 be opened on the same date. (02)

Name of work	Approximate cost in Rs.	Time of completion	Type of tender form/ Bank tender fee	Category of contractor
Construction of independent library building for -----	Rs.80Lakhs	12 months	B1 Rs.5000.00/	IV & above

(03)

A meeting for pre tender conference will be held on 12.12.2012 at 3.00 pm at the office of undersigned, which any contractor who has purchase the tender can attend.

1. A copy of detailed tender notice is displayed on the notice board in the office of executive engineer, PWD -----Division and a copy of it can be obtained on request from the office.

2. Detailed tender notice is also available on website [www.mahapwd.com](http://www.mahapwd.com)

3. The undersigned has reserved the right to reject any or all tenders without assigning any reason thereof. (02)

Sd/  
 Executive Engineer  
 PWD -----Division (01)

**b) Situation for sanction of advances**

1. **Advance payment-** When work is done but not measured And hence no bill is prepared, advance payment is given to the contractor on the basis of certificate given by the Assistant Engineer. (02)

2. **Secured advance-** It is an advance payment made on the security of material brought on the site of work, to the contractor in the interest of work. It is sanctioned by E.E. to the maximum of 75% of the value of material. (02)

3. **Mobilization advance-** The mobilization advance is given to contractor for establishing certain facilities required for the execution of work, such as execution of roads, labor quarters, stores & godowns etc. (02)

4. **Petty advance**- During the execution of work, many times purchasing of small materials in less quantity is required in emergency. The amount is less & is given to the Engineer In charge. (02)

c) **Specification for reinforced cement concrete in slab**- The detail information related to following points:

- Steel -Mild steel or deformed HYSD , free from corrosion , loose rust, scales, oils, grease, paints etc
- Centering & Shuttering- timber or steel plate, , prevent leakage of cement slurry etc
- Proportion of cement concrete 1:1.5:3 by volume
- Materials of concrete-Aggregates (Fine & coarse), cement , water
- Mixing- machine mixing W.C. ratio,
- Laying – deposition of concrete, cleaning of shuttering, vibration method, initial setting time
- Curing- by providing gunny bags or flooding or making mud walls. Period of curing
- Measurement- unit, deduction if any, etc. (1 mark to each point)

**Q.6. Attempt any TWO. (16)**

- a) i) **Brief specification** - Necessary to give nature & class of work & materials in general terms to be used in various parts of work from foundation to superstructure. Short description of different parts of work specifying materials, proportions, qualities etc. (02)

- ii) **Detailed Specification**-are necessary to know the qualities, quantities of materials, proportions, workmanship, the method of execution, & measurement of each item of work. (02)

- iii) **Standard specifications**- various engineering dept. take up construction project, which involves number of items & they required specification of the entire item. Therefore detailed specification for different works is drawn up by engineering department & printed to serve as a standard guide to the department. (02)

- iv) **Manufacturers specification**- The manufacturers of various building materials. products, engineering tools, plants, accessories establishes their own specifications for their products manufactured. (02)

b) **Different methods of calculating depreciation**

- i) Straight line method
- ii) Constant percentage method or declining method
- iii) Sinking fund method
- iv) Quantity survey method (02)

**Explanation of any one of above method** (03)

**Example of above explained method** (03)

**c) I) Meaning & formula**

- i) **Sinking fund** -The fund which is gradually accumulated by way of periodic or annual deposit for the replacement of building or structure at the end of its useful life is called sinking fund (01)

Formula:

$$\text{Sinking fund} = I = (S \times i) / \{(1+i)^n - 1\}$$

I- annual installment.

S- Total amount of sinking fund to be accumulated.

i- Rate of interest.

n- Number of years required to accumulate sinking fund (01)

- ii) **Years purchase**- is defined as the capital sum required to be invested in order to receive a net annual income as an annuity of Rs. 1/- at certain rate of interest (01)

Formula **Years purchase** =  $100/\text{rate of interest} = 1/i$  , i- rate of interest in decimal; (01)

**II)**

net annual income = Rs.12000/-

rate of interest =8%

To set Rs. 12000/- interest  $\{100/i\} \times 12000$   
Rs. 15000/- (04)

(As Capitalized value = Net annual income x years purchase)

---