

**SUBJECT: ESTIMATION & MATERIAL TESTING (EMTT)****CLASS XII  
SEMESTER - III****THEORY****FULL MARKS – 20****(MCQ Type Question)**

| UNIT | Topic                                                 | No of periods assigned | Marks |
|------|-------------------------------------------------------|------------------------|-------|
| 1    | Introduction to Estimation                            | 20                     | 07    |
| 2    | Booking of item of work in measurement book           | 5                      | 02    |
| 3    | Tendering & Tender Documents, Contract & its types.   | 6                      | 04    |
| 4    | Methods of Testing of different construction material | 14                     | 07    |

**DETAIL SYLLABUS**

| UNIT         | Topic / Sub Topic                                                                                                                                                                             | No of periods assigned |           |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------|
|              |                                                                                                                                                                                               | Topic / Sub Topic      | Total     |
| 1            | 1. Introduction to Estimation:                                                                                                                                                                |                        | 20        |
|              | 1.1 Introduction                                                                                                                                                                              | 1                      |           |
|              | 1.2 Purpose and common techniques of estimate.                                                                                                                                                | 2                      |           |
|              | 1.3 Civil Engineering Drawing, Measurement techniques (as per BIS:1200)                                                                                                                       | 2                      |           |
|              | 1.4 Estimate - necessity, importance, types- approximate and detailed estimate - main and sub estimates, revised, supplementary, maintenance / repair estimate-taking off quantities - method | 8                      |           |
|              | 1.5 Brief details of method of Estimating, Calculation of Plinth Area, Covered Area, Carpet Area, Service Area, Floor area, Classification of bricks                                          | 7                      |           |
| 2            | 2. Booking of item of work in measurement book:                                                                                                                                               |                        | 5         |
|              | 2.1 Measurement Book.                                                                                                                                                                         | 1                      |           |
|              | 2.2 Procedure of entering data into Measurement book.                                                                                                                                         | 4                      |           |
| 3            | 3. Tendering & Tender Documents, Contract & its types.:                                                                                                                                       |                        | 6         |
|              | 3.1 Introduction to tender and tender documents.                                                                                                                                              | 3                      |           |
|              | 3.2 Contracts and its types.                                                                                                                                                                  | 3                      |           |
| 4            | 4. Methods of Testing of different construction material:                                                                                                                                     |                        | 14        |
|              | 4.1 Bricks- Shape, size, colour, soundness, efflorescence, crushing strength, class.                                                                                                          | 2                      |           |
|              | 4.2 Sand (Fine aggregate)- grading zone, fineness modulus, bulking of sand, silt content.                                                                                                     | 3                      |           |
|              | 4.3 Cement-fineness, soundness, initial and final setting time, compressive strength of cement sand mortar.                                                                                   | 2                      |           |
|              | 4.4 Stone chips (Coarse aggregate)- grading, crushing strength, flakiness and elongation index.                                                                                               | 2                      |           |
|              | 4.5 Concrete- Workability (slump test, compacting factor test), Compressive strength of concrete.                                                                                             | 3                      |           |
|              | 4.6 Water-Turbidity, colour, odour, PH Types & uses of cement.                                                                                                                                | 2                      |           |
| <b>Total</b> |                                                                                                                                                                                               |                        | <b>45</b> |

**SUBJECT: ESTIMATION & MATERIAL TESTING****CLASS XII  
SEMESTER - IV****THEORY****FULL MARKS – 30****(SAQ AND LAQ Type Question)**

| <b>UNIT</b> | <b>Topic</b>                                           | <b>No of periods assigned</b> | <b>Marks</b> |
|-------------|--------------------------------------------------------|-------------------------------|--------------|
| 1           | Detailed estimation of a building                      | 15                            | 10           |
| 2           | Estimate for different items of works of a building    | 24                            | 12           |
| 3           | Rate analysis of typical items and their specification | 12                            | 6            |
| 4           | Project work                                           | 12                            | 2            |

**DETAIL SYLLABUS**

| <b>UNIT</b>  | <b>Topic / Sub Topic</b>                                                                                                                         | <b>No of periods assigned</b> |              |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|--------------|
|              |                                                                                                                                                  | <b>Topic / Sub Topic</b>      | <b>Total</b> |
| 1            | 1. Detailed estimation of a building:                                                                                                            |                               | 15           |
|              | 1.1 Detailed estimation a Boundary Wall with eccentric footing                                                                                   | 2                             |              |
|              | 1.2 Detailed estimation of a single storied building with RC framed and load bearing wall.                                                       | 8                             |              |
|              | 1.3 Detailed estimation of a Septic Tank                                                                                                         | 2                             |              |
|              | 1.4 Detailed estimation of Semi-underground Water Reservoir<br>Composition of PCC and RCC.                                                       | 3                             |              |
| 2            | 2. Estimate for different items of works of a building:                                                                                          |                               | 24           |
|              | 2.1 Earth work in excavation.                                                                                                                    | 2                             |              |
|              | 2.2 Brick flat soling                                                                                                                            | 2                             |              |
|              | 2.3 Plain Cement concrete                                                                                                                        | 2                             |              |
|              | 2.4 Brick work with cement mortar                                                                                                                | 4                             |              |
|              | 2.5 Plastering.                                                                                                                                  | 2                             |              |
|              | 2.6 RCC works                                                                                                                                    | 8                             |              |
|              | 2.7 Wood work calculation.                                                                                                                       | 2                             |              |
|              | 2.8 Painting                                                                                                                                     | 2                             |              |
| 3            | 3. Rate analysis of typical items and their specification:                                                                                       |                               | 12           |
|              | 3.1 Introduction to Rate analysis in estimation                                                                                                  | 2                             |              |
|              | 3.2 Rate analysis of Earth Work, Brick Flat Soling, RCC, PCC, Wood Work, Stone & Brick masonry, Different Flooring, Plastering & Painting.       | 10                            |              |
| 4            | 4. Project work:                                                                                                                                 |                               | 12           |
|              | 4.1 Describe the method of measurement of a finished work.                                                                                       | 2                             |              |
|              | 4.2 Study of drawing to prepare an estimate of a two storied residential building having two flat per floor of 200 sq.m. covered area per floor. | 6                             |              |
|              | 4.3 Describe the specification of Physical testing of different construction materials.                                                          | 4                             |              |
| <b>Total</b> |                                                                                                                                                  |                               | <b>63</b>    |

## Practical / Project

Practical- 40marks

Project- 10marks

| Sl No. | Practical -144 periods                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.     | <p><b>Demonstrate the :</b></p> <ol style="list-style-type: none"><li>1. Concept and purpose of estimate for different Civil construction work.</li><li>2. Concept and calculation of Plinth Area, Covered Area, Carpet Area, Service Area, Floor area,</li><li>3. Approximate Methods of Estimating for Building</li></ol> <p>Plinth area or square meter method,<br/>Cubic rate or cubic metre method,<br/>Approximate quantities with bill method,<br/>Service unit or Unit rate method,<br/>Bay method<br/>Cost comparison method<br/>Cost from materials and labour.</p> <ol style="list-style-type: none"><li>4. Prepare Detailed Estimate of Items of -<ol style="list-style-type: none"><li>i) a Wall with uniform spread footing,</li><li>ii) a boundary wall with eccentric footing,</li><li>iii) a single storied Building,</li><li>iv) a Septic Tank,</li><li>v) Semi-underground water reservoir</li></ol></li></ol> |
| 2.     | <p><b>Prepare the Estimate for quantity of materials required to construct the following item of works for a building :</b></p> <ol style="list-style-type: none"><li>a) Earth work in excavation,</li><li>b) Brick flat soling,</li><li>c) Plain Cement concrete.</li><li>d) Brick work with cement mortar,</li><li>e) Plastering.</li><li>f) RCC work</li><li>g) Wood work calculation,</li><li>h) Painting.</li></ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 3.     | <p><b>Prepare rate analysis of major items</b> - Earth Work, Brick Flat Soling, RCC, PCC, Wood Work, Stone &amp; Brick masonry, Different Flooring , Plastering &amp; Painting.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 4      | <p><b>Prepare the Booking of different item of works in measurement book according to sequence.</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5 | Demonstrate: Tendering & Tender Documents, Contract & its types.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 6 | <p><b>Testing of</b></p> <p>i) Bricks- Shape, size, colour, soundness, efflorescence, crushing strength, class.</p> <p>ii) Sand (Fine aggregate)- grading zone, fineness modulus, bulking of sand, silt content .</p> <p>iii) Cement-fineness, soundness, initial and final setting time, compressive strength of cement sand mortar.</p> <p>iv) Stone chips (Coarse aggregate)- grading, crushing strength, flakiness and elongation index,</p> <p>v) Concrete- Workability(slump test, compacting factor test), Compressive strength of concrete.</p> <p>vi) Water-Turbidity, colour, odour, PH</p> |
| 7 | <p><b>Project Work : 20 marks</b></p> <p>1. Prepare a measurement of a finished work.</p> <p>2. Estimate of a two storied residential building having two flat of 200 sq.m. covered area per floor according to detailed drawing. (Estimate of items of work, Bill of materials and cost involved as per P.W.D. Rate.)</p> <p>3. Physical testing of different construction materials</p> <p>- Bricks, Sand, Cement, Stone chips, Steel, Water, Wood etc.</p>                                                                                                                                         |