# INSTITUTE OF AERONAUTICAL ENGINEERING

**(Autonomous)**
Dundigal, Hyderabad - 500 043

## CIVIL ENGINEERING

## TUTORIAL QUESTION BANK

| | | |
|---|---|---|
| **Course Name** | **:** | **ESTIMATION AND COSTING** |
| **Course Code** | **:** | **A70138-R15** |
| **Class** | **:** | **IV - B. Tech I- Semester** |
| **Branch** | **:** | **CIVIL ENGINEERING** |
| **Year** | **:** | **2018– 2019** |
| **Course Faculty** | **:** | **Mr. Gude Ramakrishna, Associate Professor, Department of CE.** |

### COURSE OBJECTIVE:

To meet the challenge of ensuring excellence in engineering education, the issue of quality needs to be addressed, debated and taken forward in a systematic manner. Accreditation is the principal means of quality assurance in higher education. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited. In line with this, Faculty of Institute of Aeronautical Engineering, Hyderabad has taken a lead in incorporating philosophy of outcome based education in the process of problem solving and career development. So, all students of the institute should understand the depth and approach of course to be taught through this question bank, which will enhance learner's learning process.

| S. No | Question | Blooms Taxonomy Level | Course Outcome |
|---|---|---|---|
| | **UNIT-I**<br>**GENERAL ITEMS OF WORK IN BUILDING, DETAILED ESTIMATES OF BUILDINGS** | | |
| **PART - A (SHORT ANSWER QUESTIONS)** | | | |
| 1 | What is meant by estimating and costing and state its need? | Remember | 1 |
| 2 | Write a short note on types of estimates and their purpose? | Remember | 2 |
| 3 | What is specification and mention its necessity. | Understand | 1 |
| 4 | State the methods of arriving quantities with brief notes? | Understand | 1 |
| 5 | Write short notes on units of calculation? | Understand | 1 |
| 6 | What is lump sum 'provision in estimate '? | Remember | 1 |
| 7 | Explain what is meant by work charged establishment? | Remember | |
| 8 | Distinguish between detailed and abstract estimates. | Remember | 1 |
| 9 | Write short notes on approximate method of estimating. | Remember | 2 |
| 10 | Write short notes on main items of work in estimation. | Remember | 1 |
| 11 | State the necessity of preparing the approximate estimate. | Understand | 1 |
| 12 | What is a Detailed estimate? | Remember | 1 |

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| 13 | What is a Data estimate? | Remember | 1 |
| 14 | What is an Abstract estimate? | Remember | 2 |
| 15 | State the various types of preparation of rough estimates. | Understand | 1 |
| 16 | State the requirements for preparation of estimates. | Remember | 1 |
| 17 | Differentiate between detailed estimate and approximate estimate. | Remember | 1 |
| 18 | What is an Estimate? | Remember | 1 |
| 19 | write the units of measurement for Doors And Windows. | Understand | 1 |
| 20 | write the units of measurement for Earthwork Excavation. | Understand | 2 |
| 21 | write the units of measurement for Plain Cement Concrete For Foundations. | Understand | 1 |
| 22 | write the units of measurement for Sand Filling In Basement. | Understand | 1 |
| 23 | write the units of measurement for R.C.C 1:2:4 With Nominal reinforcement. | Remember | 1 |
| 24 | write the units of measurement for Damp Proofing Course With Specified Thickness. | Remember | 1 |
| 25 | write the units of measurement for R.C.C Pipes. | Remember | 1 |
| 26 | write the units of measurement for Brickwork. | Remember | 2 |
| 27 | write the units of measurement for Stone Work. | Remember | 1 |
| 28 | write the units of measurement for Wood Work. | Understand | 1 |
| 29 | write the units of measurement for Tiled Roofing. | Remember | 1 |
| 30 | write the units of measurement for Steel Work. | Remember | 1 |
| 31 | write the units of measurement for Plastering. | Remember | 1 |
| 32 | write the units of measurement for Flooring. | Remember | 2 |
| **PART – B (LONG ANSWER QUESTIONS)** | | | |
| 1 | (a) Explain principle units for various items of work.<br>(b) List out limits of measurement and degrees of accuracy in estimating. | Understand | 1 |
| 2 | (a) What is approximate estimate and explain the importance of approximate estimate.<br>(b) Enumerate purpose of an approximate estimate. | Remember | 1 |
| 3 | List out general items of work for building estimates in detail. | Understand | 1 |

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| 4 | Explain the following general items of work involved in the estimation for a building and its process calculation.<br>(a) Centering and shuttering<br>(b) Steel work<br>(c) Lime concrete in roof<br>(d) Wood work for doors and windows. | Remember | 1 |
| 5 | How do you estimate the quantities of masonry work in semicircular arch? | Understand | 2 |
| 6 | Write down unit of measurement, unit rate of payment and mode of measurement for the following general items of work.<br>(a) Asbestos Corrugated or Galvanized Corrugated Iron sheet roofing.<br>(b) Jack arch roofing.<br>(c) Water proofing on roof.<br>(d) Felt work.<br>(e) Ceiling and linings.<br>(f) Brick on Edge or brick Flat flooring.<br>(g) Lime or Cement Concrete floors or paving.<br>(h) Artificial stone to floor. | Understand | 1 |
| 7 | Explain the following general items of work involved in the estimation for a building and its process calculation.<br>(a) Centering and shuttering.<br>(b) Steel work.<br>(c) Lime concrete in roof.<br>(d) Wood work for doors and windows. | Understand | 1 |
| 8 | Write down unit of measurement, unit rate of payment and mode of measurement for the following general items of work.<br>(a) Dressed stonework as in chajjas, jallies, shelves etc.<br>(b) Boulder work.<br>(c) Terraced roofing portion of tiles, bricks or stone slabs.<br>(d) Lime terracing on roof.<br>(e) Madras terrace roofing.<br>(f) Tiled roofing.<br>(g) Ridges, hips & valley.<br>(h) Eave tiles. | Understand | 1 |
| 9 | Explain the following general items of work involved in the estimation for a building along with the process of calculations.<br>(a) Earthwork in excavation.<br>(b) Earthwork in filling.<br>(c) Brick at soling.<br>(d) Cement concrete in foundation.<br>(e) Masonry work in foundation.<br>(f) Damp proof course.<br>(g) Masonry work in superstructure.<br>(h) 10 cm thick brickwork. | Remember | 1 |
| 10 | Give the detailed specifications of the following items of works.<br>(a) Earthwork in excavation in foundation<br>(b) Centering and shuttering. | Remember | 1 |
| 11 | Give standard specifications for the items in the construction of class ‘C’ residential building:<br>(a) Footing and plinth.<br>(b) Super structure.<br>(c) Roofs.<br>(d) Damp proof course | Understand | 2 |

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| 12 | Explain the following estimates<br>(a) Detailed estimate<br>(b) Repair estimate<br>(c) Revised estimate and supplementary estimates due to reduction of cost<br>(d) Quantity estimate. | Remember | 1 |
| 13 | Explain the following methods along with an example.<br>(a) Straight line method<br>(b) Quantity survey method. | Understand | 1 |
| 14 | What is the difference between preliminary estimates, detailed estimates, supplementary estimates and revised estimates? Under what circumstances each one is prepared and what statements and drawings are to be attached with each one of them. | Understand | 1 |
| 15 | What are different types of estimates? How do they differ from each other? Which of the methods can give us the exact cost and why? | Understand | 1 |
| **PART – C (PROBLEM SOLVING AND CRITICAL THINKING QUESTIONS)** | | | |
| 1 | Prepare a preliminary estimate of four storeyed office building having total carpet area of 2000sq.m for obtaining the administrative approval of the government, given the following data. It may be assumed that 40% f the built up area will be taken up by corridors, verandah, lavatories, staircase etc.<br>Plinth area rate in Rs. 4500/- per sq.m.<br>Extra due to deeper foundation at site 1 % of building cost.<br>Extra for special architectural treatment 0.5% of building cost.<br>Extra for water supply and sanitary installations at 8% of building cost.<br>Extra for internal electrical installation at 12.5% of building cost.<br>Extra for other services 5% of building cost.<br>Contingencies – 2.5%<br>Supervision charges – 10 %. | Remember | 2 |
| 2 | Prepare an approximate estimate of the building with a plinth area of 1600sq.m with the following data.<br>1. Plinth area rate Rs. 8000 per sq.m<br>2. Add for architectural work 2.5% of the cost.<br>3. Add for water supply and sanitary installation at 5% of the cost.<br>4. Contingencies at 3% of the cost.<br>5. Supervision charges at 2 % of the cost. | Remember | 1 |
| 3 | The plinth area of the apartment is 400sq.m. Determine the total cost of the building with the following data.<br>1. Cost of construction - Rs. 7500 per cu.m<br>2. Height of apartment – 16.50m.<br>3. Water supply, sanitary and electrical installations each at 5% of building cost.<br>4. Architectural appearance at 1% of building area.<br>5. Unforeseen items at 2% of building cost.<br>6. P.S. charges and contingencies at 4%. | Remember | 1 |
| 4 | Prepare a rough estimate of the hospital building for 100 beds. The cost of construction altogether for each bed Rs. 1, 25,000/-. Determine the total cost building assuming suitable provisions as per Standard data book. | Remember | 1 |

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| 5 | A building consists of 260sq.m. of plinth area in each floor. It consists of ground and first floor, whose heights are 5m and 4.5m respectively. Calculate the cost of the building from the given data. The rates given below are same for both floors.<br>1. Cubic area rate – Rs. 6000 per cu.m.<br>2. Add for architectural work – 4% per cu.m.<br>3. Add for water supply 5% per cu.m.<br>4. Add for sanitary work 5% per cu.m.<br>5. Add for electrical works 6% per cu.m.<br>6. Add for unforeseen items 5% per cu.m.<br>7. Add for supervision 10% per cu.m. | Remember | 1 |
| 6 | Prepare a rough estimate of the hostel building which can accommodate 270 students. The cost of construction altogether including all provisions is Rs. 45,000/- per student. Determine the total cost building assuming suitable provisions as per Standard data book. | Remember | 1 |
| 7 | Prepare a preliminary estimate of a building having plinth area equal to 2600 sq.m. Given that –<br>1. Plinth area rate – Rs. 8000 per sq.m.<br>2. Extra for architectural work – 1.5% of the building cost.<br>3. Extra for electrical installation – 10% of the building cost.<br>4. Extra for water supply and sanitary installations – 6% of the building cost.<br>5. Extra for other services – 8% of building cost<br>6. Contingencies and Supervision charges – 10 %. | Understand | 2 |
| 8 | Prepare a preliminary estimate of multistoreyed office building having a carpet area of 3300 sq.m. 35% of built up area will be taken up by corridors, verandahs, lavatories, staircases etc. and 1% of the built up area will be occupied by walls.<br>Assume the plinth area rate to be Rs. 6800 per sq.m. And provide for water supply and sanitary fitting and electrical installations, contingencies and other services. | Understand | 1 |
| 9 | Describe the procedure for the calculation of rate per unit cum of I-class brick in superstructure with 20 x10x 10 cm bricks with cement sand mortar 1:6. | Understand | 1 |
| 10 | A person is to construct a building of plinth area equal to 250sq.m. on a plot in Hyderabad at a cost of Rs. 20,00,000. The height of the building from ground level to the top roof is 3.2m and a parapet wall of height equal to 800mm is constructed on the terrace.<br>Determine the cost of construction of similar type of the building with plinth area of 300 sq.m. in the same locality based on<br>1. Plinth area rate and<br>2. Cubical content / volume rate. | Understand | 1 |
| 11 | Calculate the quantity of wood work in chowkhat of a door frame 2.1m X 1.2m size and 7.5cm X 10cm in section. | Understand | 1 |

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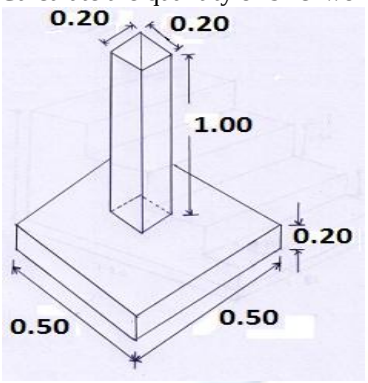
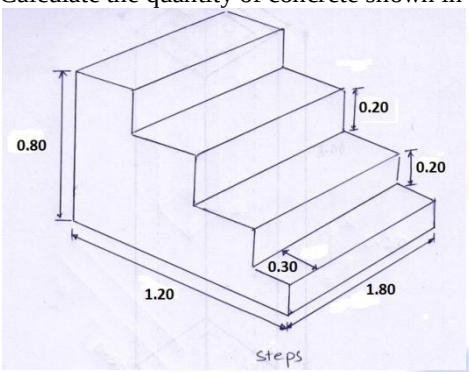
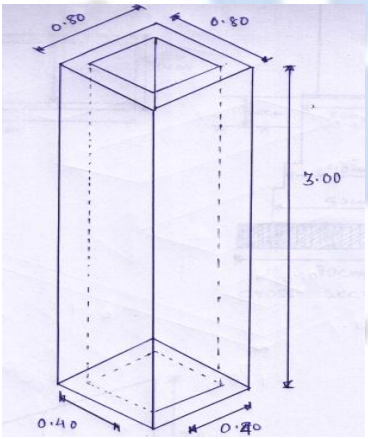
| 12 | Calculate the quantity of brickwork shown in the figure<br>  <br><br>. | Understand | 1 |
| 13 | Calculate the quantity of concrete shown in the figure<br>  <br><br>. | Understand | 2 |
| 14 | Calculate the quantity of woodwork shown in the figure<br>Total height = 3.00 m<br>External width = 0.80m<br>Internal width = 0.40m<br>  <br><br>. | Understand | 1 |

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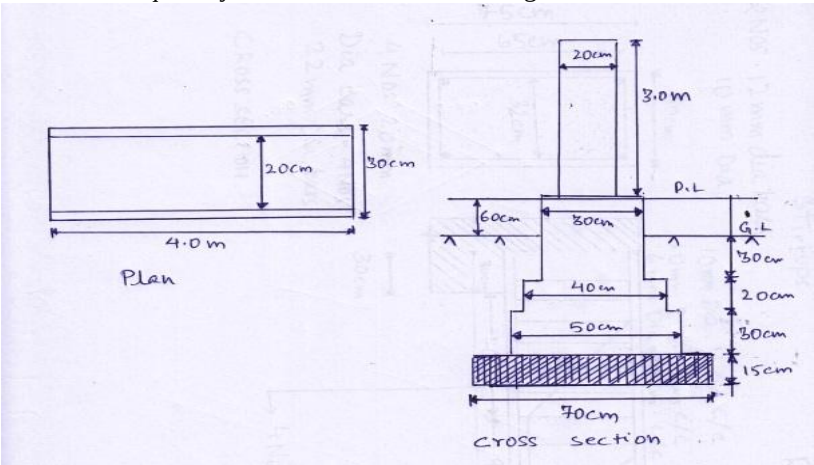
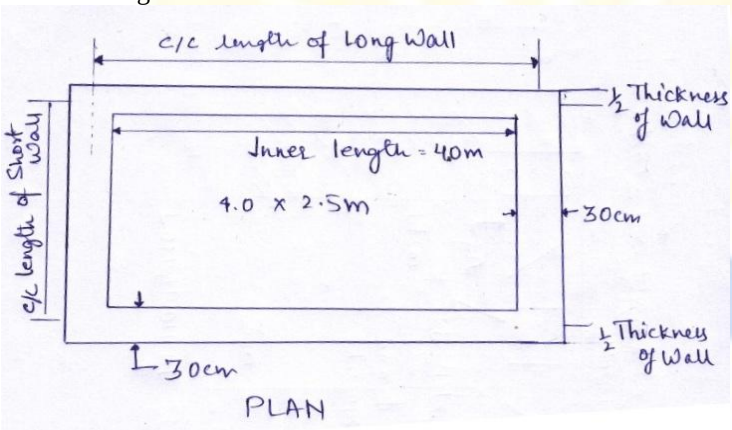
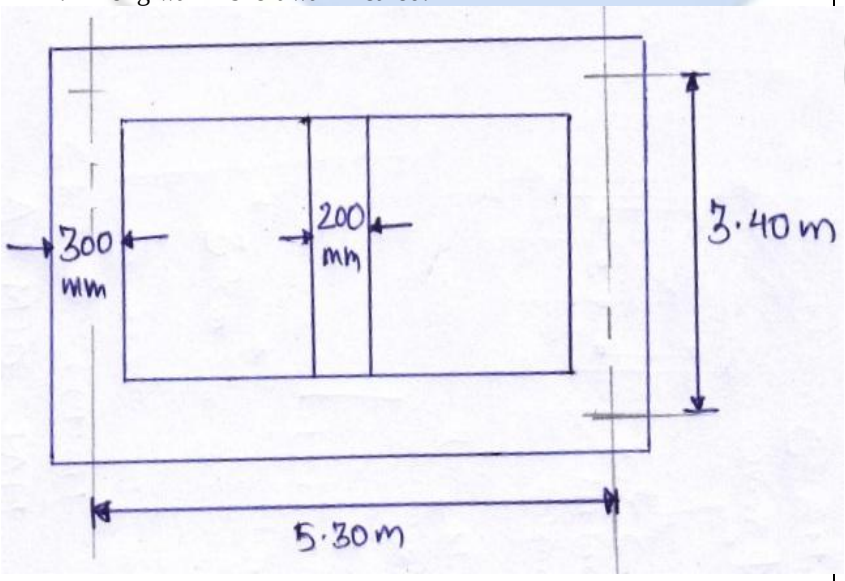
| 15 | Calculate the quantity of concrete shown in the figure<br>  <br><br>. | Understand | 1 |
| 16 | Calculate the quantity of brickwork shown in the figure by<br>1. Center line method .<br>2. Long wall – short wall method.<br>  <br> | Understand | 2 |
| 17 | Calculate the quantity of brickwork shown in the figure by<br>1. Center line method .<br>2. Long wall – short wall method.<br>  <br> | Understand | 2 |

| S. No | Question | Blooms Taxonomy Level | Course Outcome |
|---|---|---|---|
| | **UNIT-II**<br>**EARTHWORK FOR ROADS AND CANALS** | | |
| | **PART - A (SHORT ANSWER QUESTIONS)** | | |
| 1 | Define and explain regarding Earth work embankment | Remember | 3 |
| 2 | Define and explain regarding Earthwork cutting | Remember | 3 |
| 3 | Define and explain regarding Lead | Remember | 4 |
| 4 | Define and explain regarding Lift | Remember | 4 |
| 5 | State the methods of calculating quality of earthwork | Remember | 3 |
| 6 | Distinguish lead and lift | Understand | 4 |
| 7 | Distinguish earthwork in embankment and in cutting | Understand | 3 |
| 8 | Distinguish trapezoidal rule and prismoidal rule | Remember | 3 |
| 9 | Draw a neat sketch for earthwork banking and describe its various terms | Remember | 4 |
| 10 | Draw a neat sketch for earthwork cutting and describe its various terms | Remember | 4 |
| 11 | Consider a cross section and calculate its area using trapezoidal formula | Remember | 3 |
| 12 | Consider a cross section and calculate its area using Prismoidal formula | Remember | 4 |
| 13 | Define the term turfing | Understand | 3 |
| 14 | Necessety of soling coat explain | Understand | 3 |
| 15 | Write a short note on widening | Remember | 3 |
| 16 | water allowance in constuction explain | Remember | 3 |
| 17 | Write a short note on inter coat and top coat | Remember | 4 |
| 18 | Explain about mean harmonic slope | Remember | 4 |
| 19 | Write a short note on ganghuts | Remember | 3 |
| 20 | What are the blinding materials used in construction | Remember | 4 |
| | **PART – B (LONG ANSWER QUESTIONS)** | | |
| 1 | Draw the tabular form for the calculation of earthwork with the following methods.<br>(a) Mid – ordinate method and<br>(b) Mean – sectional area method. | Understand | 3 |
| 2 | (a) Explain the terms lead and lift.<br>(b) List out the general methods for computation of earth work. Explain? | Understand | 3 |
| 3 | How do you calculate:<br>(a) Earth work with vertical fall of the ground surface for fully in banking, fully in cutting and partly in banking cutting?<br>(b) Earth work on curvature of a road without transverse slope. | Understand | 4 |
| 4 | How do you calculate:<br>(a) Earth work with vertical fall of the ground surface for fully in banking, | Understand | 4 |

<table>
<tr><th>S. No</th><th>Question</th><th>Blooms Taxonomy Level</th><th>Course Outcome</th></tr>
<tr><td></td><td>fully in cutting and partly in banking cutting?<br>(b) Earth work on curvature of a road without transverse slope.</td><td></td><td></td></tr>
<tr><td>5</td><td>Calculate the volume of earthwork for 100.00m length of road in a uniform ground. Height of the bank at one end is 0.75m and at the other end 1.20m. Formation width is 10.00m and side slopes of embankment are 2:1. Ground does not have any cross slope. Calculate the volume of earthwork by<br>1. Mid sectional area method<br>2. Mean sectional area method<br>3. Trapezoidal method and<br>4. Prismoidal method.</td><td>Understand</td><td>4</td></tr>
<tr><td colspan="4">PART – C (PROBLEM SOLVING AND CRITICAL THINKING QUESTIONS)</td></tr>
<tr><td>1</td><td>Prepare a detailed estimate for earthwork for a portion of a road from the following data.<br><br>
<table>
<tr><th>Distance in m</th><th>RL of ground</th><th>RL of the formation</th></tr>
<tr><td>0</td><td>114.50</td><td>115</td></tr>
<tr><td>100</td><td>114.75</td><td rowspan="4">Upward gradient 1 in 200 up to 600 m</td></tr>
<tr><td>200</td><td>115.25</td></tr>
<tr><td>300</td><td>115.20</td></tr>
<tr><td>400</td><td>116.10</td></tr>
<tr><td>500</td><td>116.85</td><td rowspan="8">Downward gradient 1 in 400</td></tr>
<tr><td>600</td><td>118.00</td></tr>
<tr><td>700</td><td>118.25</td></tr>
<tr><td>800</td><td>118.10</td></tr>
<tr><td>900</td><td>117.80</td></tr>
<tr><td>1000</td><td>117.75</td></tr>
<tr><td>1100</td><td>117.90</td></tr>
<tr><td>1200</td><td>117.50</td></tr>
</table>
<br>Formation width of road is 8m, side slopes are 2:1 in banking and 1½:1 in cutting. Draw L-section and cross sections.</td><td>Remember</td><td>3</td></tr>
<tr><td>2</td><td>The formation width of a road embankment is 9.0m. The side slopes are 2.5:1. The depths along the center line of road at 50.0m intervals are 1.2, 1.1, 1.4, 1.2, 0.9, 1.5 and 1.0.m. It is required to calculate the quantity of earthwork by<br>(a) Prismoidal rule.<br>(b) Trapezoidal rule.</td><td>Remember</td><td>3</td></tr>
<tr><td>3</td><td>Calculate the quantity of each work for 200m length for a portion of a road in an uniform ground the heights of banks at the two ends being 1.00m and 1.60m. The formation width is 10 m and side slopes 2:1 ( H : V ). Assume that there is no transverse slope. Use the following methods and justify which method is good.<br>(a) Mid – sectional area method and<br>(b) Prismoidal formula.</td><td>Understand</td><td>4</td></tr>
<tr><td>4</td><td>A canal is proposed to be excavated between two points A and B, 120m apart. If the bed width is 10.00m. side slopes 1.5:1 and depth of cutting 1.00m, 2.00m and 3.00m at A,B and C. Calculate the quantity of earthwork excavation by<br>1. Mid sectional area method<br>2. Mean sectional area method<br>The longitudinal section of the position A – B and cross section at A, B, C and Mid-point section is shown in the figure</td><td>Understand</td><td>4</td></tr>
</table>

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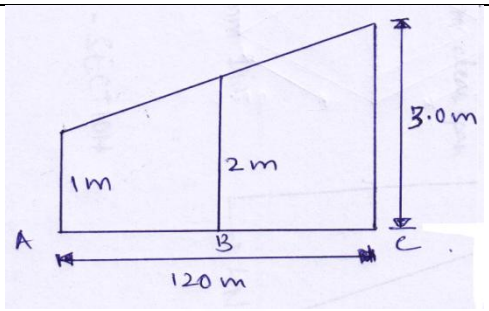
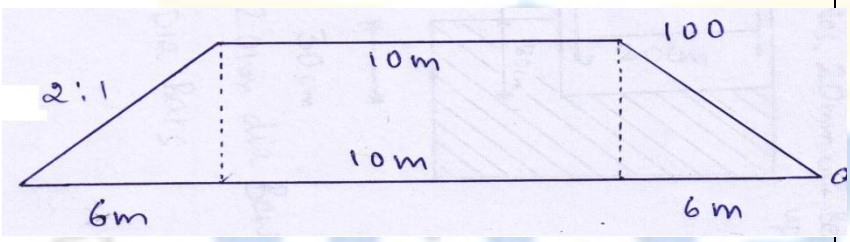
<tr><th>S. No</th><th>Question</th><th>Blooms Taxonomy Level</th><th>Course Outcome</th></tr>
<tr><td></td><td> 
</td><td></td><td></td></tr>
<tr><td>5</td><td>The ground levels along the center line of the road are given below
<table>
<tr><td>Chainage in meters:</td><td>0</td><td>50</td><td>100</td><td>150</td><td>200</td></tr>
<tr><td>R.L. of ground</td><td>97.00</td><td>96.50</td><td>96.00</td><td>97.50</td><td>98.00</td></tr>
</table>
The road is to be formed in embankment with the formation level at 100.00m throughout the length. If the width of the road is 10.00m and side slopes 2:1. Calculate the quantity of earthwork required by<br>1. Trapezoidal rule<br>2. Prismoidal rule.<br>Assuming the transverse slope as level. The figure below shows the c/s of the road at chainage “0”<br> 
</td><td>Understand</td><td>3</td></tr>
<tr><td>6</td><td>Calculate the volume of earthwork for 100.00m length of road in a uniform ground. Height of the bank at one end is 0.75m and at the other end 1.20m. Formation width is 10.00m and side slopes of embankment are 2:1. Ground does not have any cross slope. Calculate the volume of earthwork by<br>1. Mid sectional area method<br>2. Mean sectional area method<br>3. Trapezoidal method and<br>4. Prismoidal method.</td><td>Understand</td><td>3</td></tr>
<tr><td>7</td><td>Reduced levels of ground along the center line of a proposed road from chainage “0” to “9” are given below. The formation level at “0” chainage is 10.00 and the road is in downward gradient of 1 in 100. Formation width of road is 10m and side slopes are 2:1 for both banking and cutting. Length of chain is 20m. The ground level is in the transverse direction.<br>Calculate the quantity of earthwork required by<br>1. Trapezoidal rule<br>2. Prismoidal formula
<table>
<tr><td>Chainage</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr>
<tr><td>R.L. of ground</td><td>8.00</td><td>7.80</td><td>7.60</td><td>7.20</td><td>6.80</td><td>6.10</td><td>6.20</td><td>5.90</td><td>5.00</td></tr>
</table>
.</td><td>Understand</td><td>3</td></tr>
</table>

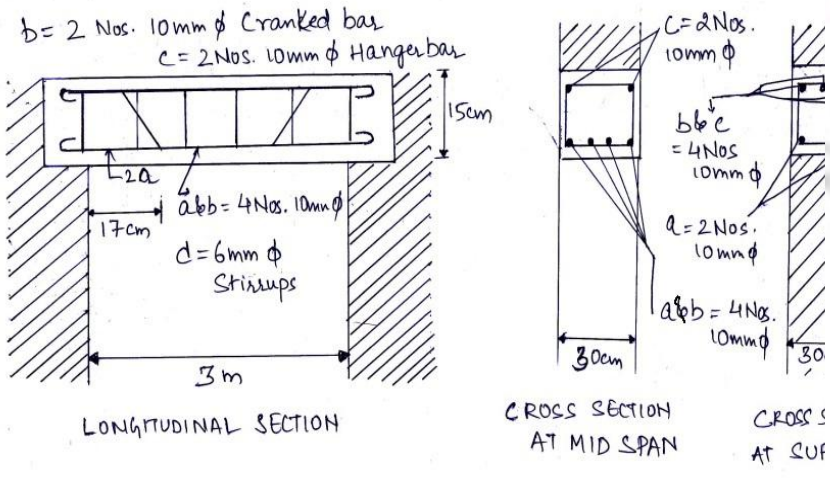
<table>
<tr><th>S. No</th><th>Question</th><th>Blooms Taxonomy Level</th><th>Course Outcome</th></tr>
<tr><td>8</td><td>Reduced levels of ground along the center line of a proposed road from distance 200m from the beginning to the distance 500m are given below. The formation level at 200m distance is 127.00 and has a falling gradient of 1 in 150 up to 320m distance mark. Thereafter the falling gradient changes to 1 in 100. Formation widths of road are 10m and side slopes are 2:1 for both banking and cutting.<br>Draw the longitudinal section of the road and a typical cross-section and prepare an estimate of earthwork at the rate of Rs. 3000 per 100cu.m. Intervals of the levels being 30m.<br>Also find the area of the side slopes and cost of turfing the side slopes at the rate of Rs. 750 per 100sq.m.<br><table><tr><td>Distance in meters</td><td>200</td><td>230</td><td>260</td><td>290</td><td>320</td><td>350</td><td>380</td><td>410</td><td>440</td><td>470</td><td>500</td></tr><tr><td>R.L. of ground</td><td>125.00</td><td>125.60</td><td>125.44</td><td>125.90</td><td>125.42</td><td>124.30</td><td>125.00</td><td>124.10</td><td>124.30</td><td>124.00</td><td>123.30</td></tr></table></td><td>Understand</td><td>3</td></tr>
<tr><td>9</td><td>Estimate the quantity of earthwork between “0m” chainage and “120m” chainage at equal intervals of 20.00m.<br><table><tr><td>Distance in meters</td><td>0</td><td>20</td><td>40</td><td>60</td><td>80</td><td>100</td><td>120</td></tr><tr><td>R.L. of ground</td><td>78.10</td><td>77.74</td><td>77.80</td><td>78.20 80.40</td><td>80.75</td><td>80.250</td><td>79.98</td></tr></table>The formation level at zero chainage is 78.50 and the formation has a rising gradient of 1 in 100. The formation width of road is 12m and side slope in filling is 2:1 and cutting 1:1. Draw the longitudinal section of the road for the length in question</td><td>Understand</td><td>3</td></tr>
<tr><td>10</td><td>The formation width of a road embankment is 10.0m. The side slopes are 1.5:1. The depths along the center line of road at 30.0m intervals are 1.2, 1.1, 1.4, 1.2, 0.9, 1.5 and 1.0.m. It is required to calculate the quantity of earthwork by<br>(a) Prismoidal rule.<br>(b) Trapezoidal rule.</td><td>Remember</td><td>3</td></tr>
<tr><td>11</td><td>Calculate the quantity of each work for 100m length for a portion of a road in a uniform ground the heights of banks at the two ends being 1.50m and 2.30m. The formation width is 10 m and side slopes 2.5:1 (H: V). Assume that there is no transverse slope. Use the following methods and justify which method is good.<br>(a) Mid – sectional area method and<br>(b) Prismoidal formula.</td><td>Understand</td><td>4</td></tr>
<tr><td colspan="4">UNIT-III<br>RATE ANALYSIS</td></tr>
<tr><td colspan="4">PART - A (SHORT ANSWER QUESTIONS)</td></tr>
<tr><td>1</td><td>Give a brief notes on Blasting charges.</td><td>Remember</td><td>3</td></tr>
</table>

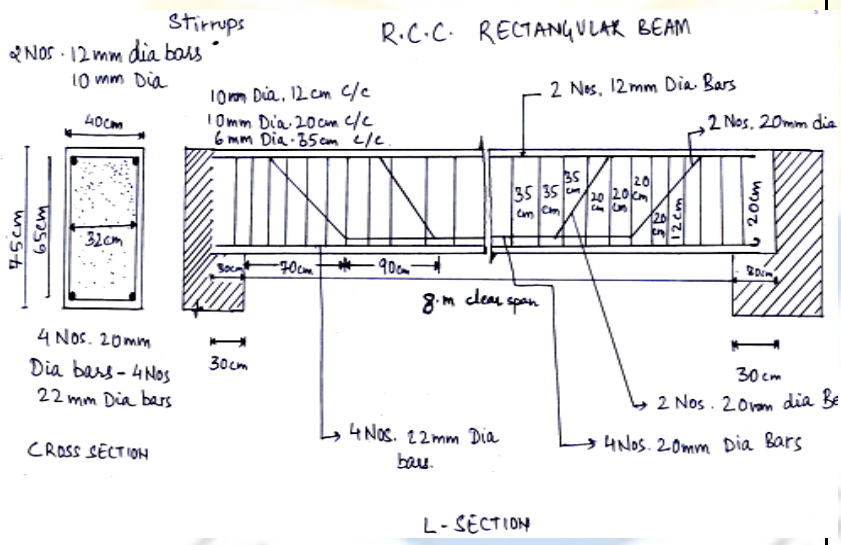
| S. No | Question | Blooms Taxonomy Level | Course Outcome |
|---|---|---|---|
| 2 | Write short note on Crushing charges. | Remember | 3 |
| 3 | Explain about Vibrating charges. | Remember | 4 |
| 4 | Write short note on Hill road allowance. | Understand | 4 |
| 5 | Scaffolding impartence explain. | Understand | 3 |
| 6 | Write short note on Area allowances. | Understand | 4 |
| 7 | What are the Allowances in jalli ? | Understand | 3 |
| 8 | Centering charges of R.C.C GL +First floor write short note. | Understand | 3 |
| 9 | Determine the total lead for conveyance of bricks, if the lead is 5.00 km (MR) 10.00km CT and 4.00km ST (Total lead = total equivalent to MR) | Understand | 4 |
| 10 | Determine the quantity of cement required for 5.00 cum of R.C.C 1:2:4. | Understand | 4 |
| 11 | Calculate the quantity of cement bags required for Plastering with CM 1:4, 20mm thick: 40.00sqm | Remember | 3 |
| 12 | Calculate the quantity of cement bags required for Point with CM 1:3 to R.R. Masonry 30.00sqm | Understand | 4 |
| 13 | Calculate the cement content required for Cement concrete 1:4:8 mix with 40mm size HBG metal :15.00 cum | Understand | 3 |
| 14 | Calculate the cement content required for Brick masonry in CM 1:6 With country bricks 8.50 cum | Understand | 3 |
| 15 | Write a short note on sundries. | Remember | 3 |
| 16 | Explain about stacking charges. | Remember | 4 |
| 17 | Write a short note on standard schedule of rates. | Remember | 4 |
| 18 | Explain about seniorage charges and impartance. | Understand | 3 |
| 19 | What is the multiplying factor for metal tracks in a lead statement? | Remember | 4 |
| 20 | Multiplying factor for carts tracks in a lead statement? | Remember | 3 |
| 21 | What is the multiplying factor for sandy tracks in a lead statement | Remember | 3 |
| 22 | What is Quantity of dry concrete required for $1m^3$ of wet concrete | Understand | 4 |
| | **PART – B (LONG ANSWER QUESTIONS)** | | |
| 1 | Explain the following<br>(a) Market rate.<br>(b) Work-charged establishment.<br>(c) Lump-sum. | Remember | 3 |
| 2 | (a) What is an Estimate? Draw and explain Flow Chart of Estimation.<br>(b) What is Analysis of Rates? What is the Purpose of Rate Analysis? | Understand | 3 |
| 3 | Calculate the quantity of materials and analyze the rate required for lime | Understand | 4 |

<table>
<tr><th>S. No</th><th>Question</th><th>Blooms Taxonomy Level</th><th>Course Outcome</th></tr>
<tr><td></td><td>concrete in foundation with 40mm size brick ballast with 1 lime and 2 surkhi mortar. Proportions 1:2:6 for 1 cu.m</td><td></td><td></td></tr>
<tr><td>4</td><td>Calculate the quantity of materials and analyze the rate required for lime concrete in foundation with 25mm size stone ballast, lime and sand. Proportions 1:2:4 for 1 cu.m</td><td>Understand</td><td>3</td></tr>
<tr><td>5</td><td>Prepare the lead statement for the following materials
<table>
<tr><th rowspan="2">S.No</th><th rowspan="2">Material</th><th rowspan="2">Rate at source</th><th colspan="3">Lead in Km</th><th rowspan="2">Conveyance charges per Km</th></tr>
<tr><th>MT</th><th>CT</th><th>ST</th></tr>
<tr><td>1</td><td>40mm HBG metal</td><td>Rs. 1200 / cu.m</td><td>-</td><td>8</td><td>9</td><td>Rs. 50 per cu.m</td></tr>
<tr><td>2</td><td>River sand</td><td>Rs. 1500 / cu.m</td><td>6</td><td>8</td><td>12</td><td>Rs. 35 per cu.m</td></tr>
<tr><td>3</td><td>Cement</td><td>Rs. 275 / bag</td><td>5</td><td>-</td><td>7</td><td>Rs. 5 per bag</td></tr>
</table></td><td>Understand</td><td>3</td></tr>
<tr><td>6</td><td>Calculate the quantity of materials for following items:<br>1. R.C.C (1:2:4) for 20m$^3$ of work<br>2. R.C.C (1:3:6) for 15m$^3$ of work</td><td>Understand</td><td>4</td></tr>
<tr><td>7</td><td>Calculate the quantity of materials for following items:<br>1. C.M(1:4) for 1cu.m of work<br>2. C.M(1:6) for 1cu.m of work</td><td>Understand</td><td>4</td></tr>
<tr><td>8</td><td>Calculate the quantity of cement in bags required for following items:<br>1. B.M in C.M(1:3) for 15cu.m of work using 0.2cu.m of CM required for 1cu.m of Brickwork<br>2. R.C.C (1:2:4) for 20 cu.m of work</td><td>Understand</td><td>3</td></tr>
<tr><td>9</td><td>Calculate the quantity of cement in bags required for following items:<br>1. C.C(1:4:8) using 40mm HBG metal for 30cu.m of work<br>2. R.R masonry in C.M (1:5) for 20cu.m of work</td><td>Understand</td><td>3</td></tr>
<tr><td>10</td><td>Prepare the lead statement for the following materials
<table>
<tr><th rowspan="2">S.No</th><th rowspan="2">Material</th><th rowspan="2">Rate at source</th><th colspan="3">Lead in Km</th><th rowspan="2">Conveyance charges per Km</th><th rowspan="2">Seignior age&cess charges</th></tr>
<tr><th>MT</th><th>CT</th><th>ST</th></tr>
<tr><td>1</td><td>40mm HBG metal</td><td>Rs. 1200 / cu.m</td><td>3</td><td>7</td><td>5</td><td>Rs. 50 per cu.m</td><td>275</td></tr>
<tr><td>2</td><td>River sand</td><td>Rs. 1500 / cu.m</td><td>4</td><td>5</td><td>9</td><td>Rs. 35 per cu.m</td><td>160</td></tr>
<tr><td>3</td><td>Cement</td><td>Rs. 275 / bag</td><td>5</td><td>6</td><td>3</td><td>Rs. 5 per bag</td><td>-</td></tr>
<tr><td>4</td><td>Bricks</td><td>Rs. 850 / 100 nos</td><td>5</td><td>6</td><td>8</td><td>Rs. 100 / 100nos</td><td>350</td></tr>
</table></td><td>Understand</td><td>3</td></tr>
<tr><td colspan="4">PART – C (PROBLEM SOLVING AND CRITICAL THINKING QUESTIONS)</td></tr>
<tr><td>1</td><td>Describe various steps to be followed for the estimation and for rate analysis of any item along with a flow chart.</td><td>Remember</td><td>3</td></tr>
<tr><td>2</td><td>(a) List out the purposes and requirements of rate analysis. (b) What are the factors affecting rate analysis?</td><td>Understand</td><td>3</td></tr>
</table>

<table>
<tr><th>S. No</th><th>Question</th><th>Blooms Taxonomy Level</th><th>Course Outcome</th></tr>
<tr><td>3</td><td>(a)Calculate the rate for cement concrete (1:2:4) with graded stone chips from 20 mm down to 6 mm for RCC works excluding shuttering and reinforcement.<br>(b)Analysis the rate for cement concrete (1:2:4) pouring into moulds completely.</td><td>Remember</td><td>3</td></tr>
<tr><td>4</td><td>Prepare the data sheet and calculate the cost of the items given below:<br>Brick masonry in C.M(1:6) with country bricks – 1 cu.m<br>1. 600 no’s country bricks<br>2. 0.38cu.m C.M (1:6)<br>3. 1.40 no’s mason<br>4. 0.7 no’s man mazdoor<br>5. 2.10 no’s woman mazdoor<br>6. L.S. Sundries</td><td>Understand</td><td>3</td></tr>
<tr><td>5</td><td>Prepare the data sheet and calculate the cost of the items given below:<br>Cement concrete(1:5:10) with 40mm size HBG metal – 1 cu.m<br>1. 0.92 cu.m – 40mm size HBG metal<br>2. 0.46 cu.m – sand<br>3. 0.092 cu.m – cement<br>4. 0.20 no’s – mason<br>5. 1.80 no’s – man mazdoor<br>6. 1.40 no’s – woman mazdoor<br>7. L.S. Sundries</td><td>Understand</td><td>4</td></tr>
<tr><td>6</td><td>Prepare the data sheet and calculate the cost of the items given below:<br><br>Lead statement of materials:<br><br><table><tr><th>S. No</th><th>Material</th><th>Rate at source</th><th>Lead in Km</th><th>Conveyance charges per Km</th></tr><tr><td>1</td><td>40mm HBG metal</td><td>Rs. 1200 / cu.m</td><td>25</td><td>Rs. 50 per cu.m</td></tr><tr><td>2</td><td>River sand</td><td>Rs. 1500 / cu.m</td><td>38</td><td>Rs. 35 per cu.m</td></tr><tr><td>3</td><td>Cement</td><td>Rs. 275 / 50 kg bag</td><td>15</td><td>Rs. 5 per bag</td></tr><tr><td>4</td><td>Country bricks</td><td>Rs. 850 / 100 Nos</td><td>18</td><td>Rs. 100 / 100nos</td></tr></table>.</td><td>Understand</td><td>4</td></tr>
<tr><td>7</td><td>Prepare the unit rates for finished items of works for cement concrete in foundation (1:5:10)</td><td>Remember</td><td>3</td></tr>
<tr><td>8</td><td>Prepare the unit rates for finished items of works for cement concrete in foundation (1:4:8)</td><td>Remember</td><td>4</td></tr>
<tr><td>9</td><td>Prepare the unit rates for finished items of works for Reinforced cement concrete in foundation (1:2:4)</td><td>Remember</td><td>3</td></tr>
<tr><td>10</td><td>Prepare the unit rates for finished items of works for Reinforced cement concrete in foundation (1:2:4) for bed blocks, column footings including formwork and centering charges.</td><td>Remember</td><td>3</td></tr>
<tr><td>11</td><td>Prepare the unit rates for finished items of works for pointing to R.R Masonry in CM (1:4) mix of cement, sand and all materials from approved sources to site and labour charges for pointing neatly.</td><td>Remember</td><td>4</td></tr>
<tr><td>12</td><td>Prepare the unit rates for finished items of works for cement concrete flooring (1:2:4using 12mm HBG metal machine crushed chips from approved quarry to site of work including curing cost and conveyance of all materials completed.</td><td>Remember</td><td>4</td></tr>
</table>

| S. No | Question | Blooms Taxonomy Level | Course Outcome |
|---|---|---|---|
| | **UNIT - IV**<br>**REINFORCEMENT BAR BENDING, CONTRACTS** | | |
| 1 | Distinguish between main reinforcement and distribution reinforcement in R.C.C slab | Understand | 4 |
| 2 | Distinguish Straight bar and cranked bar | Understand | 3 |
| 3 | Distinguish main reinforcement and lateral reinforcement in R.C.C column | Understand | 3 |
| 4 | Sketch a straight bar hooked on both ends and mention the total length of bar and also length of the hooks | Understand | 4 |
| 5 | Sketch a bar with one side straight and other side bent up hooked on both ends and mention the total length of bar and also length of the hooks | Understand | 4 |
| 6 | Sketch a straight bar bent up and hooked on both ends and mention the total length of bar and also length of the hooks | Understand | 3 |
| 7 | What is contract and write about contractor? | Remember | 4 |
| 8 | State the important types of contracts. | Remember | 3 |
| 9 | Write about sub contractor. | Understand | 3 |
| 10 | Explain the term Earnest money deposit. | Remember | 4 |
| 11 | What is Further security deposit explai with example. | Remember | 4 |
| 12 | Explain the term Add security deposit. | Understand | 3 |
| 13 | State the necessity of composing penalties on contractor. | Remember | 4 |
| 14 | What is tender and state the necessity of inviting tenders. | Remember | 3 |
| 15 | What is Contract document explain and State its importance. | Understand | 3 |
| 16 | Write short note on lump-sum contract. | Remember | 4 |
| 17 | Distinguish between scheduled contract and lump-sum contract. | Remember | 4 |
| 18 | Write short notes on types of damages that occur due to delay. | Understand | 3 |
| 19 | What are the conditions for termination of contract? | Remember | 4 |
| 20 | What is Item rate contract explain. | Remember | 3 |
| 21 | Write short note on percentage contract. | Understand | 3 |
| | **PART – B (LONG ANSWER QUESTIONS)** | | |
| 1 | (a) Differentiate between development length in tension and compression.<br>(b) What do you mean by development length of reinforcement? | Understand | 4 |
| 2 | (a) What are development lengths for plain and deformed bars.<br>(b) Compare development length in tension and in compression. | Understand | 3 |
| 3 | (a) What do you mean by end anchorage, explain types of end anchorages | Remember | 4 |

| S. No | Question | Blooms Taxonomy Level | Course Outcome |
|---|---|---|---|
| | (b) What do you mean by development length of reinforcement? | | |
| 4 | Explain the following engineering contracts along with their advantages and disadvantages.<br>(a) Item rate contract<br>(b) Percentage rate contract. | Understand | 3 |
| 5 | Write a short note on the following:<br>(a) Time limits for tender notice<br>(b) Sale of tender papers.<br>(c) Global tender. | Remember | 3 |
| 6 | Explain the following:<br>(a) Informal tender.<br>(b) Opening of tenders.<br>(c) Unbalanced tender. | Remember | 4 |
| 7 | Write a short note on the following:<br>(a) Comparative statement of tenders<br>(b) Negotiated tender<br>(c) Sealed tender | Understand | 4 |
| 8 | Discuss different categories of contract in detail and differentiate them with respect to their important characteristics. | Understand | 3 |
| 9 | What is contract document and mention the documents to be attached to the contract agreement. | Understand | 4 |
| 10 | Explain tender notice and tender documents. | Understand | 3 |
| 11 | Define the terms : Conditions of contract and Arbitration. | Understand | 3 |
| | **PART – C (PROBLEM SOLVING AND CRITICAL THINKING QUESTIONS)** | | |
| 1 | Prepare a schedule of bars for the RCC lintel shown in the figure 1 assuming bearing of the lintel be 15 cm on walls at each side. Weight of 10mm diameter bar is 0.62 kg/rm and 6 mm diameter bar is 0.22 kg/rm.<br>  <br><br>Figure 1 | Remember | 5 |
| 2 | Calculate the quantity of steel reinforcement required for a roof slab of 3 m x 6 m and fully resting over a wall of 300 mm thick on all sides. (i)10 mm dia main bars are provided in shorter span direction at 150 mm c/c. Alternative bars are bent up near the support and all bars are hooked at | Remember | 6 |

| S. No | Question | Blooms Taxonomy Level | Course Outcome |
|---|---|---|---|
| | both ends.<br>Detailsofreinforcement:<br>(ii) 8 mm dia distribution bars are provided in longer span direction at 200 mm c/c. To hold the bent up bars in position 3 no's distribution bars are provided on each side at top.<br>(iii) Cover: Bottom and top cover to reinforcement taken as 15 mm and end cover of 25 mm is provided. | | |
| 3 | Prepare bar bending schedule and calculate the quantity of reinforcement in a R.C.C (1:2:4) lintel as per data given below:<br>Total Length of the lintel including bearing=1.50 m;<br>Thickness of wall = 400 mm;<br>Thickness of lintel = 150 mm;<br>Main reinforcement 5 bars of 12 mm ø (out of which 2 bars are bent up near support).<br>Top reinforcement 2 bars of 10 mm ø;<br>6 mm ø, 2 legged stirrups are provided @175 mm c/c uniformly. | Remember | 7 |
| 4 | Prepare a detailed estimate if a R.C.C beams of 8 meters clear span and 75cm x 40cm in section from the given drawing.<br>Steel in detail and RCC work shall be calculated separately. Also prepare the schedule of bars.<br>  <br> | | |
| 5 | Explain the process of acceptance of tenders and general tender conditions. | Understand | 5 |
| 6 | State and explain various types of contracts for execution of works in government department. | Understand | 6 |
| 7 | (a) If the contractor is in financial trouble, can the employer pay the sub-contractors directly?<br>(b) Justify the following case "Can an employer suffering no actual loss still deduct liquidated damages". | Understand | 7 |
| 8 | (a)What is pre – qualification of contractors and what criterion is applied for taking a decision by the client? Suggest weightage rate for merit rating.<br>(b)Write short notes on CPWD contract conditions and special conditions of contract. | Understand | 7 |

| S. No | Question | Blooms Taxonomy Level | Course Outcome |
|---|---|---|---|
| 9 | (a) Write out an auction notice for auction of five dry trees in mile 783 of G.T. road.<br>(b) A contractor fails to complete his work in spite of repeated reminders. How will you get the work completed? | Remember | 5 |
| | **UNIT-V**<br>**VALUATION OF BUILDINGS, STANDARD SPECIFICATIONS** | | |
| 1 | Define valuation of building and its purpose. | Remember | 7 |
| 2 | Explain about Municipal taxes? | Understand | 5 |
| 3 | Write short note on Scrap value/ | Remember | 6 |
| 4 | Give a shot notes on Salvage value/ | Understand | 7 |
| 5 | Write short note on Market value/ | Remember | 7 |
| 6 | Explain Book value/ | Understand | 5 |
| 7 | Write short note on Market value/ | Remember | 6 |
| 8 | What are the Ratable value & Obsolescence? | Understand | 7 |
| 9 | Define Annuity & Capital cost/ | Remember | 7 |
| 10 | Write short note on sinking fund. | Remember | 5 |
| 11 | Write short note on capitalized value. | Remember | 6 |
| 12 | Write short note on depreciation & mortgage. | Understand | 7 |
| 13 | What are the factors to be considered for valuation of building? | Remember | 7 |
| 14 | State methods of calculating depreciation. | Understand | 5 |
| 15 | Write the detailed specifications of damp-proof course 2.5cm. | Understand | 6 |
| 16 | Explain the detailed specifications of plastering cement mortar / lime mortar. | Remember | 7 |
| 17 | Write the detailed specifications of pointing. | Remember | 7 |
| 18 | Explain the detailed specifications for white washing , color washing. | Remember | 5 |
| 19 | Give the detailed specifications for painting. | Understand | 6 |
| 20 | Explain the detailed specifications for wood work. | Understand | 7 |
| 21 | Write the detailed specifications for centering and shuttering. | Understand | 7 |
| 22 | Give the detailed specifications for earthwork in irrigation channels & roads. | Understand | 5 |
| 23 | Explain the detailed specifications for cement mortar. | Understand | 6 |
| | **PART – B (LONG ANSWER QUESTIONS)** | | |
| 1 | Find the plinth area required for the residential accommodation for an | Understand | 7 |

| S. No | Question | Blooms Taxonomy Level | Course Outcome |
|---|---|---|---|
| | assistant engineer in the pay scale of rupees 400 to 1000 per month. | | |
| 2 | Explain the following method of valuation of a building along with an example.<br>(a) Valuation based on cost<br>(b) Direct method of valuation. | Understand | 5 |
| 3 | (a)Define valuation and explain the purpose of valuation.<br>(b)Explain capitalized value with a simple example. | Understand | 6 |
| 4 | Give the detailed specifications of the following items of works.<br>(a) Color washing<br>(b) Lime concrete in foundation. | Remember | 7 |
| 5 | Give the detailed specifications of the following items of works.<br>(a) Galvanized corrugated sheet roofing.<br>(b) Lime concrete in foundation. | Understand | 7 |
| 6 | Write explanatory notes on any four of the following:<br>(a) Bill of quantities<br>(b) Schedule of rates<br>(c) Unbalanced tender<br>(d) Conditions of contract<br>(e) Arbitration | Remember | 5 |
| 7 | Explain the following:<br>(a) Sinking fund<br>(b) Capitalised value | Remember | 6 |
| **PART – C (PROBLEM SOLVING AND CRITICAL THINKING QUESTIONS)** | | | |
| 1 | A building is situated by the side of a main road of Hyderabad city on a land of 800 sqm. The built up portion in 25m X 20m. The building is first class type and provided with water supply, sanitary and electric fittings, and the age of the building is 30 years. Workout the valuation of the property. Assume plinth area rate is Rs.200.00 and cost of land as Rs.6000 per sqm. | Understand | 7 |
| 2 | A three storey building is standing on a plot of land measuring 800sq.m. The plinth area of each storey is 400sq.m. The building is of RCC frame structure & the future life may be taken as 70years. The building fetches a gross rent of rupees 1500 per month. Workout the capitalized value of the property on the basis of 6% net yield. For sinking fund 3%, compound interest may be assumed. Cost of land may be taken as Rs.40 per sq.m. Other data required may be assumed suitably. | Understand | 5 |
| 3 | A colonizer intends to purchase a land of 100,000 sq.m area located suburb of a big city to develop it into plots of 700sq.m each after providing necessary roads and parks and other amenities. The current sale price of small plots in the neighborhood is Rs. 30 per sq.m. The colonizer wants a net profit of 20%. Workout the maximum price of the land at which the colonizer may purchase the land. | Understand | 6 |
| 4 | In a plot of land costing rupees 20,000. A building has been newly constructed at a total cost of 80,000. Including sanitary and water supply works, electrical installations etc. the building consists of 4 flats for 4 tenants. The owner expects 8% returns on the cost of construction and 5% return on cost of land. Calculate the standard rent for each flat of the building assuming<br>1. The life of the building as 60 years and sinking fund will be created on 4 % interest basis<br>2. Annual repairs cost at 1% cost of construction<br>3. Other outgoings including taxes at 30% of the net return of the building | Understand | 7 |
| 5 | (a) Explain the term leasehold property.<br>(b)Calculate the standard rent of a government residential building newly | Understand | 7 |

| S. No | Question | Blooms Taxonomy Level | Course Outcome |
|---|---|---|---|
| | constructed from the following data:<br>Cost of land = Rs. 1,00,000/-<br>Cost of construction of the building = Rs. 4,00,000/-<br>Cost of roads within the compound and fencing= Rs. 20,000/-<br>Cost of sanitary and water supply works = 8% of the cost of the building.<br>Cost of electrical installation including fans = 10% of the cost of the building.<br>Municipal house tax = Rs. 4,000/-per Annum.<br>Water tax = Rs. 1,200/-per Annum.<br>Property tax = Rs. 1,000/-per Annum. | | |
| 6 | a) Explain the factors which affect the value of the building property.<br>b) Work out the value of a building consisting of land and a house in a poor condition, to let for Rs. 600/- per month inclusive of all taxes. The house is in such condition that the effective life cannot be more than 20 years and after that the house shall have to be rebuilt at an estimated cost of Rs. 25,000/-. The rent by comparison with other buildings is fair and likely to be maintained for a very long period provided yearly repairs are regularly executed.<br>***Assume the following data:***<br>Cost of annual repairs at 8% of the gross rent; Rebuilt time = one year;<br>Interest on capital at 7% and for redemption of estimated cost to rebuild the house at 4%; other outgoing at 18% of the gross rent. | Understand | 8 |
| 7 | Determine the total valuation of a property situated by the side of a main road of Hyderabad city on a land of 1000 sq.m area. The built up area is30m x 20m. The building is first class type and provided with water supply, sanitary and electrical installations. The age of the building is 30 years. The cost of land will taken as Rs. 1800 per sq.m and plinth area rate of the building including all its utility services be taken as Rs. 2000 per sq.m. | Understand | 9 |
| 8 | A R.C.C building fetches a monthly rent of Rs. 2500/-. It is a freehold property constructed 20 years ago, and is expected to last for 80 years more. It is estimated to cost<br>Rs. 5, 00,000/- for rebuilding at the end of its useful life and to yield Rs. 30,000/- as scrap value.<br>The municipal taxes are 6.25% of rental income.<br>Water charges Rs. 60 for each of four connections in the building and sanitary charges Rs. 800 all per annum.<br>The insurance charges are Rs. 1000/- per annum.<br>The rent is likely to be maintained if repairs are executed constantly at a rate of 5% of cost of structure every year.<br>If the rate if interest for capitalization is 6% and that of sinking fund 4%. Workout the value of building for perpetual income. | Understand | 10 |
| 9 | List and explain general specifications of a second class building. | Understand | 10 |
| 10 | Write detailed specifications of cement concrete (1:2: 4) for M20. | Remember | 10 |

**Prepared By:** Mr. Gude Ramakrishna, Associate Professor, Civil Engineering

**HOD, CE**