



**MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION
(Autonomous)**

(ISO/IEC -270001 – 2005 certified)

SUMMER -2019 EXAMINATION





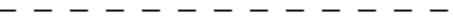
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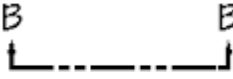


Model Answer

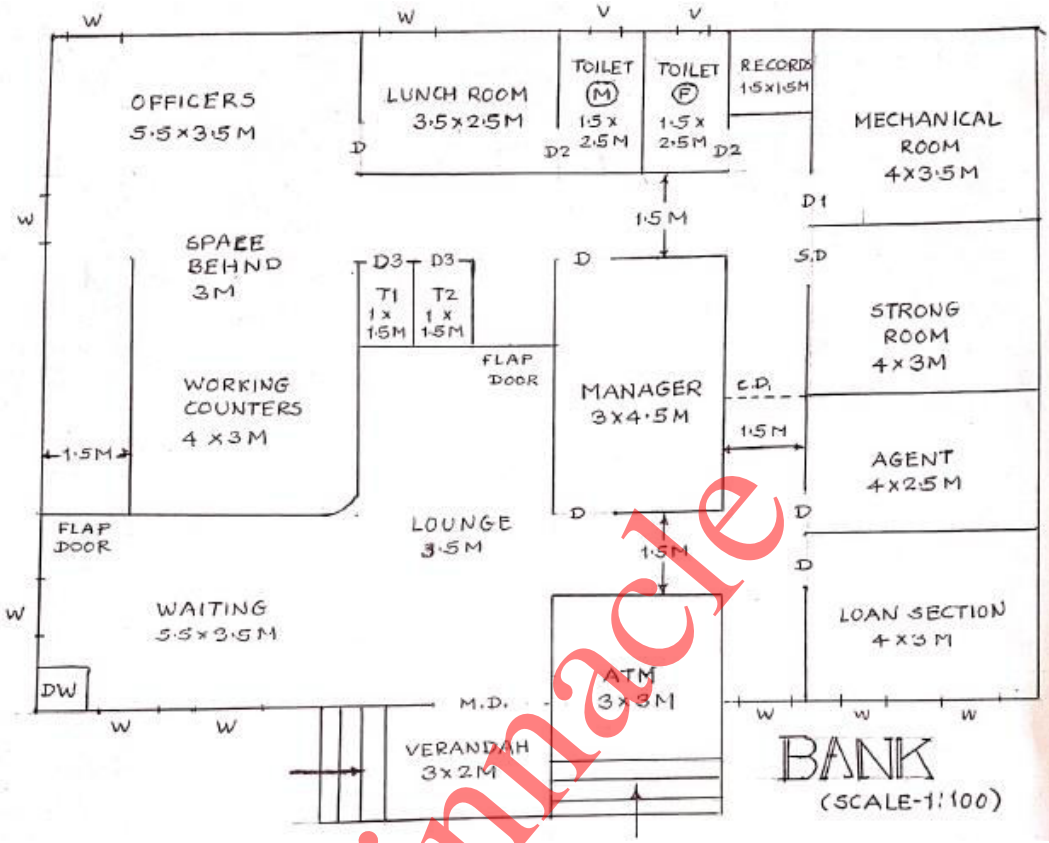
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Important Instructions to examiners:

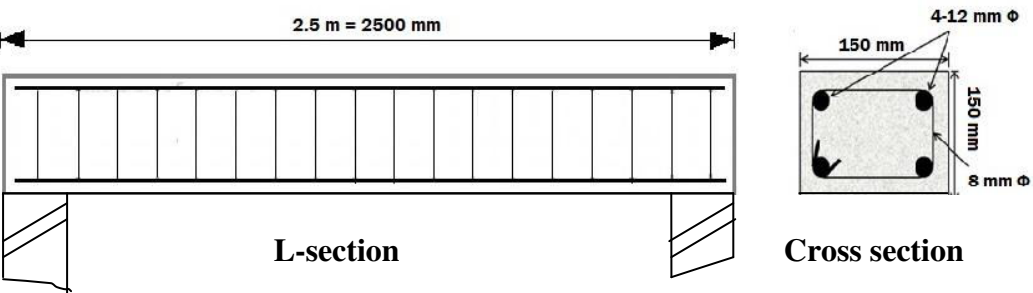
- 1) The answer should be examined by keywords and not as word-to-word as given in the model answer scheme.
- 2) The model answer and the answer written by candidate may vary but the examiner may try to assess the understanding level of the candidate.
- 3) The language error such as grammatical, spelling errors should not be given more importance. (Not applicable for subject English and communication skill).
- 4) While assessing figures, examiner may give credit for principal components indicated in the figure. The figure drawn by candidate and model answer may vary. The examiner may give credit for any equivalent figure drawn.
- 5) Credits may be given stepwise for numerical problems. In the some cases, the assumed constants values may vary and there may be some difference in the candidates answer and model answer.
- 6) In case of some questions credit may be given by judgment on part of examiner of relevant answer based on candidates understanding

Q.No.	Question and Model Answers	Marks
Q.1	Answer any THREE of the following:	12M
(a)	Draw Graphical Symbols for (1) Concrete (2) Wood work (3) Sliding door (4) UCR Masonry	4M
	<p>Ans: Graphical Symbols for-</p> <p>(1) Concrete </p> <p>(2) Wood work </p> <p>(3) Sliding door </p> <p>(4) UCR Masonry </p> <p><i>*(Note- 01 mark each)</i></p>	1M each
(b)	Draw neat sketches for following lines (1) Section line (2) Hidden line (3) Dimension line (4) Extension line	4M
	<p>Ans:</p> <p>(a) Hidden Line </p>	1M each

	<p>(b) Section Line </p> <p>(c) Dimension Line </p> <p>(d) Extension Line </p>	
(c)	Define orientation and grouping Principles of Planning.	4M
	<p>Ans:</p> <p>(1) Orientation: Orientation is the method of proper placement of planned unit of the building in relation to natural elements like sun, rain, wind, topography, etc. The position of building is decided with respect to North to place the different units of room to achieve natural ventilation, air circulation and lighting.</p> <p>(2) Grouping: It is an arrangement of various rooms with reference to their functions or in other words, making group of units of building depending upon their functional co-relations.</p>	<p>2M</p> <p>2M</p>
(d)	State the importance of site plan and openings schedule in civil engineering drawing.	4M
	<p>Ans:</p> <p>Importance of Site plan –</p> <ol style="list-style-type: none"> 1) It gives idea of site i.e. plot size and size or shape of proposed building. 2) It is helpful to calculate plot area and plinth area. 3) It gives details of side margins. 4) It shows adjacent road and road width. 5) With north direction, plot orientation can be decided. 6) It gives idea about water & drainage line. 7) It shows adjacent plots, survey number, plot number, nearby permanent structure like temple, etc. <p>Importance of openings schedule or schedule of openings –</p> <ol style="list-style-type: none"> 1) To check opening area for ventilation. 2) To know the type of openings proposed. 3) To give purchase order. 4) To give the details and number of opening or gates to the fabricator. 5) For billing purpose. 6) To make alteration in type of opening, if required. 	<p>2M (for any four points)</p> <p>2M (for any four points)</p>
(e)	Give the necessity of perspective drawing.	4M
	<p>Ans:</p> <p>Necessity of perspective drawing –</p> <ol style="list-style-type: none"> 1) Perspective drawing gives a three dimensional feeling of a flat image. 2) It is helpful for architects or designer to decide the elevation and overall structure's look. 3) It is helpful for the owner to get idea about how the building will look after construction. 	<p>4M (for any four points)</p>

	<p>4) It is required for model making of the building. 5) It is necessary for advertisements of commercial projects. 6) It helps in landscaping around the structure.</p>	
<p>Q.2</p>	<p>Draw to suitable scale the line plan of bank building. Label all units with their sizes. Clearly indicate position of openings.</p>	<p>10M</p>
	<p>Ans:</p>  <p style="text-align: center;">Bank</p> <p><i>*(Note- for neat and suitable line plan with scale 05 marks, for proper sizes – 02 marks, for door and window position -02 marks and 01 mark for labeling)</i></p> <p style="text-align: center;"><u>Important Note: Student may draw any other line plan of Bank Building. So give credit accordingly.</u></p>	<p>10M*</p>
<p>Q.3</p>	<p>Fig. No. 1 shows a line plan of a residential building. Draw to a Scale of 1:50, the developed plan. Show all dimensions and label the units. Use following data. Plinth height 600 mm. Super structure in Brick Masonary with walls 300 mm thick and internal walls for bath and WC 100 mm thick. Assume Chajja Projection 450 mm. Assume suitable data if necessary.</p>	<p>12M</p>
	<p style="text-align: center;"><u>Important Note:</u> <u>As fig. No. 1 is not given in the question paper,</u> <u>Not to assess and give ZERO marks.</u></p>	

Q.4	Attempt any TWO of the following:	12M
(a)	Write any four purposes of construction notes and any two purposes of north line.	6M
	<p>Ans: Purposes of Construction notes –</p> <ol style="list-style-type: none"> 1) These include additional information about the structure which can not be shown in drawing. 2) These are useful for better understanding of drawing. 3) To give idea about any special work. 4) To know materials, finishes, thickness, proportions, etc. 5) To avoid any confusions. 6) To provide information about finishing work, especially like flooring, colouring, pointing, ornamental work etc., which is difficult to show in drawing. <p>Purposes of North direction –</p> <ol style="list-style-type: none"> 1) For orientation of Building. 2) It helps in planning of various units and their placement. 3) To keep uniformity in drawing with common reference direction. 4) To avoid discrepancies in understanding of drawing. 	<p>4M (for any four)</p> <p>2M (for any two)</p>
(b)	Explain important rules and byelaws of sanctioning authorities for construction in rural area.	6M
	<p>Ans: Important rules and byelaws of sanctioning authorities for construction in rural area are –</p> <ol style="list-style-type: none"> 1) The minimum height of plinth shall be regulated on the basis of environmental and topographical condition and higher plinth height may be required in areas prone to flooding. 2) Every dwelling unit to be provided should have at least two habitable rooms. First room shall not be less than 9.0 m² with minimum width of 2.5 m and second room shall not be less than 6.5 m² with a minimum width of 2.1 m provided the total area of both the rooms is not less than 15.5 m². 3) The minimum size of such a mezzanine floor should not be lesser than 6.5 m² and such a floor should occupy not more than 50 percent of room area. 4) Minimum clear height below and above the mezzanine floor should be 2.4 m and 2.1 m respectively. 5) The size of independent water-closet shall be 0.9 m²; with minimum width of 90 cm. 6) The size of independent bathroom shall be 1.2 m with minimum width 1m. 7) The size of a cooking alcove serving as cooking space shall not be less than 2.4 m² with a minimum width of 1.2 m. 8) The minimum height of rooms/spaces shall be a) Habitable room 2.75 m, b) Kitchen 2.6 m, c) Bath/water-closet 2.2 m, d) Corridor 2.1 m 9) One water tap per dwelling unit may be provided, where adequate drinking water supply is available. 10) Water from drains shall be connected to village ponds and appropriate eco-friendly methods like growing of duck weed plants shall be adopted to treat waste water. <p><i>*(Note- Student may write byelaws in municipal area. Give credit to any six.)</i></p>	6M* (for any six)

(c)	Draw a neat sketch showing RCC components of lintel with 1:20 scale.	6M																																													
	<p>Ans:</p>  <p style="text-align: center;">RCC components of Lintel</p> <p style="text-align: right;">(Scale 1:20)</p> <p style="text-align: center;">*(Note-for L-section 02 marks, cross section 02 marks, 01 mark for scale, 01 mark for labeling)</p>	6M*																																													
Q.5	Attempt any TWO of the following :	12M																																													
(a)	Prepare schedule of openings in the standard format and area statement for building in Q. No. 2.	6M																																													
	<p>Ans:</p> <p style="text-align: center;">For Bank building in Q.NO.2</p> <p>Schedule of Openings –</p> <table border="1" data-bbox="255 996 1316 1377"> <thead> <tr> <th>Sr.No.</th> <th>Symbol</th> <th>Description</th> <th>Size in m</th> <th>Nos.</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>M.D.</td> <td>Fully Glass Panelled door (with Collapsible door and Rolling Shutter)</td> <td>2.0 x 2.5</td> <td>1</td> </tr> <tr> <td>2</td> <td>D</td> <td>Partially paneled and partially glazed.</td> <td>1.0 x 2.1</td> <td>5</td> </tr> <tr> <td>2</td> <td>D1</td> <td>Flush door</td> <td>1.0 x 2.1</td> <td>1</td> </tr> <tr> <td>3</td> <td>D2</td> <td>Flush door or PVC door</td> <td>0.9 x 2.1</td> <td>2</td> </tr> <tr> <td>4</td> <td>S.D.</td> <td>Heavy steel door with safety grill</td> <td>1.2 x 2.0</td> <td>1</td> </tr> <tr> <td>5</td> <td>C.D.</td> <td>Collapsible Gate with grill above</td> <td>1.5 x 2.4</td> <td>1</td> </tr> <tr> <td>6</td> <td>W</td> <td>T.W. Panelled window</td> <td>1.2 x 1.4</td> <td>9</td> </tr> <tr> <td>7</td> <td>V</td> <td>Louvered window</td> <td>0.5 x 0.7</td> <td>2</td> </tr> </tbody> </table> <p style="text-align: center;">*(Note- for Correct Symbols - 01 mark, Opening type - 03 marks, Opening sizes - 03 marks, No. of openings – 01 Mark)</p> <p style="text-align: center;"><u>Important Note: Student may take another type of door or window, with different sizes, give credits accordingly.</u></p> <p>Area Statement –</p> <p>1) Plot area (Assuming front margin as 4 M and all other as 3 M) $= (12 + 4 + 3) \times (17.5 + 3 + 3)$ $= 19 \times 23.5$ $= 446.5 \text{ Sq.M.}$</p> <p>2) Built up Area = 15% more of floor area $= \text{approx. } [(17.5 \times 12) + (3 \times 1.5)] \times 1.15$ $= 246.675 \text{ Sq.M.}$</p> <p>3) F.S.I. allowed = 1</p> <p>4) F.S.I. Consumed = Built up area/ Plot area $= 246.675/446.5$ $= 0.55$</p>	Sr.No.	Symbol	Description	Size in m	Nos.	1	M.D.	Fully Glass Panelled door (with Collapsible door and Rolling Shutter)	2.0 x 2.5	1	2	D	Partially paneled and partially glazed.	1.0 x 2.1	5	2	D1	Flush door	1.0 x 2.1	1	3	D2	Flush door or PVC door	0.9 x 2.1	2	4	S.D.	Heavy steel door with safety grill	1.2 x 2.0	1	5	C.D.	Collapsible Gate with grill above	1.5 x 2.4	1	6	W	T.W. Panelled window	1.2 x 1.4	9	7	V	Louvered window	0.5 x 0.7	2	3M*
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	<u>Important Note: Student may take another side margin or different % for built up area, give credits accordingly.</u>																
(b)	Enlist various units of primary Health Center and write minimum dimension of each unit.	6M															
	<p>Ans: Units required for <u>Primary health centre:</u></p> <ol style="list-style-type: none"> a) Entrance or reception - 2.5 m wide b) Doctor's Room – 3 m x 3.6 m c) Examination Room – 3 m x 4 m d) Operation Theatre – 4 m x 5.5 m e) Circulation Space – 3 m wide f) Laboratory – 15 sq. m g) Ward (general/ maternity) – area 8 to 10 sq. m per bed h) Medical Store or Pharmacy – 3 x 4.5 m i) Office – 12 sq. m j) Family Planning Unit – 3 m x 4 m k) Parking - Scooter/ Motorcycle – 3 sq.m./ vehicle, Cycle- 1.2 sq.m./ cycle l) Sanitary block <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 5px;">Unit</th> <th style="padding: 5px;">Male</th> <th style="padding: 5px;">Female</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">W.C.</td> <td style="padding: 5px;">1 in 100</td> <td style="padding: 5px;">1 in 50</td> </tr> <tr> <td style="padding: 5px;">Urinal</td> <td style="padding: 5px;">1 in 50</td> <td style="padding: 5px;">---</td> </tr> <tr> <td style="padding: 5px;">Wash basin</td> <td style="padding: 5px;">1 in 100</td> <td style="padding: 5px;">1 in 100</td> </tr> <tr> <td style="padding: 5px;">Bath</td> <td style="padding: 5px;">2 per ward</td> <td style="padding: 5px;">2 per ward</td> </tr> </tbody> </table> <p style="text-align: center;"><u>*(Note- 1/2 mark for stating six units and 1/2 mark for their respective minimum sizes. i.e. 3 + 3 = 6 marks.)</u></p>	Unit	Male	Female	W.C.	1 in 100	1 in 50	Urinal	1 in 50	---	Wash basin	1 in 100	1 in 100	Bath	2 per ward	2 per ward	6M* (for any six)
Unit	Male	Female															
W.C.	1 in 100	1 in 50															
Urinal	1 in 50	---															
Wash basin	1 in 100	1 in 100															
Bath	2 per ward	2 per ward															
(c)	List any three purposes of submission drawing and working drawing in civil engineering works.	6M															
	<p>Ans: Purposes of submission drawing –</p> <ol style="list-style-type: none"> 1) To get sanction from competent authority before starting actual work. 2) To check whether the proposed construction is as per bye-laws or not. 3) To decide the taxation of building by municipal authority. 4) Without sanction of submission drawing, any construction, if constructed is illegal. 5) To regularize the construction as per bye laws. <p>Purposes of working drawing –</p> <ol style="list-style-type: none"> 1) To carry out actual construction work. 2) To get better idea of work. 3) To know the sizes of R.C.C. sections, steel reinforcement, etc. 4) To understand the exact nature of work. 5) To carry out the work as per design. 6) To check the work carried out and record measurements. 	1M each (for any three)															
Q.6	Attempt any ONE of the following:	12M															
(a)	Draw to a suitable scale a two point perspective drawing of the object shown below in fig. No. 2 or fig. No. 3. Assume eye level 1.5 m above G.L. and station point at 3.0 m from PP. Retain all construction lines.	12M															

	<p>Ans:</p> <p style="text-align: center;"><u>Important Note:</u> <u>As fig. No. 2 and fig. No. 3 are not given in the question paper,</u></p> <p style="text-align: center;"><u>Not to assess and give ZERO marks.</u></p>	
<p>(b)</p>	<p>Draw a plan and section of a single flight of a R.C.C. stair case from following data: Number of risers- 10 of 160 mm height Number of treads – 9 of 250 mm height Width of stair case is 1000 mm Landing at top is 1000 x 1000 mm</p>	<p>12M</p>
	<p>Ans:</p> <p style="text-align: center;">SECTION AB</p> <p style="text-align: center;">PLAN (ALL DIMENSIONS IN MM) SCALE - 1:25</p> <p style="text-align: center;">*(Note- Distribution of 6 marks for plan and section each is as below- 04 marks for arrangement, 01 mark for dimensions, 01 mark for labeling)</p>	<p>6M*</p> <p>6M*</p>