MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION
(Autonomous)

(ISO/IEC -270001 – 2005 certified)

WINTER -2019 EXAMINATION

Subject code: 22405 **Model Answer** **Total Pages - 09**

Important Instructions to examiners:

1) The answers 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.

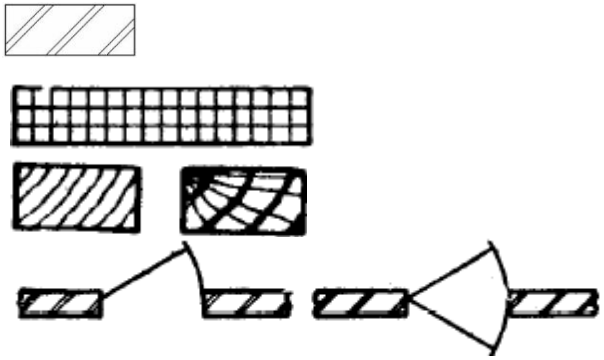
3) The language error such as grammatical, spelling errors should not be given more importance. (Not applicable for subject English and communication skill).

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.

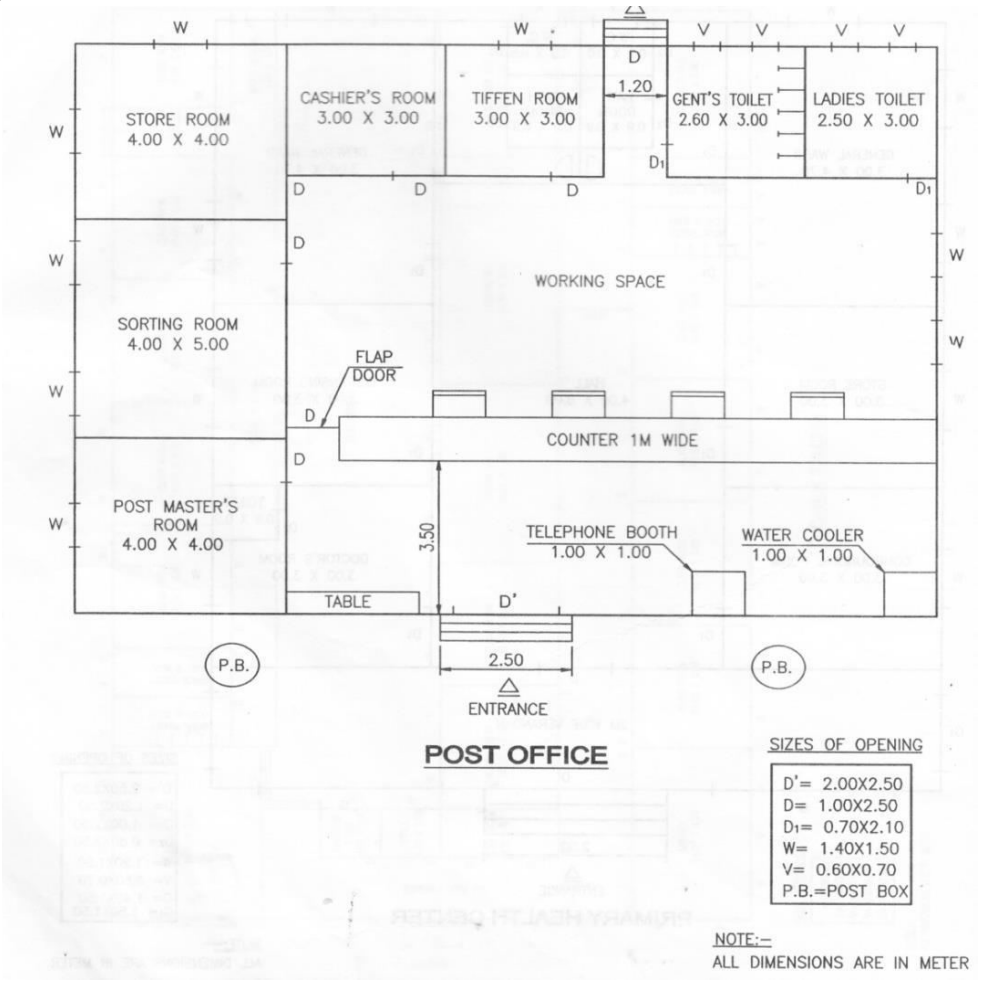
5) Credits may be given step wise for numerical problems. In the some cases, the assumed constant values may vary and there may be some difference in the candidate's answer and model answer.

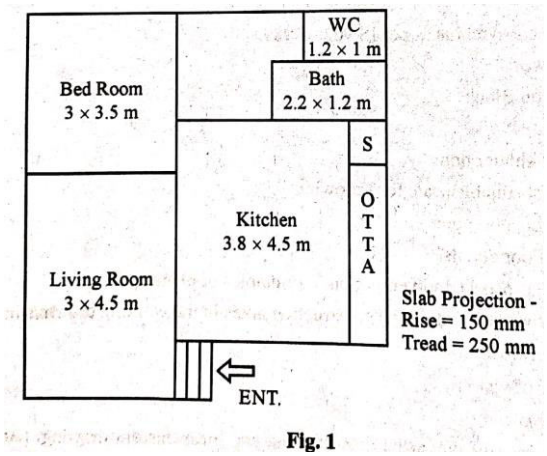
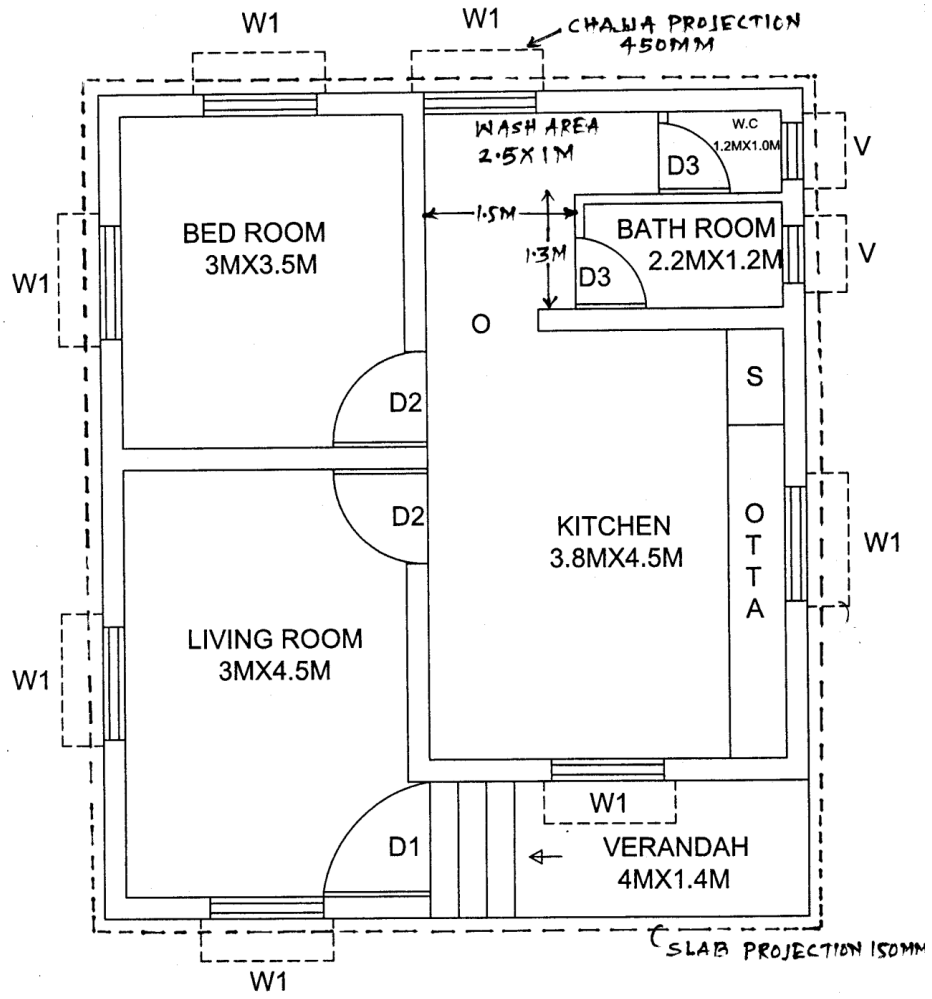
6) In case of some questions credit may be given by judgment on part of examiner of relevant answer based on candidates understanding.

7) For programming language papers, credit may be given to any other program based on equivalent concept.

Q. No.	Question and Model Answers	Marks
1.	**Attempt any THREE of the following:**	**3 x 4 = 12**
(a)	**Draw graphical symbols as per IS 962 – 1989.** **(i) Brickwork** **(ii) Partition Block** **(iii) Wood** **(iv) Single shutter door**	**4M**
	Ans: **Graphical Symbols as per IS 962 – 1989, for-** **(i) Brickwork** **(ii) Partition Block** **(iii) Wood** **(iv) Single shutter door** 	**1M each**

(b)	**(i) Suggest suitable scale for following:** **(1) Location plan** **(2) Poor details**	**2M**
	Ans: **Suitable scale for-** **(1) Location plan –** 1:1000 **(2) Poor details –** 1:20 or 1:10 ***(Note- if the student has written scale for door details or poor details, as given above, give credit of 01 mark)***	**1M* each**
	(ii) Define prospect and ventilation in principle of planning.	**2M**
	Ans: **Prospect –** It is defined as the art of positioning of openings like doors and windows to have a desirable view like gardens, lake, sea, river, mountains, greenery, etc. and blocking un desirable views, such as slums, garbage dump, gutters, railway tracks, etc. **Ventilation –** It is defined as the circulation of natural air from outside to inside of house and vice a versa. **OR** Ventilation is the process of fresh air entering a building via a window, door or other opening	**1M** **1M**
(c)	**State the purpose of writing the construction notes in the working drawing.**	**4M**
	Ans: **Purposes of Construction notes –** 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.	**4M (for any four)**
(d)	**Define the terms:** **(i) Centre of vision** **(ii) Picture plane**	**4M**
	Ans: **(i) Centre of vision** The orthographic projection of the station point on the picture plane is called as centre of vision or principal vanishing point. . **(ii) Picture plane** An imaginary transparent plane set up between the observer's eye and the object is called as picture plane.	**2M** **2M**

(e)	**State the purpose of preparing data drawing and measures drawing. (At least two purposes each)**	**4M**
	Ans: **Purpose of preparing Data drawing –** 1) Data drawing is necessary to prepare line plan of proposed structure as per requirements of owner like, number of family members, number of units required, sizes, locations, floors required, etc. 2) It is helpful for owner to get better idea of proposed building and finalize the plan or arrangement of units. 3) It helps an architect to prepare detailed drawings. **Purpose of Measured Drawing –** 1) For billing of work. 2) For valuation of building. 3) For altering or making modifications in existing structure. 4) For taking judgement in case of any dispute about area.	**2M (for any two)** **2M (for any two)**
2.	**Draw to a suitable scale the line plan of a post office for a taluka place with different units. Also, show position of doors, windows and dimension of each room.**	**10M**
	Ans:  ***(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)*** **<u>Important Note: Student may draw any other line plan of Post office building. So give credit accordingly.</u>**	**10M***

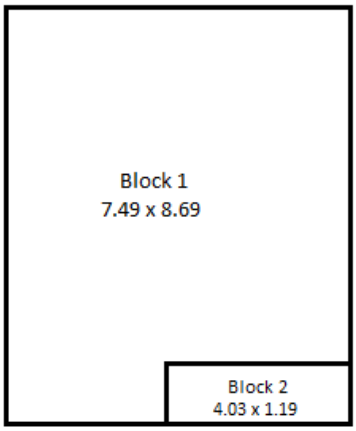
3.	**Attempt the following:**	**12M**
	Fig. No. 1 shows a line plan of residential building. Draw developed plan with suitable scale. Show all dimensions and label the parts. **Given data:**  **Fig. 1** **(1) Super structure consists of B.B. Masonry with walls 230 mm thick and internal walls for bath and W.C. 110 mm thick.** **(2) Assume Chajja projection 450 mm.** **(3) Plinth height 600 mm.** **(4) Width of main door 1.2 m, internal door of 0.9 m and window 1.2 m, ventilator/louvers – 0.8 m.** **Assume suitable data if necessary.**	
	Ans:  **DEVELOPED PLAN** (SCALE 1:100) ***(Note- for Wall thickness - 04 marks, Position of Window & Door– 03 marks, Labeling and Dimension- 03 marks, Neatness and Scale – 02 Marks)***	**12M***

4.	**Attempt any TWO of the following:**	**2 x 6 = 12**
(a)	**State the importance of submission drawing and working drawing in civil engineering works.**	**6M**
	Ans: **Purposes of submission drawing** – 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. **Purposes of working drawing –** 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)** **1M each (for any three)**
(b)	**Prepare schedule of openings and area statement table for fig. No. 1.**	**6M**
	Ans: **For building in Q.NO. 3, Fig. No. 1** **Schedule of Openings –** **3M**	

Sr.No.	Symbol	Description	Size in m	Nos.
1	D1	T.W. Panelled door or Decorative type door	1.2 x 2.1	1
2	D2	Flush door	0.9 x 2.0	2
3	D3	Flush door or PVC door	0.8 x 1.8	2
4	O	Opening	1.0 x 2.0	1
5	W1	Alluminium Sliding Window	1.2 x 1.2	6
6	V	Louvered window	0.8 x 0.8	2

Important Note: Student may take another type of door or window, with different sizes, give credits accordingly.

Area Statement –

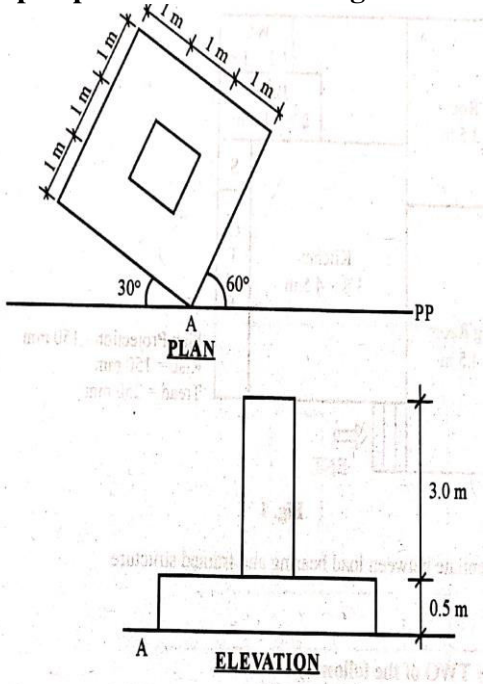
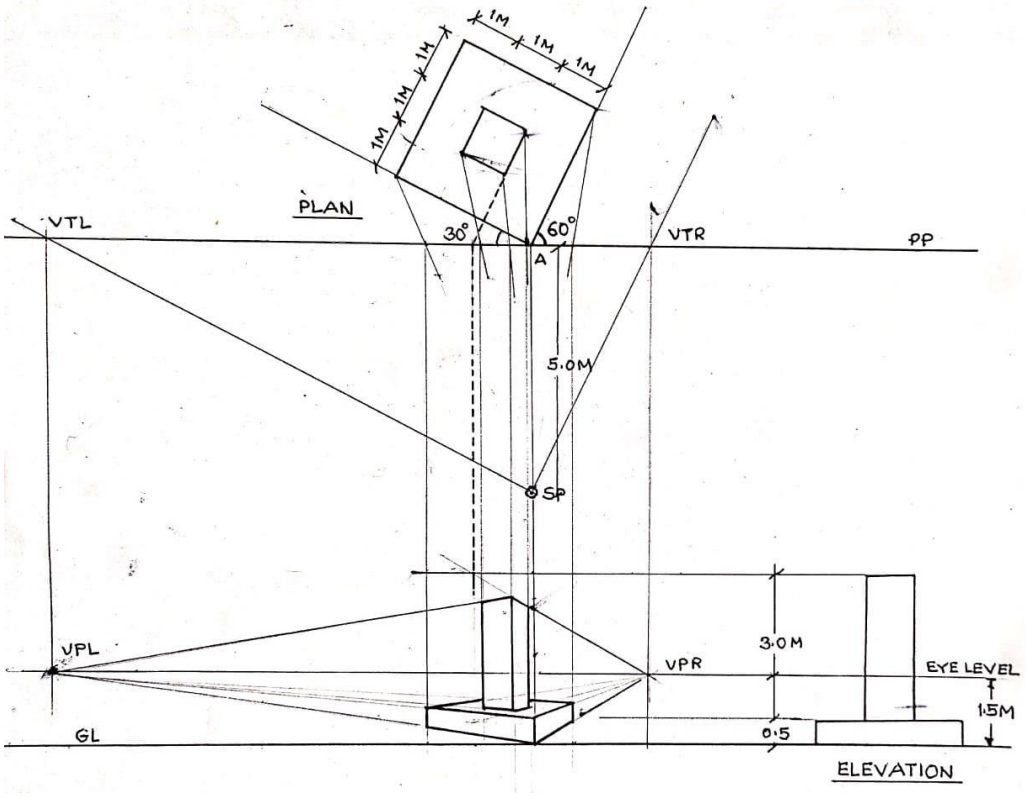


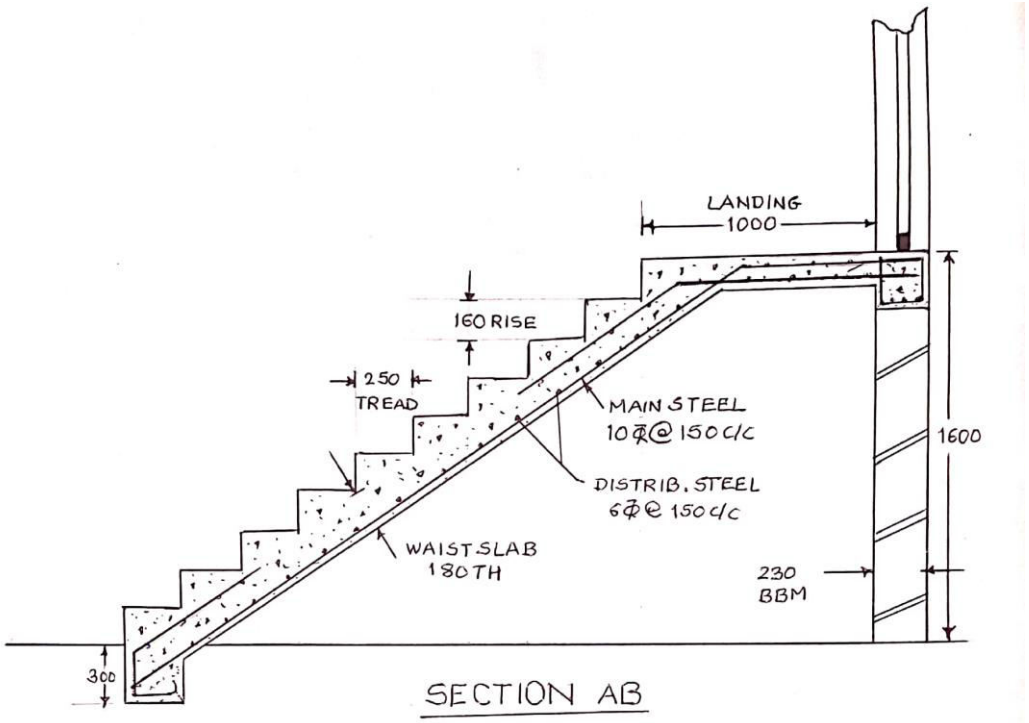
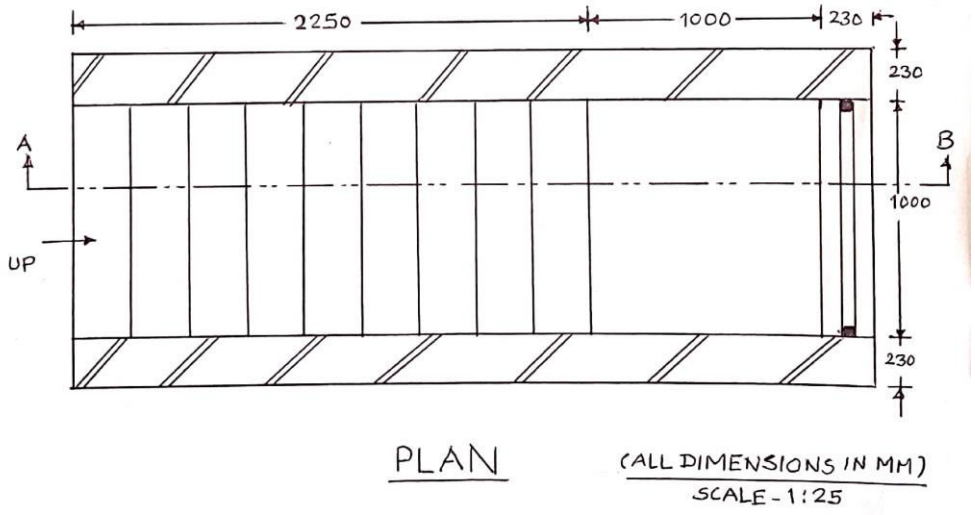
Block diagram

	1) Plot area (Assuming all side margin as 3 M) = (7.49 + 3 + 3) x (8.69 + 3 + 3) = 13.49 x 14.69 = 198.17 Sq.M. 2) Built up Area = [(7.49 x 8.69) – (4.03 x 1.19)] = 60.29 Sq.M. 3) F.S.I. allowed 1 4) F.S.I. Consumed = Built up area/ Plot area = 60.29/ 198.17 = 0.304 ***Note: Student may take any other side margin, give credits accordingly.***	**3M**
(c)	**Differentiate between load bearing and framed structure.**	**6M**
	Ans; **Sr. No.** | **Load Bearing Structure** | **Framed Structure** 1) | Load is transferred to ground or foundation through walls. | Load is transferred to ground or foundation through columns. 2) | Walls play an important role as a structural element for taking & transfer of loads. | Walls don't transfer load but acts as partition only. 3) | Structure consist slabs, beams and walls. | Structure consist slabs, beams, walls and columns. 4) | Continuous wall footing under every wall. | Continuous wall footing under every wall. 5) | More space utilised for walls. | Less space utilised for walls. 6) | Every floor arrangement shall be same. | Scope for changes in arrangement. 7) | (G+2) structure can be constructed at the max. | No restriction over no. of floors. 8) | U.C.R. masonry for plinth. | U.C.R. masonry may not be used as plinth.	**6M (for any six points of difference)**
5.	**Attempt any TWO of the following:**	**2 x 6 = 12**
(a)	**Enlist the various documents and drawings required for municipal sanction.**	**6M**
	Ans: **The various drawings required for municipal sanction are –** 1) Site Plan : Along with block plan showing plinth outline and area statement 2) Ground floor plan, first floor plan, plans of higher floors. Basement floor plan, terrace plan and car park plan. 3) Elevation 4) Section passing through staircase, W.C., bath etc giving details upto foundation. 5) Schedule of doors, windows and grill work. 6) Schedule giving notes for type of construction. Foundation, R.C.C. work etc. **The various documents required for municipal sanction are –** 1) Notice to execute the proposed work in the standard form. 2) Undertaking from the architect in the standard form. 3) Extract from property register stating the details regarding the owner and land. 4) Plan from city survey office showing boundaries of the plot and adjoining survey numbers. 5) Certificate regarding to area of plot given by a corporation or town planning department.	**1M each (for any six points)**

(b)	**Define following:** **(i) Floor Area** **(ii) Super built up Area** **(iii) Carpet Area**	**6M**
	Ans: **(i) Floor Area –** This is the usable covered area of the building at any floor level. Floor area is calculated by deducting area of walls from plinth area. **(ii) Super built up Area –** When area of common use like staircase, corridors, lift lobbies, lift walls, machine rooms, duct walls, pump rooms, security cabins, panel room, water tanks, servant rooms/toilets, clubhouse, etc. is added proportionally to built up area, it is called as super built up area. This term is mostly used for flats in multi dwelling units like apartments. **(iii) Carpet Area –** This is the floor area of the usable rooms at any floor **<u>OR</u>** the area where carpet can be laid.	**2M** **2M** **2M**
(c)	**Suggest various units and their sizes for primary health centre for the structure constructed in a village.**	**6M**
	Ans: **Units required for <u>Primary health centre</u>:** 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 ***(Note- ½ mark for stating six units and ½ mark for their respective minimum sizes. i.e. 3 + 3 = 6 marks.)***	**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

6.	**Attempt any <u>ONE</u> of the following:**	**1 x 12 = 12**
(a)	**A plan and elevation of pedestal is shown in fig. No. 2. Corner 'A' touches the picture plane and observer is exactly opposite the corner at 5 m distance. Eye level is 1.5 m. Draw two point perspective with 30-60 angles.**  **Fig. 2**	**12M**
	Ans:  ***(Note- For drawing neatly picture plane-01 mark, plan-01 mark, elevation-01 mark, two vanishing points-01 mark, construction lines-01 mark, true heights-01 mark, base or body of object-03 marks, top of obect-03 marks = total 12)***	**12M***

(b)	**Draw a plan and section of single flight of an RCC stair case from following data:** **(i) Number of Risers – 10 Nos. of 160 mm height.** **(ii) Number of treads – 9 Nos. of 250 mm width** **(iii) Width of stair case – 1000 mm** **(iv) Landing at top is – 1000 x 1000 mm**	**12M**
	Ans:   ***(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)***	**6M*** **6M***