

MANIPAL ACADEMY OF HIGHER EDUCATION
FIFTH SEMESTER B. ARCH. DEGREE EXAMINATION – APRIL 2018
SUBJECT: ARC 305 - BUILDING CODES AND BYELAWS
(2010 SCHEME)

Monday, April 23, 2018

Time: 14:00 – 17:00 Hrs.

Max. Marks: 50

- ✍ **Answer any FIVE full questions.**
 ✍ **Assume missing data if any.**

1. Determine which of the following sentences are true (T) and which are false (F).

- 1A. Fire exit requirements depend on floor area
 - 1B. Fire exit stairs can open directly to a courtyard
 - 1C. Maximum number of risers per flight is 12
 - 1D. Minimum height of a habitable room varies with occupancy
 - 1E. Minimum intersection spacing in sub-arterial roads is 300m
 - 1F. ECS for two-wheeler is 0.25
 - 1G. Design speed affects road geometry
 - 1H. Total built up area depends on ground coverage
 - 1I. Building codes are applicable for design and construction of new buildings only
 - 1J. Change in occupancy is permissible without prior permit
- (1 mark × 10 = 10 marks)

2. Write notes on the following. Provide sketches where applicable.

- 2A. F.A.R and ground coverage
 - 2B. Habitable room
 - 2C. Fire separation
 - 2D. Refuse Chute
 - 2E. Right of way
- (2 marks × 5 = 10 marks)

3. Draw the site plan and site elevations (front and side) indicating the building volume for the following:

Use: Residential

Site: 10m × 20m (shorter side facing the access road)

R.O.W.: 5.0m

Maximize F. A. R. consumption

Provide required parking (assume building with single tenement)

(10 marks)

4. Draw toilet layout showing fixtures, doors and windows for the following:

Use: Restaurant

Seats: 200

Staff: 30

External wall: Two

(10 marks)

5. Draw ground floor and typical floor plans showing exit corridors and fire exit stairs. Draw detailed plan and section of fire staircase in 1:50.

Use: Business

Site: 50m × 100m (shorter side facing the access road)

R.O.W.: 30.0m

Maximize F.A.R consumption.

Assume 3.75m floor to floor height. Assume Type 1 construction.

Height of the building shall be above 25.5m up to 40.0m

(10 marks)

6. Write notes on following: Provide sketches where applicable.

6A. CRZ II

6B. Ramps for wheelchair users.

(5marks × 2 = 10 marks)

Table 3 Maximum Permissible Floor Area Ratio

Sl. No.	Width of Means of Access (m)	Use Groups of Buildings			
		Residential Buildings	Educational Buildings	Industrial, Storage and Hazardous Buildings	Assembly, Institutional Business, Mercantile Buildings including Mixed use Buildings
1.	Below 2.4	Nil	Nil	Nil	Nil
2.	Above 2.4 to 3.5	1.25	Nil	Nil	Nil
3.	Above 3.5 to 7.0	1.75	Nil	Nil	Nil
4.	Above 7.0 to 9.0	2.00	2.00	Nil	Nil
5.	Above 9.0 to 15.0	2.25	2.25	2.00	2.00
6.	Above 15.0 to 20.0	2.50	2.50	2.00	2.25
7.	Above 20.0 to 24.0	2.75	2.75	2.00	2.50
8.	Above 24.0	3.00	3.00	2.00	2.75

74. Permissible Height of Buildings

(1) The permissible height of the buildings on means of access of different widths shall be as given in Table 5 below:

Width of Means of Access (in m.)	Permissible Height of Building (in m.)	Permissible Height of Building (in m.)
		In case of free gifting of strip of land having a width of 2.5 m. throughout the frontage of the entire plot.
(i) above 2.4 upto 3.0	7.0	Nil
(ii) above 3.0 upto 5.0	10.0	12.5
(iii) above 5.0 upto 7.0	12.5	15.5
(iv) above 7.0 upto 9.0	20.0	25.5
(v) above 9.0 upto 12.0	40.0	-
(vi) above 12.0 upto 15.0	60.0	-
(vii) above 15.0	No restriction	-

Ground Coverage for Building

Occupancy or Use Group	Maximum Percentage of Ground Coverage	
	Plot Size up to 200 sq. m.	Plot Size up to 500 sq. m. or more
Residential	60%	50%
Educational	50%	45%
Institutional	40%	40%
Assembly	40%	40%
Mercantile (Retail)	40%	40%
Industrial	40%	40%
Storage	40%	40%
Business	40%	40%

62. Minimum open spaces with respect to buildings for residential use

Height of building	Front open space	Open space on side-1	Open space on side-2	Rear open space
Upto 7.0 m	1.2 m	1.2 m	1.2m	2.0 m
Above 7.0 m upto 10.0 m	1.2m	1.2m	1.2m	3.0 m
Above 10.0 m upto 12.5 m	1.2 m	1.2m	1.5 m	3.0 m
Above 12.5 m upto 15.5 m	2.0 m	1.5 m	2.5 m	4.0 m
Above 15.5 m upto 20.0 m	3.5 m	4.0 m	4.0 m	5.0 m
Above 20.0 m upto 25.5 m	5.0 m	5.0 m	5.0 m	6.5 m
Above 25.5 m upto 40.0 m	6.0 m	6.5 m	6.5 m	8.5 m
Above 40.0 m upto 60.0 m	8.0 m	8.0 m	8.0 m	10.0 m
Above 60.0 m upto 80.0 m	10.0 m	15% of the height of the Building	15% of the height of the Building	12.0 m
Above 80.0 m	12.0 m	15% of the height of the Building	15% of the height of the Building	14.0 m

64. Minimum open spaces with respect to buildings for institutional, assembly, business, mercantile and mixed uses

Height of building	Front open space	Open space on side-1	Open space on side-2	Rear open space
Upto 10.0 m for land area upto 500.0 sq. m	2.0 m	1.2 m	4.0 m	4.0 m
Upto 10.0 m for land area above 500.0 sq. m	3.0 m	3.5 m	4.0 m	4.0 m
Above 10.0 m upto 20.0 m	4.0 m	4.0 m	4.0 m	5.0 m
Above 20.0 m upto 25.5 m	5.0 m	5.0 m	5.0 m	6.0 m
Above 25.5 m upto 40.0 m	6.0 m	6.5 m	6.5 m	9.0 m
Above 40.0 m	8.0 m	9.0 m	9.0 m	10.0 m
Above 60.0 m upto 80.0 m	10.0 m	15% of the height of the Building	15% of the height of the Building	12.0 m
Above 80.0 m	12.0 m	15% of the height of the Building	15% of the height of the Building	14.0 m

Off-street Car Parking Space

Occupancy	Car Parking Space Requirement
Residential	<p>(1) Building with single tenement –</p> <p>(a) For a building having one tenement of less than 100 sq. m. in floor area – no car parking space.</p> <p>(b) For a building having a tenement of 100 sq. m. or more but less than 200 sq. m. of floor area – one car parking space.</p> <p>(c) For a building having one tenement of 200 sq. m. or more of floor area – one car parking space for every 200 sq. m.</p>

Table 18 Restaurants

(Clause 5.2.5.1)

Sl No.	Fixtures	Public Rooms		Non-Residential Staff	
		Male	Female	Male	Female
(1)	(2)	(3)	(4)	(5)	(6)
i)	Water-closets	1 per 50 seats up to 200 Over 200 add at 1 per 100 or part thereof	2 per 50 seats up to 200 Over 200 add at 1 per 100 or part thereof	1 for up to 15 2 for 16-35 3 for 36-65 4 for 66-100	1 for up to 12 2 for 13-25 3 for 26-40 4 for 41-57 5 for 58-77 6 for 78-100
ii)	Ablution tap	One in each water-closet 1 water tap with draining arrangements shall be provided for every 50 persons or part thereof in the vicinity of water-closets and urinals	One in each water-closet	One in each water-closet	One in each water-closet
iii)	Urinals	1 per 50 persons or part thereof		Nil up to 6 1 for 7 to 20 2 for 21-45 3 for 46-70 4 for 71-100	—
iv)	Washbasins	1 per WC	1 per WC	1 per WC	1 per WC
v)	Cleaner's sink		1 per each restaurant		
vi)	Kitchen sink/Dish washer		1 per kitchen		

NOTES

1. Some WC's may be European style if desired.
2. Male population may be assumed as two-third and female population as one-third.
3. Provision for additional and special fittings where required shall be made.

Table 20 Occupant Load

(Clause 4.3)

Sl No.	Group of Occupancy	Occupant Load, Floor Area in m ² /Person
(1)	(2)	(3)
i)	Residential (A)	12.5
ii)	Educational (B)	4
iii)	Institutional (C)	15 (see Note 1)
iv)	Assembly (D)	
a)	With fixed or loose seats and dance floors	0.6 (see Note 2)
b)	Without seating facilities including dining rooms	1.5 (see Note 2)
v)	Mercantile (F)	
a)	Street floor and sales basement	3
b)	Upper sale floors	6
vi)	Business and industrial (E&G)	10
vii)	Storage (H)	30
viii)	Hazardous (J)	10

Table 21 Occupants per Unit Exit Width

(Clauses 4.4.2, 4.4.3 and C-1.6.2)

Sl No.	Group of Occupancy	Number of Occupants		
		Stairways	Ramps	Doors
(1)	(2)	(3)	(4)	(5)
i)	Residential (A)	25	50	75
ii)	Educational (B)	25	50	75
iii)	Institutional (C)	25	50	75
iv)	Assembly (D)	40	50	60
v)	Business (E)	50	60	75
vi)	Mercantile (F)	50	60	75
vii)	Industrial (G)	50	60	75
viii)	Storage (H)	50	60	75
ix)	Hazardous (J)	25	30	40

Fire exit staircase: minimum requirements				
Category of Building	Area per floor	Width of the Stairway (Mtr)	Minimum No. of Staircase (Height upto 12.5 Mtrs.)	Minimum No. of Staircase (Height Above 12.5 Mtrs.)
Educational	Upto 500 sq. m.	1.35	1	2
	Above 500 sq. m.	2.0	2	2
Assembly	Upto 500 sq. m.	1.50	1	2
	Above 500 sq. m.	2.0	2	2
Institutional	Upto 500 sq. m.	1.50	1	2
	Above 500 sq. m.	2.0	2	2
Business	Upto 500 sq. m.	1.50	1	2
	Above 500 sq. m.	1.50	2	2
Mercantile (Retail)	Upto 500 sq. m.	1.50	2	2
	Above 500 sq. m.	2.00	2	2

