

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF ARCHITECTURE AND QUANTITY SURVEYING

DEPARTMENT OF ARCHITECTURE
BACHELOR OF ARCHITECTURAL STUDIES (HONOURS) DEGREE

PART III SUPPLEMENTARY EXAMINATIONS – MAY 2003
AAR 3202 BUILDING SERVICES II

Instructions

Time : 3 Hours

Answer ANY FOUR Questions

QUESTION 1

- a) (I) Write brief notes on fire classification (8)
- (ii) Explain the fire fighting mechanism you could employ for a hotel room where linen is kept. [8]
- b) If the hotel in question (ii) above is 65m tall, describe briefly how you can utilise water in fighting the fire in an floor. [9]

QUESTION 2

- a) Discuss how you can
- i) protect a residential building form lightning. [6]
- ii) provide electricity wiring circuits within a building. [8]
- b) The illumination of a certain room is 900 lx. The dimension of the room are 7m x 7m x 3m high. Maintenance factor is 0,85 and utilization factor is 0,45.
- Calculate:
- i) The room index if the desks are 0,55m above the floor. [3]
- ii) The rate output of the light fittings if they are 29. [3]
- iii) Suggest a layout for them. [5]

QUESTION 3

- a) Discuss the necessity of air – conditioning in buildings. [7]
- b) Describe the operation of difference fans used in air conditioning. [8]
- c) Conditioned air is supplied to rooms through the use of fans and ducts. If a fan absorbs 4,2 kW of power and discharges 2,5m³/s when the impeller angular velocity is 1000 revolutions per minute, then its angular velocity increased to 1400 revolutions per minute, calculate the discharge in m³/s and the power absorbed for this new condition. [10]

QUESTION 4

- a) Discuss the importance of room acoustics. [4]
- b) Explain in brief the materials and methods used to control the quality of sound in a building. [12]
- c) A dancing room has volume of 6000 m³ and a reverberation time of 1,5 seconds. Calculate the amount of extra absorption required to obtain a reverberation time of 1 second. [9]

QUESTION 5

- a) Discuss factors that influence the location of lift within a building. [6]
- b) Describe how you can install lifts/escalators in a four storey building. [7]
- c) Determine the number of lifts in a rectangular educational building, single occupancy having ground with 10 upper floors with uniform floor to floor height of 3 m and main lobby at ground floor. Gross floor area is 2000 square metres. at all floor's . Quality of service is fair, use tables below for your calculations if speed of the lifts is 1,5m/s and lift capacity is 8 people. [12]

Table 1

Accepted interval or waiting in seconds	Quality
20 to 25	Excellent
30 to 35	Good
35 to 40	Fair
45	Poor
over 45	unsatisfactory

Table 2

Type	Occupancy area/per person
1. Residential	12,5
2. Educational	4
3. Institutional	15
4. Business	10
5. Industrial	10

Table 3

No of upper floors served	No of passenger/trip (car capacity)					
	10	12	14	16	18	20
14	7	8	9	9	10	11
12	7	8	9	9	10	10
10	6	7	8	8	9	9
8	6	6	7	7	8	8

Table 4

Lift speed m/s	Rate of acceleration m/s ²
1	0,50
1.5	0,70
2,5	1,0
>2,5	2,5

Table 5

No of passengers	Entrance lobby loading time in seconds	Transfer time i.e. loading and unloading time at upper floor.
8	7	1
13	12	1,25
16	14	1,5
20	17	1,6