

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF THE BUILT ENVIRONMENT

DEPARTMENT OF QUANTITY SURVEYING

BACHELOR OF QUANTITY SURVEYING (HONOURS) DEGREE

PART IV SECOND SEMESTER EXAMINATIONS – MAY 2011

MEASUREMENT IV-AQS4204

Time :3 Hours

Total Marks :100

Instructions to candidates

Answer Section A and any **two** questions from Section B.

SECTION A

Question 1

- a) Define an Electrical Installation of a building. **(5 marks)**
- b) Describe and compare underground and overhead reticulation systems. **(5 marks)**
- i) State what is meant by ring main and radial electricity distribution systems and give advantages and disadvantages of each system. **(5 marks)**

Question 2

Illustrate through the use of schematic and wiring diagrams how one light can be controlled by two switches placed at two different places so that it can be switched On and Off by either switch. **(10 marks)**

Question 3

A three storey commercial complex is to be provided with electric wiring. The load requirement for each floor is follows.

Ground Floor

Location	Light Points	Fan Points	5A Socket Outlets	15A Socket Outlet	Geysers	Cooker Units
Room G-1	2	1	1	4	-	-
Room G-2	2	1	-	-	-	-
Room G-3	3	1	1	-	-	-
Room G-4	3	1	-	-	-	-
Room G-5	2	1	1	3	-	-
Room G-6	2	1	1	2	-	-
Room G-7	3	1	1	3	-	-
Room G-8	3	1	1	2	-	-
Toilet	1	1	-	-	-	-
Kitchen	2	1	-	2	1	1
Common Room	4	3	-	6	1	-
Staircase entrance	1	-	-	1	-	-

First Floor

Location	Light Points	Fan Points	5A Socket Outlets	15A Socket Outlet	Geysers	Cooker Units
Room F-1	2	1	1	2	-	-
Room F-2	3	1	-	-	-	-
Room F-3	3	1	1	-	-	-
Room F-4	2	1	-	-	-	-
Room F-5	2	1	1	3	-	-
Room F-6	2	1	1	2	-	-
Room F-7	3	1	1	3	-	-
Room F-8	2	1	1	2	-	-
Toilet	1	1	-	-	-	-
Kitchen	1	1	-	2	1	1
Common	3	2	-	4	1	-

Room						
Staircase entrance	1	-	-	1	-	-

Second Floor

Location	Light Points	Fan Points	5A Socket Outlets	15A Socket Outlet	Geysers	Cooker Units
Room S-1	3	1	1	3	-	-
Room S-2	2	1	-	-	-	-
Room S-3	2	1	1	-	-	-
Room S-4	2	1	-	-	-	-
Room S-5	3	1	1	3	-	-
Room S-6	2	1	1	2	-	-
Room S-7	2	1	1	3	-	-
Room S-8	3	1	1	2	-	-
Toilet	1	1	-	-	-	-
Kitchen	2	2	-	2	1	1
Common Room	4	2	-	5	1	-
Staircase entrance	1	-	-	1	-	-

Given;

Light points rated at 80Watts

Fan Points rated at 100Watts

5A Socket Outlets rated at 100W

15A Socket Outlets rated at 1000W

Geyser rated at 1000W

Stating any other assumptions made and the workings:-

- Decide the number of sub circuits required **(12marks)**
- State the different sizes of wires and circuit breakers that will be required for this installation and for which purpose. **(8marks)**
- What are the advantages for using sub- distribution boards (Sub DB) for this installation? **(5marks)**

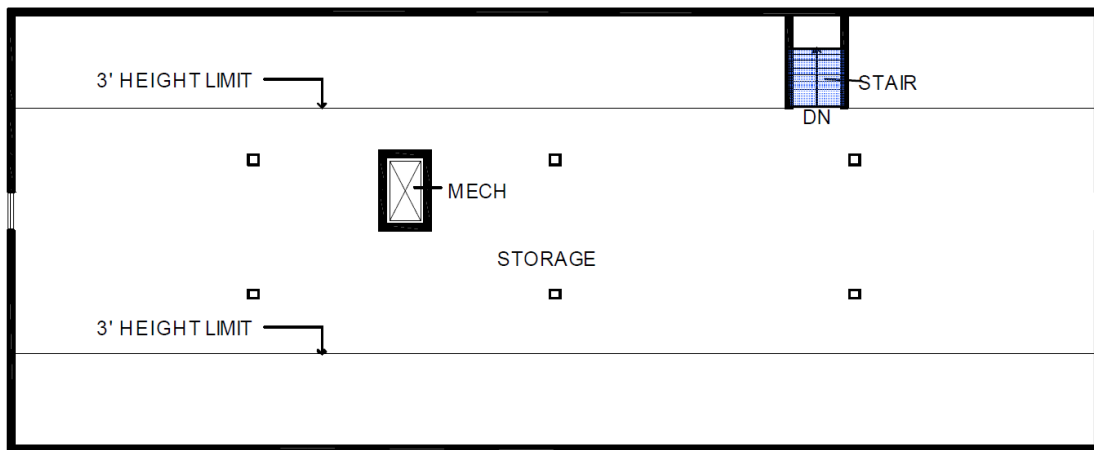
SECTION B

Answer any two questions. Show ALL working, where necessary

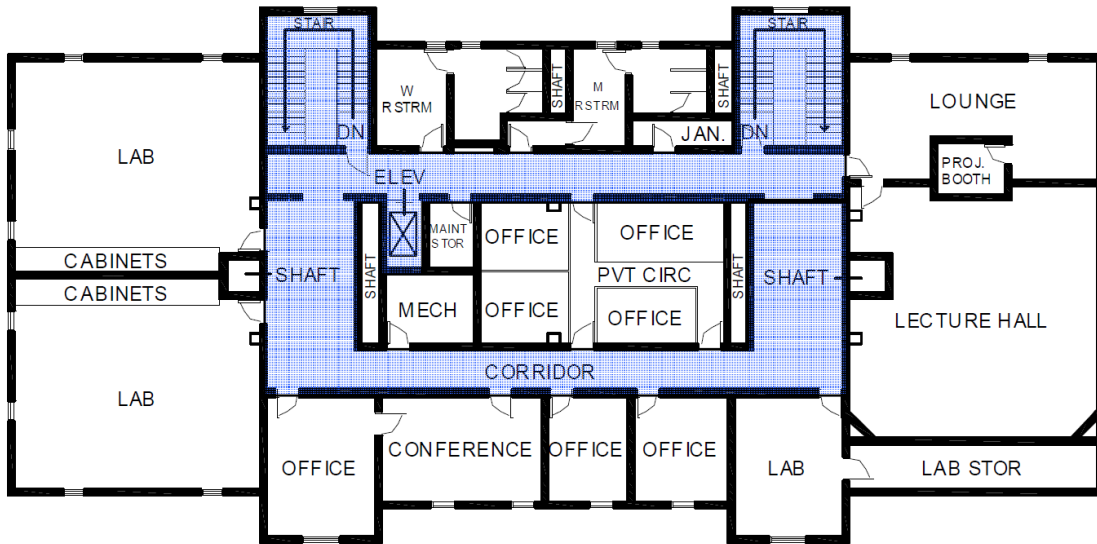
QUESTION 4

The diagrams in Figure 4(a-c) represent the plan views of a three storey building, respectively at each floor level. The shaded areas represent the Circulation Area of the building by floor, at each floor level.

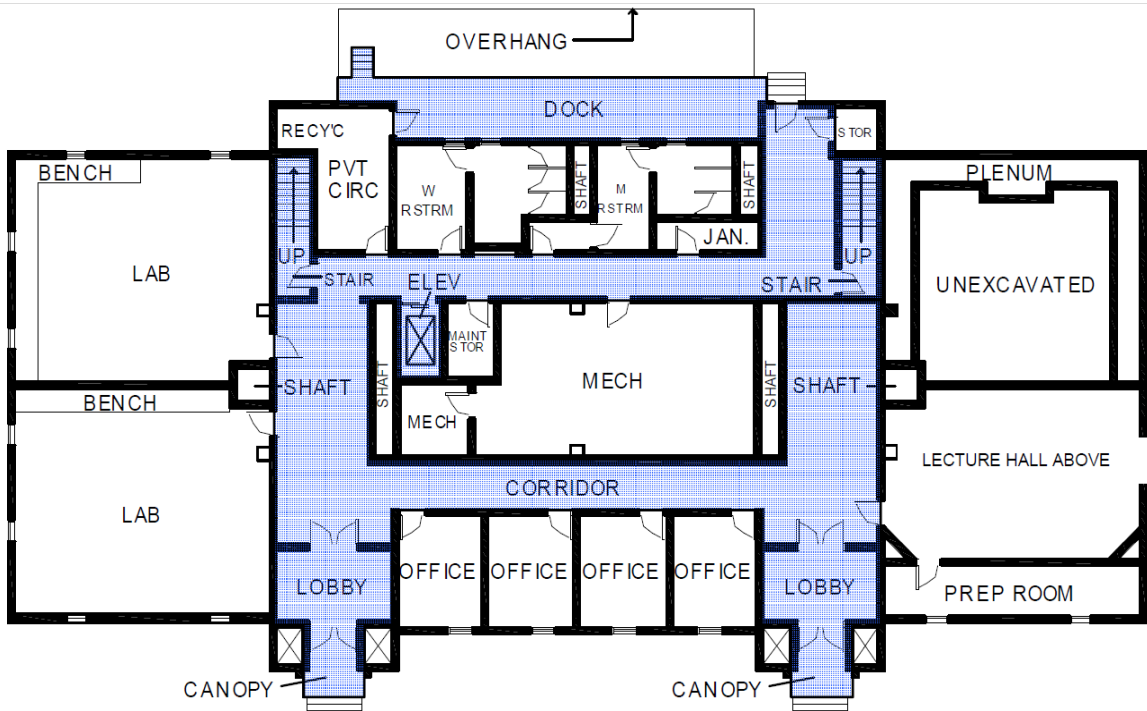
Required: Using a scale of 1mm : 1m in physical measurements extraction, determine the Circulation Area of a building by floor as a percentage of the gross floor space for the whole three storey building.



(a) ATTIC



(b) SECOND FLOOR



(c) GROUND FLOOR

Figure QU4 (a-c) Circulation Area of a building by floors

QUESTION 5

Discuss the 3 (three) main strategies used for fire protection and fire fighting in built environments. **(12 marks)**

(b) Write brief accounts on 2 (two) types of Fire Testing methods of building materials, indicate the measured parameters in each case. **(13 marks)**

QUESTION 6

Modern escalator systems, for providing transportation in built environments, operate under the S.O.D concept in order to enhance energy economy on the transportation infrastructure in buildings.

(i) Explain what is meant by the term S.O.D as used on escalator transportation systems on buildings. **(3 marks)**

(ii) How does a S.O.D system based escalator function? **(4 marks)**

(iii) Identify and explain the two basic S.O.D based escalator systems **(6 marks)**

(iv) Briefly discuss how else energy consumption may be minimized with the employment of the transportation technology of escalators and elevators in built environment. **(12 marks)**

QUESTION 7

(a) Correct system sizing requires considering many factors other than simply reading the nameplate of the existing unit. Explain, briefly, the key factors considered for correctly sizing a heating and cooling system in built environments. **(6 marks)**

(b) Outline the General rules for duct designing in Air-conditioning systems installation. **(6 marks)**

(c) The following Figure 7(c) shows a typical duct layout. The key measurements are indicated on the diagram. Design the duct system using the Velocity method. Take the velocity of air in the main duct (A) as 8 m/s for both the methods. Assume a dynamic loss coefficient of 0.3 for upstream to downstream and 0.8 for upstream to branch and for the elbow. The dynamic loss coefficients for the outlets may be taken as 1.0. Find the FTP required for each case and the amount of dampering required.

(13 marks)

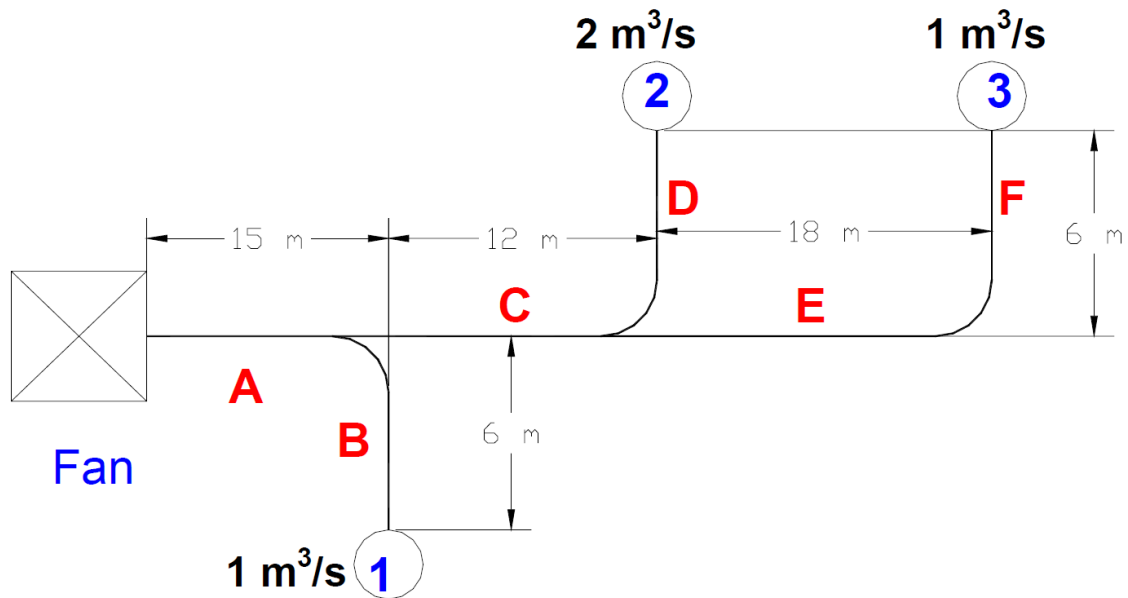


Figure Qu7