

**COVENANT UNIVERSITY
NIGERIA**

*TUTORIAL KIT
OMEGA SEMESTER*

**PROGRAMME: ESTATE
MANAGEMENT**

COURSE: ESM 228

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ESM 228: BUILDING CONSTRUCTION AND MATERIALS II

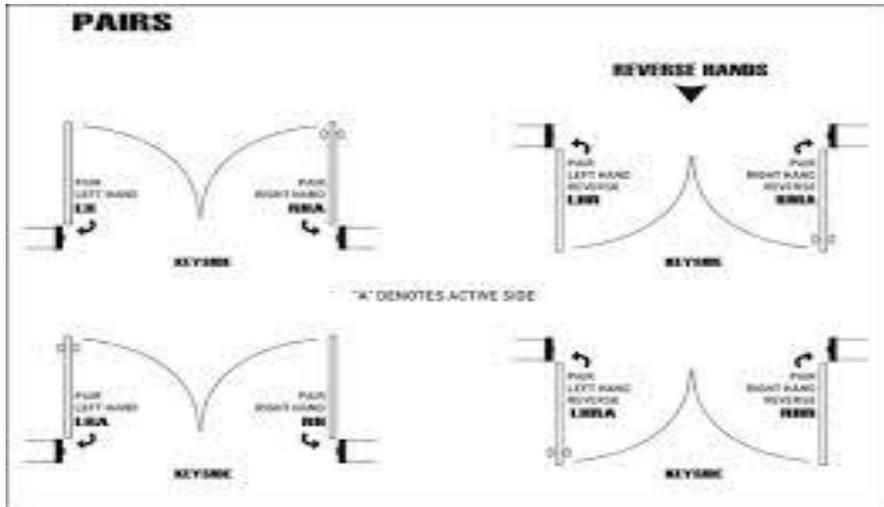
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1. Explain the term and any 3 design considerations of stairways.
2. Explain and illustrate the following types of staircase: dog-leg, quarter turn, straight and open-well.
3. Explain also any 2 of the followings: flights, double-return staircase, riser and balustrade. Distinguish between geometrical and spiral staircase. Design the staircase of a vertical duplex.
4. Distinguish between any 3 types of doors. Design a typical hardwood contemporary door or a kitchen cabinet.
5. Explain the principle of door handling.
6. Explain the terms door and window. Prepare a door /window schedule for any two bedroom bungalow of your choice.
7. Distinguish between any 3 different types of window classified according to their methods of opening.
8. Design a casement window in timber or metal.
9. Explain the term screed; enumerate and explain the different types. Recommend with reasons floor finishes for hospital general waiting area and pharmaceutical laboratory.
10. Distinguish between any 2 basic types of floors mainly by means of sketches and enumerate their basic characteristics.
11. Explain five functional requirements of floors. Explain the following terms: hardcore, damp-proof membrane and blinding layer
12. Enumerate any 3 advantages of precast pre-stressed concrete elements over in-situ monolithic reinforced concrete elements.
13. Explain with good sketches a monolithic reinforced concrete floor. State its advantages over timber floor.
14. What are the functions of window? When is it necessary to estimate the minimum daylight available at a point? How is this calculated? Also, how is air quality determined?
15. Of in-situ 'granolithic and terrazzo' floor finishes, one was described as being a better finish. How would you as a student of environmental sciences react to the statement?
16. Enumerate any 4 functions or uses and the different types of screed. Explain with the aid of sketches the characteristics of the simplest and most complicated of them.

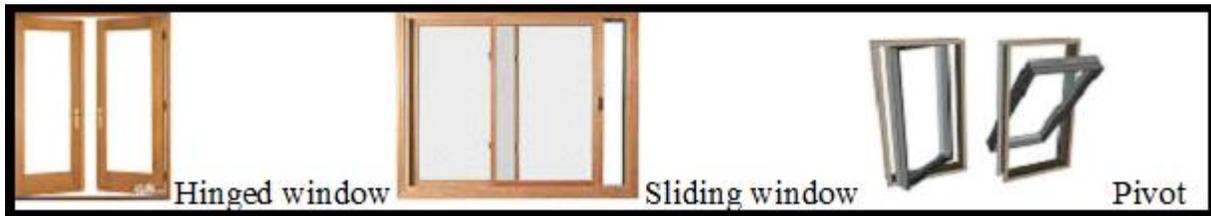
17. What do you understand by fire resistance integrity? Write short notes on match boarded and fire doors.
18. Explain the term and functions of ramps. Also discuss the basic types. Explain by means of sketches any 5 design parameters.
19. Explain the three basic types of flush doors and their uses.
20. What are the functions of structural elements? Explain the following in detail: column, beam and slabs.

ANSWERS

1. **Key Points:** *Student should emphasize the design requirements of a functional stair case.*
Model Answer:
- *A staircase is a name for a construction designed to bridge a large vertical distance by dividing it into smaller vertical distances called steps.*
 - *Rise-Going Formula=2R+G=550-700mm.*
 - *Width of staircase: 600-750mm (single room); private use: 800mm-900mm; commercial use: 900mm-1000mm.*
 - *Handrails: height, height for landing, staircase on two sides if clear width > or = 1000mm.*
3. **Key Points:** *The railing system should be well understood by the student.*
Model Answer:
- *Riser: the vertical portion between each tread on the stair.*
 - *Balustrade: it is the system of railings and balusters that prevents people from falling over the edge.*
 - *Geometrical stair is a spiral form of stair with the face of steps radiating from the centre of a circle which forms the plan of the outer string and incorporates an open well; while a spiral stair is a form of geometrical stair without an open well.*
 - *To design the staircase of a duplex, the height of the duplex should be considered. The student should know the minimum headroom which would determine the number of risers.*
5. **Key Point:** *the method of opening of door should be stated when preparing door schedule.*
Model Answer:
When entering a room from the corridor, if the door hinges on the right, it is right hand (RHA), if it is hinged on the left side, it is called left hand (LHA). The reverse is the case if you are inside the room. Where you have RHA, it becomes right hand reverse (RHR); and where it is LHA, it becomes left hand reverse (LHR).



7. **Key Points:** Windows are classified according to materials, method of opening and functions.
Model Answer: The types of window according to the method of opening are presented below.



9. **Key Points:** Student should have knowledge of floor finishes.

Model Answer:

- Screed is used to provide a level, smooth base for some floor finishes;
- It is usually a mix of cement and sand in ratio 1:3 trowelled smooth using steel trowel, which is not normally suitable for finished floor.
- Types according to the laying methods: Monolithic, Separated and Un-bonded.
- For hospital general waiting area, I would recommend Terrazzo floor finish because it has hard wearing surface, and it is suitable for heavy traffic area, it is easily cleaned, attractive in appearance.
- For a pharmaceutical laboratory, I would recommend a Granolithic floor because it is not affected by chemical, it is hard wearing, it is not compulsory to have an attractive floor in a laboratory, it can be easily cleaned.

11. **Key Points:** A functional floor must meet certain design requirements.

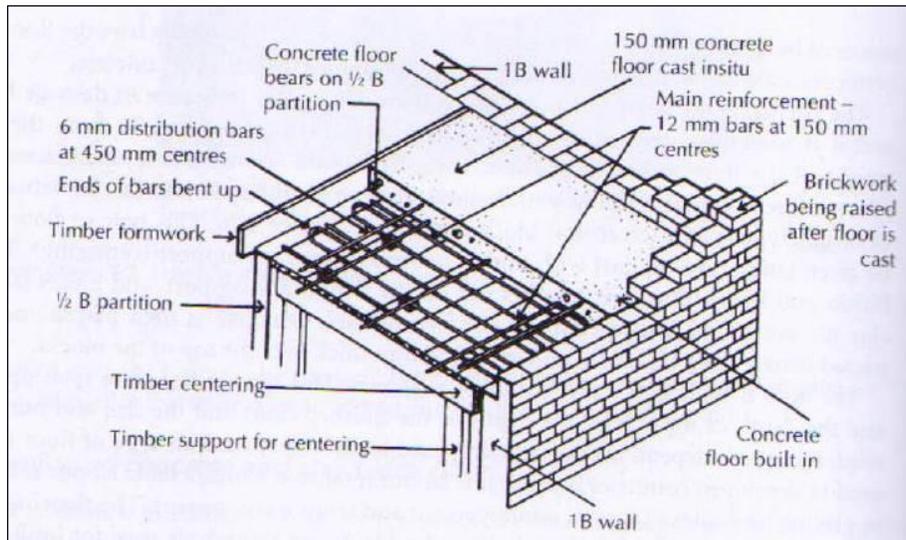
Model Answer:

- ☐ **Resistance to weather and ground moisture:** ability of the floor to resist passage of moisture from the floor to the inside of building.

- ❑ **Durability and freedom from maintenance:** this depends on the material and use. Floor should be durable for the expected life of the building.
- ❑ **Fire safety:** fire rating from 0.5-4hrs for suspended floors before collapsing during fire incident
- ❑ **Resistance to heat passage:** resisting heat from passing from one space to another e.g. kitchen to dining etc.
- ❑ **Resistance to the passage of sound:** suspended/upper floor; party walls. This could be improved by using absorbent materials like carpet or felt, acoustic based resilient floors
- ❑ **Hardcore:** broken blocks, crushed stones, bricks, concrete; hard and doesn't absorb water; prepares a good base for concrete.
- ❑ **Blinding layer:** spread over the hardcore before the DPM. It is not necessary if the hardcore is well compacted
- ❑ **DPM:** used to prevent moisture from rising from the ground. Materials include polythene, polyethylene, recycled membrane, bitumen, tar, rubber emulsion.

13. **Key Point:** The aim is to acquaint student with the method of constructing a monolithic reinforced concrete floor.

Model Answer:



Advantages over timber floor:

- It is more stable.
- It is more resistant to passage of sound.
- It is more resistant to passage of heat.
- It requires less maintenance.

15. **Key Point:** Student should be able to differentiate granolithic floor finish from terrazzo floor finish.

Model Answer:

Both are cement-based floor, with resultant sensitivity to cracking due to shrinkage. As a result, both are laid on limited areas.

However, Terrazzo is described as a better finish because:

- *It is richer in cement for more strength.*
- *It is more attractive, hardwearing and easily cleaned.*
- *It can be laid in-situ or precast form.*

17. What do you understand by fire resistance integrity? Write short notes on match boarded and fire doors.

19. **Key Points:** *There are different types of flush doors for different purposes in a building.*

Model Answer:

- *Cellular core flush doors are made with a cellular, fibre board or paper core in a light softwood frame with lock and hinge blocks, covered with plywood or hardwood facing glued to the frame and core on both sides. They provide poor acoustic, security and fire resistance. They are cheap. They are used as internal domestic doors.*
- *Skeleton core flush doors: The core consists of small section timber. The main members are the stiles and rails, with intermediate rails. It is covered with plywood or hardwood. It will withstand normal use and maintain its shape better than a cellular core flush door. It is used as internal domestic doors.*
- *Solid core flush doors: they are made with a core of timber, chipboard, flaxboard or compressed fibreboard strips. The door is edged with lipping for neat finishing. They have better stability, shape and acoustic resistance than cellular or skeleton flush doors because of the solid core.*