

CONSTRUCTION

The complete revision guide

Name _____

Exam techniques and practice! How to **MAXIMISE** your chances in your exam!



Look at the marks available for every question! **State, name, identify, suggest and propose** are low mark questions and need little or no explanation! Easy marks to pick up!

Command words in construction

1-2 MARKS

- State
- Name
- Identify

2-3 MARKS

- Suggest
- Propose

- Assess
- Discuss

7-10 MARKS

- Describe
- Explain

4-6 MARKS

Look at the marks available for every question! **Assess and discuss** are high mark questions and need you to give a lot of detail and possibly explain the positives and negatives of the topic in question

Look at the marks available for every question! **Describe and Explain** are higher mark questions and need some more details in your answers! You can do it!

Keywords- highlight all the words you know the meaning of!

Infrastructure	Economic	External	Mitigation
Function	Recycle	Commercial	Implications
Residential	Reuse	Industrial	Elements
Component	Excavation	Agricultural	Sustainable
Dwelling	Urban	Recreational	Low rise
Habitation	Rural	Religious	Refurbishment
Occupants	Superstructure	Community	Renovation
Truss	Partition wall	Substructure	Extension
Lintel	Heritage	Superstructure	Conversion
Preservation	Listed status	SSSI	Civil engineering
Conservation area	Internal	AONB	Building services

GRADE	EXAM MARK
D2*/8.5	52
D2/7	43
M2/5.5	34
P2/4	25
D1*/3	21
D1/2	18

The sector



The construction industry is responsible for the **designing, building** and **maintenance** of all the buildings that surround us. These include all buildings in which we live (residential), work, shop and socialise (non residential) in.

To **function** as intended, these buildings need to be connected by transport networks (roads, railways, bridges, tunnels)

They also need to receive essential services (energy, telecommunications, water, sewerage) provided by a system of pipes and powerlines

Buildings are for us to live, work and socialise in.
They are made up of these main components:

- Foundations
- Walls
- Floors
- Roof
- Doors/windows
- Insulation

The main functions of a building is to provide the occupants with:

- Privacy/soundproofing
- Security and safety
- Shelter from weather
- Warmth
- Natural light and ventilation

INFRASTRUCTURE

- Buildings
- Roads
- Railways
- Bridges
- Pipe systems for clean water
- Sewerage systems
- Powerlines for electricity and telecommunications
- Pipe systems for gas

BUILDING SERVICE ENGINEERS!

MECHANICAL ENGINEER



VENTILATION/ AIR CONDITIONING

LIFTS/ ESCALATORS



HEATING



ELECTRICAL ENGINEER

Communication lines- phone, internet, IT network



Energy supply

Security alarms, fire detection, sprinkler systems

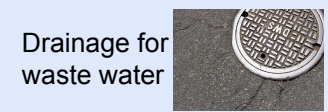


Lighting



PUBLIC SERVICE ENGINEER

Plumbing for water supply/ domestic hot water



Drainage for waste water



Storm water drainage

The PROFESSIONALS! -More qualified, higher salary, more responsibility!

Site/ contract manager



- Responsible for coordinating construction site activities
- Organises resources of labour, plant and materials
- Undertakes the day-to-day activities on site
- Is responsible for health and safety on site and for the welfare of workers.

Quantity Surveyor



- Makes payment to subcontractors and suppliers •
- Produces a final account at the end of a project •
- Is responsible for the control of budgets and control of cost.

Designer/ Architect



- Creates new buildings/ renovates existing buildings
- Produces designs to meet the clients requirements
- Considers all regulations, laws and legislations, and environmental requirements
- Produces detailed drawings for the contractor

Civil engineer



- Designs, plans and manages construction projects including public works such as roads, water distribution, sewages, dams, bridges, railways etc
- Produces a structural solutions
- Assesses potential risks within a project.

Surveyor



- Surveys land, measuring existing features of the natural and built environment
- Sets out construction works in accordance with the drawings and specification
- Produces built data and drawings for architects and structural engineers

Structural engineer



- Checks existing structures for stability and safety
- Works with architects to make sure bridges and buildings are strong and stable enough to withstand loads
- Takes into account wind, earthquakes, traffic, gravity and temperatures.



Use the example questions below to test yourself on this topic. Answers are in the back. Remember to look at the **COMMAND** word and **MARKS** available!

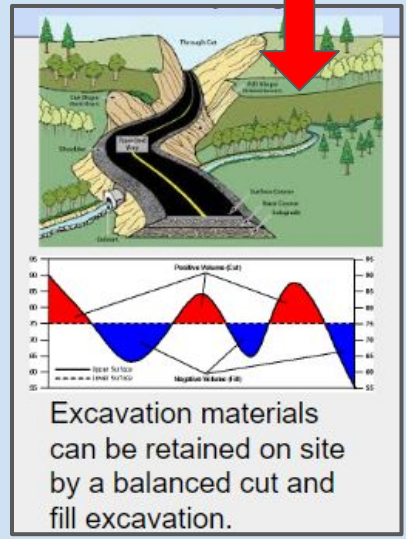
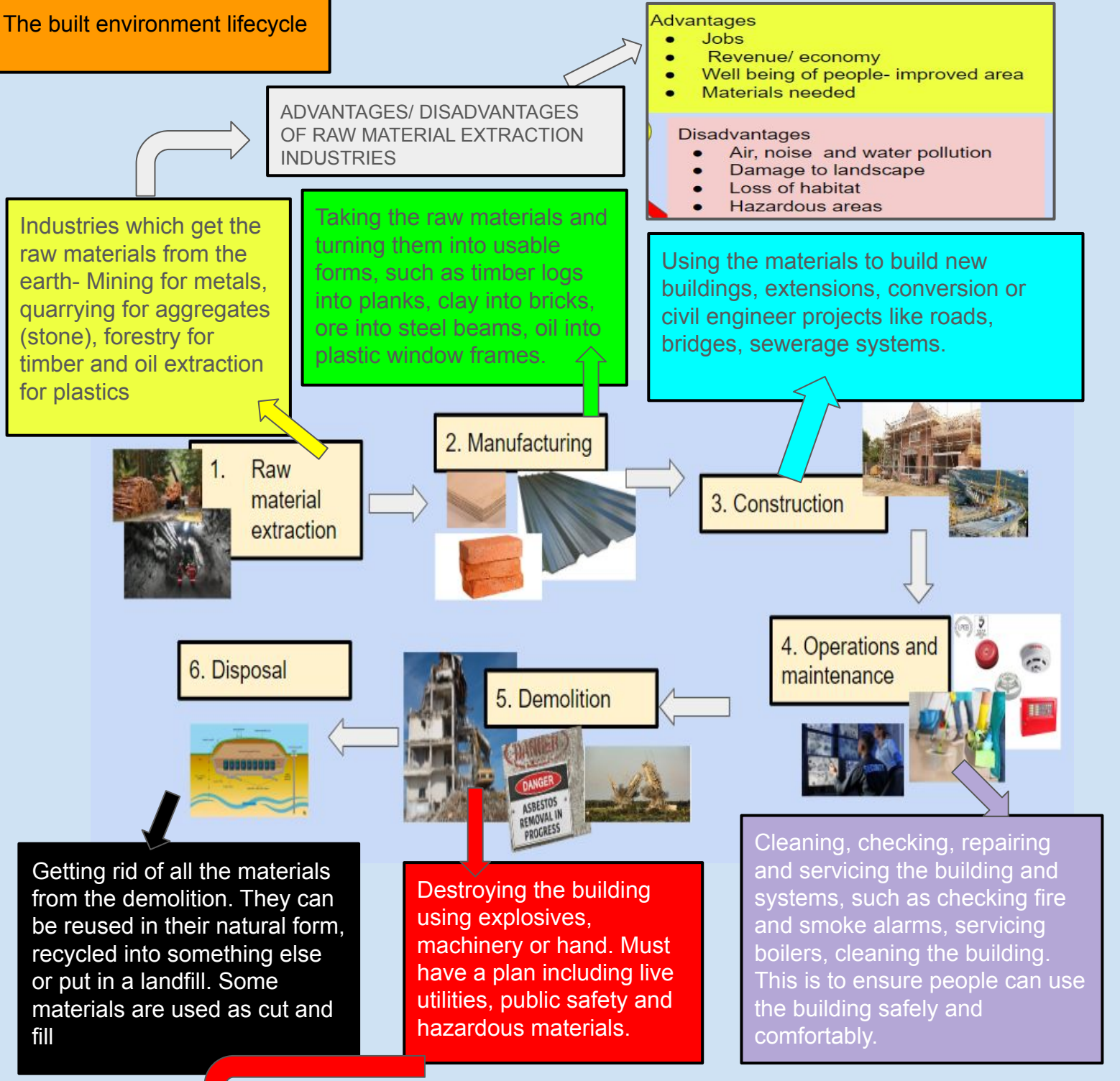
Question 1

- a) **Identify** two mechanical services you might find in a building (2)
- b) **Identify** two electrical services you might find in a building (2)
- c) Railways are an example of a form of infrastructure construction. **Identify** 4 other forms of infrastructure construction (4)
- d) **Describe** 2 responsibilities of a site manager (4)
- e) **Identify** 2 other professional roles associated with the construction industry (2)
- f) Choose one of those roles and **describe** one responsibility of that role (2)
- g) One function of the superstructure of a low rise residential dwelling is to provide the occupants with protection from the weather. **State** 4 other functions of the the superstructure of a low rise residential dwelling (4)

Notes/ misconceptions

SCORE
out of 20

The built environment lifecycle



Brownfield sites

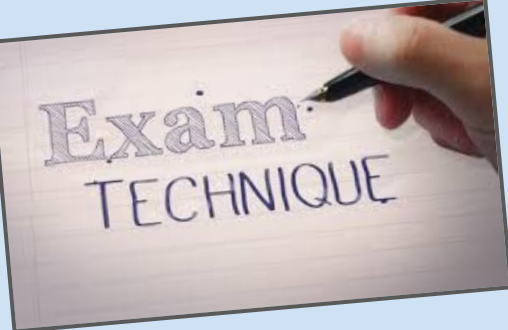
Areas of land which have previously been built on.

Usually urban/ inner city areas. Building on these sites usually is easier for planning permission but may have costly clean up/ demolition needs. Local traffic, buildings, transport routes and people can be affected. Positives are that it regenerates an area and can provide safer and more attractive areas.

Greenfield sites

Areas of land which have not previously been built on.

Usually countryside/ rural areas. Building on these sites needs permission, and is often seen as harmful to the environment/ landscape. It does provide more housing, cleaner living areas and it gives developers a blank canvas to design and build on. However it creates less green space for locals and visitors.



Use the example questions below to test yourself on this topic. Answers are in the back. Remember to look at the **COMMAND** word and **MARKS** available!

Question 2

- a) Raw material extraction comes before construction in the built environment lifecycle. **Identify** 2 industries that extract raw material (2)
- b) Manufacturing follows raw material extraction in the built environment lifecycle. **Describe** one manufactured product made from timber that is used in construction (2)
- c) **Name** 2 stages of the built environment lifecycle that come after the construction stage (2)
- d) **Describe** 2 tasks which would be required during the maintenance and operations stage of the built environment lifecycle (4)
- e) **Give** 2 benefits of recycling or reusing materials at the end of the built environment lifecycle (2)
- f) The built environment lifecycle will result in a brownfield site. **Describe** 2 benefits of re-developing a brownfield site (4)
- g) **Describe** one way waste construction material on a brownfield site can be reused (2)

Notes/ misconceptions

SCORE
out of 18

Types of buildings and structures.

Residential Dwelling- a building designed to be lived in.

- Used as habitation
- Are the smallest types of building
- Vary by location- flats in urban areas, detached in rural areas
- Made of timber/ brick mostly
- Are in demand due to shortage of affordable housing

DETACHED HOUSE



Characteristics-

- Stands alone
- Front and back gardens
- Found in rural areas
- Larger in size

SEMI DETACHED HOUSE



Characteristics-

- Share 1 common wall
- Drive and gardens
- Semi rural areas

TERRACED HOUSE



Characteristics-

- Connected to a row of houses
- Small gardens, limited parking
- Saves space in towns

FLAT



Characteristics-

- Several rooms on one floor
- Multi story, large building
- Saves land in busy towns and cities

COMPONENTS OF A BUILDING

- FOUNDATIONS
- WALLS
- FLOORS
- ROOF
- DOORS/WINDOWS
- INSULATION



The main functions of a building is to provide the occupants with:

- Privacy/soundproofing
- Security and safety
- Shelter from weather
- Warmth
- Natural light and ventilation

When building a new building, it will affect people, the environment and have a financial impact.

SOCIAL



Effects on people

ENVIRONMENTAL

Effects on the environment



ECONOMIC

Financial effects



Non- Residential Dwelling- a building designed not to be lived in.

commercial



Shops
hotels

Used to provide services or retail products
Used for business owners to make a profit
May be adapted or purpose built
Often in retail centres/ city centres

religious



Church
mosque

Places of worship
Vary considerably in terms of age, size, and architectural style
Can be elaborate, with towers, domes.

community



School
Community centre
hospital

Used by members of the community
Located in a convenient location
May be modern or old, or converted for its purpose

industrial



Factory
warehouse

Larger buildings
Often used for storage, processing or manufacturing
May be part of a new development eg) industrial park

agricultural



Barn
Cattle store

Associated with farming and agriculture industry
May be older and constructed of more traditional materials such as stone
May be a large modern facility for a specific purpose eg) milk production, but still set in rural location

recreational



Gym
cinema

Vary considerably in size and style
May be buildings in their own right or extensions to another building
May be for a specific purpose or multi use



Use the example questions below to test yourself on this topic. Answers are in the back. Remember to look at the **COMMAND** word and **MARKS** available!

Question 3

- a) **Give** an example of a type of industrial building (1)
- b) **Describe** the main features, characteristics and uses of an industrial building (2)
- c) **Give** an example of a type of agricultural building (1)
- d) **Describe** the main features, characteristics and uses of an agricultural building (2)
- e) **Give** an example of a type of community building (1)
- f) **Describe** the main features, characteristics and uses of a community building (2)
- g) **Give** an example of a type of commercial building (1)
- h) **Describe** the main features, characteristics and uses of a commercial building (2)
- i) **Give** an example of a type of recreational building (1)
- j) **Describe** the main features, characteristics and uses of a recreational building (2)
- k) **Give** an example of a type of religious building (1)
- l) **Describe** the main features, characteristics and uses of a religious building (2)

Notes/ misconceptions/

SCORE
out of 18

Renewable technologies and materials 1

Static load

A load which remains still (roof)

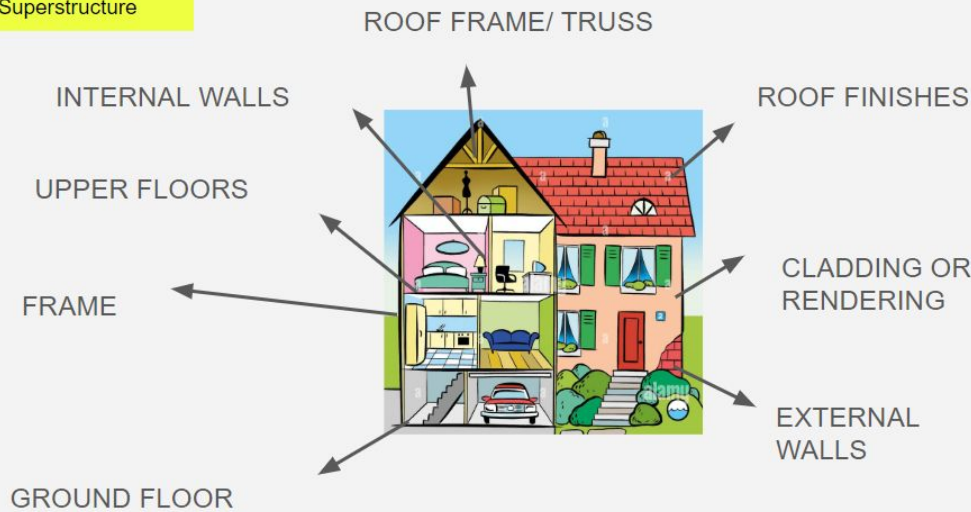
Dynamic load

A load which moves and varies (people)

Impact load

A sudden load (falling object)

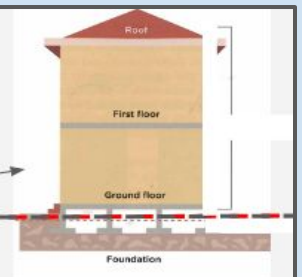
Superstructure



GROUND LEVEL

SUPERSTRUCTURE (ABOVE GROUND)

SUBSTRUCTURE (BELOW GROUND)



Substructure

Foundations: safely transmit the loads of the building to the sub-soil, to settle within acceptable limits for settlement, to support the loads of the building for its lifespan

- **PRIMARY STRUCTURES-** These are **integral** to keeping the building standing up, such as columns, braces, joists and beams



Secondary structures

These are the structures that hold things up but are not **crucial** to the building's structural **integrity** such as stud walls, lintels and trusses.



Building Services materials

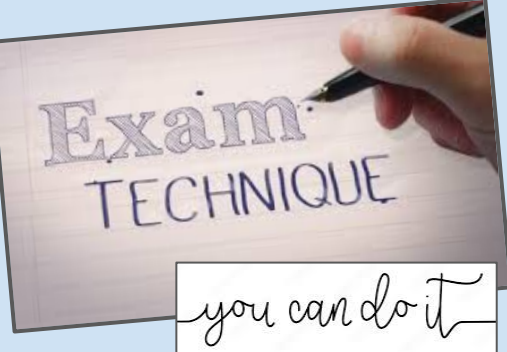
For this topic we will look at some of building services materials:

- Plastic and Copper pipework for plumbing and heating services.
- Plastic rainwater goods and drainage systems.
- Copper cable for electricity and communication systems.



RENEWABLE MATERIALS

ROOF TRUSS	TIMBER, STEEL
ROOF FINISHES	SLATE, CONCRETE TILES
EXTERNAL WALLS	BRICK
CLADDING	TIMBER, ALUMINIUM, STEEL, FIBREGLASS
INTERNAL WALLS	TIMBER, STEEL, BLOCK
GROUND FLOOR	CONCRETE
INSULATION	WOOL, FOAM
BEAMS, JOISTS	TIMBER, STEEL
LINTELS	STEEL, CONCRETE
FLAT ROOF	FIBREGLASS, RUBBER, SOLAR PANELS



Use the example questions below to test yourself on this topic. Answers are in the back. Remember to look at the **COMMAND** word and **MARKS** available!

Question 4

- a) **Describe** the function of the foundations (2)

- b) **Describe** the function of the superstructure (2)

- c) **Describe** 2 different types of roof finish for a flat roof (4)

- d) **Suggest** suitable materials for the following elements of a new building (4)

Cladding of external walls_____

Formal openings in external walls_____

Roof structure_____

Internal partition walls_____

- e) The superstructure is an important element of a low rise building. **List** 4 other elements of a low rise building.(4)

- f) **Identify** 3 functions of an external wall (3)

Notes/ misconceptions

SCORE
out of 19

Renewable technologies and materials 2

Renewable Technologies and Materials.

These use natural energy from sources such as wind, sun, rivers to produce electricity. They will never run out, unlike our coal, oil and gas sources. There are benefits to using renewable technologies.....

Renewable Technologies and Materials.



Wind turbines

Harness the power of the wind to create electricity'

Benefits- Saves money on electricity bills. Environmentally friendly, generates power day and night, can sell excess to NG.

Drawbacks- Expensive to set up, not attractive, less effective when no wind, have to clear land to install them, can emit noise, need planning permission.

Renewable Technologies and Materials.

SOLAR PHOTOVOLTAIC

The direct conversion of light into electric using semiconducting materials. Benefits- efficient in summer, excess energy can be sold to the national grid, they are efficient enough to power household appliances and needs.

Drawbacks- Not efficient in winter, expensive to set up.



SOLAR THERMAL

Uses energy from the sun to heat fluid, which in turn generates heat or electricity.

Benefits- more efficient and cheaper than SP, environmentally friendly way of heating water, can sell excess to NG.

Drawbacks- Expensive to set up, shorter life span than SP, less effective in winter.



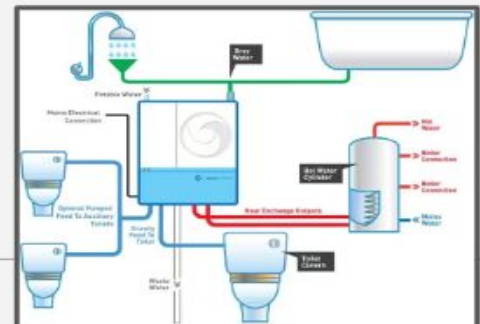
Hydro electricity

The use of moving water to create energy.



Grey water reuse

Collecting bath and shower water to use for watering plants, flushing toilets etc



Rain water harvesting (RWH)

Collecting rainwater and using it to flush toilets, in washing machines, watering plants etc



Benefits

Low running costs
Less maintenance needed
Safer than gas
Reduce carbon emissions
Can cool as well as heat
Long lifespan

Drawbacks

Expensive to set up
Hard to install
May need other heat supplies at times
They do need electricity supply to work

Renewable Technologies and Materials.

HEAT PUMPS

AIR



Heat pumps take the air from outside and turn it into heat which can be stored for later use.

GROUND



Heat pumps are made up of a network of water pipes buried underground, the natural heat found underground warms the water and it stored for later use.

WATER



Heat pumps use the water from natural lakes, ponds and rivers. Water is pumped by suction and heat energy is generated,



Use the example questions below to test yourself on this topic. Answers are in the back. Remember to look at the **COMMAND** word and **MARKS** available!

Question 5

- a) A farmer wishes to build a new dwelling on his land that will be south facing and will have a pitched roof. He would like to use renewable technologies to generate electricity for the new dwelling.

Describe a system that uses a renewable source of energy to provide hot water (2)

Propose a system that could be installed at the new dwelling to use a renewable source of energy to generate electricity(2)

- b) **Explain** why the new dwelling is to be connected to the national grid (2)

- c) **Describe** how solar panels generate energy (2)

- d) **Identify** 2 benefits and 2 drawbacks of using solar panels to generate energy (4)

- e) **Describe** one method of reducing the use of mains water in an occupied building (2)

Notes/ misconceptions

SCORE
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Buildings and structures

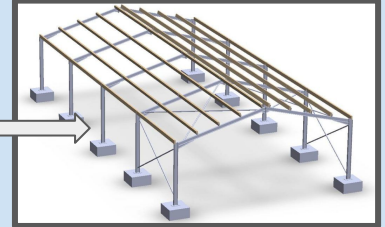
At the start of a building project, architects and engineers are required to make decisions about the type of structure most suitable for the project.

There are 3 main types of building structures.

Individual cells or rooms which are made of concrete. Walls are all load bearing. Usually restricted to 6-1 storeys due to weight. Noise and fire resistant. Often used in flats/ apartments.



Vertical columns permanently fixed to horizontal/ diagonal beams and trusses. Made from steel, or reinforced concrete. Advantages- lightweight, low cost, can be pre fabricated, good for large buildings such as agricultural, warehouses etc.



The weight of the building is carried by a framework of columns and beams. This frame supports the walls, roof and internal floors. Used for tall buildings and skyscrapers. More flexibility for external materials such as cladding/ glass. Smaller buildings will have timber frames, but larger buildings will have steel and reinforced concrete frames.



Our built environment includes many historic buildings, some of which have been given listed status. This means the building has some architectural or historical interest and must be protected.



Older buildings also need a good maintenance program to keep them from decay, damage and deterioration. It is important that materials and methods of construction match the original design as much as possible and that as much of the original features are kept wherever possible.

Heritage and traditional construction methods

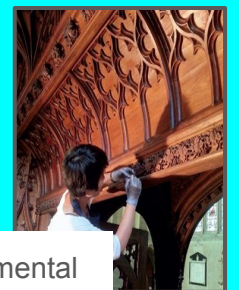
It is essential that the maintenance and renovation of such buildings is undertaken by experienced and qualified tradespersons who specialise in traditional methods. This is to....



- Ensure the history and character of the building is maintained
- Preserve heritage for future generations
- Comply with planning regulations within conservation areas



Ornamental plasterer



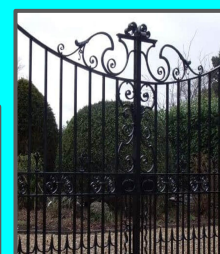
Ornamental carpenter

Building renovation includes installing essential services such as heating, lighting, ventilation, security etc. There are certain rules developers must consider.....

Mitigation- reduce the severity of change to the building when installing new services.

Minimisation- choose effective and affordable options to minimise change to the building

Reversibility- consider how the removal of these services will eventually affect the building.



Blacksmith



Stonemason



Use the example questions below to test yourself on this topic. Answers are in the back. Remember to look at the **COMMAND** word and **MARKS** available!

Question 6

- a) Choosing the right building structure is a very important factor in the success of a development project.

Describe 2 characteristics of each of the following building structures (4)

Cellular_____

Rectangular_____

- b) **Describe** one benefit of using a portal frame construction (2)

- c) The preservation of the historic environment requires a system of planned maintenance. **Describe** the purpose of planned maintenance (2)

- d) One aim of this maintenance work is to preserve the history and character of historic buildings.

Describe 2 methods of carrying out maintenance work on historic buildings (4)

- e) **Explain** how the following trades could be used when refurbishing a historic building (4)

Stonemason

Ornamental plasterer

- f) Heritage trades are used in the maintenance of historic buildings. **Suggest** 2 reasons why using these methods are important (4)

Notes/ misconceptions

SCORE
out of 20

Sustainable construction methods

What is sustainable construction?



Sustainability is 'meeting the needs of the present without compromising the ability to meet the needs of future generations.'

Sustainable construction aims to create a world which will improve the lives of future generations by using environmentally friendly construction methods. In order to achieve this, builders and designers aim to meet the following targets:

1. Improve energy efficiency
2. Use sustainably sourced materials
3. Reducing waste
4. Reducing pollution
5. Protecting the natural environment

Use less fossil fuels, recycle and reuse materials to cause less processing and pollution

Cultural and social benefits of sustainable construction

Sustainable construction is concerned with improving the wellbeing of all stakeholders- including construction workers, local residents, and occupiers.

Reducing pressure on local infrastructure- reduce traffic congestion and ensure transport networks run smoothly

Improving householder's comfort- use intelligent heating, lighting, ventilation systems



Use less gas/ electricity- fit SMART technologies like heat pumps, solar panels and usage monitors in new homes

Use sustainable materials (see below)

Buy less, reuse and recycle all waste

Avoid damage to the natural environment when building

Financial benefits of using sustainable construction methods

As well as the legal and moral necessity of implementing sustainable construction methods, there are also lots of financial benefits to building 'green' buildings. They are cheaper to run, and use less global energy.

Minimising waste- less over ordering and less leftover material

Using sustainable materials- recycled timber, reclaimed bricks etc

Reducing energy consumption- new technologies such as heat pumps etc



Sustainable materials- All materials used in construction have some impact on the environment, but these materials all help sustainability and the environment because they can be regrown, reused or recycled.

Pollution and the preservation of natural environments and habitats

The most important factor in preserving the natural environment when undertaking a construction project, is limiting the pollution of water, air and ground surfaces. It is vital that an environmental risk assessment is done in order to put specific measures in place to prevent or reduce pollution. (mitigation) These include.....



Dust suppression- use mesh screens, fine water mist to reduce dust.

Avoid burning any materials on site

Use non toxic paints and solvents and segregate any hazardous substances to avoid contamination

Covering materials such as stones, cement so they don't get washed into rivers

Reduce noise pollution by using less noisy machinery and power tools

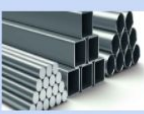
Collect any waste water and dispose of it responsibly

TASK- Complete the diagram

AONB-Area of natural beauty

SSSI- Site of special scientific interest

These areas may have scenic views, biodiversity, geodiversity or historic value

Wood Roof, internal walls, cladding	Steel Roof, external frames, lintels	Reclaimed brick External and load bearing walls
		
Can be regrown, is recyclable and reusable. Minimum impact to environment (forestry)	Can be reused again and again, although raw extraction does impact the environment (mining)	Can be reused or crushed to make filling materials. Initial impact on environment (quarrying)

Straw bales Insulation in brick/ steel walls	Wool Insulation in brick/ steel walls	Slates/ tiles Roof finishes
		
Good for insulation, can be regrown and minimal impact on environment	Completely free of harm to the environment, however it is not fire resistant so needs treating which increases the impact	Reusing slates and tiles reduces the impact on the environment rather than extracting raw materials

table



Use the example questions below to test yourself on this topic. Answers are in the back. Remember to look at the **COMMAND** word and **MARKS** available!

Question 7

- a) A new community centre is to be constructed in a rural location on the outskirts of a country town. The site for the community centre lies within a conservation area. The community centre is to be a framed, single story building, designed to suit the local area and to make use of sustainable materials.

Propose suitable sustainable materials for 3 different elements of the building (6)

- b) **Propose** 2 measures that could be taken to preserve the natural environment during the construction of the community centre (4)

- c) **Describe** 2 social or cultural benefits of sustainable construction (4)

- d) **Outline** 2 financial benefits of using sustainable construction methods (4)

Notes/ misconceptions

SCORE
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Trades, employment and careers

Trades and employment

The construction industry requires a range of skills and work to be carried out by various trades, be that on a new build, a renovation or heritage project. The following trades are the most common, although there are many more within the sector.

WE HAVE ALREADY LOOKED AT THE PROFESSIONAL ROLES WITHIN THE SECTOR-

- Architect
- Surveyor
- Quantity surveyor
- Site manager

AND THE ENGINEERING ROLES-

- Mechanical engineer
- Public services engineer
- Electrical engineer
- Structural engineer

Bricklayer

- Works from plans/ specifications
- Lays rows of bricks/ blocks
- Shapes and trims bricks using chisels or power tools
- Applies mortar with trowel
- Checks vertical and horizontal alignment with spirit level/ plumb line
- Uses stretcher bond or other types of layout



Tiler

- Prepares and levels off the surface
- Cuts tiles to correct size using manual or electric tile cutter
- Fixes tiles with adhesive
- Grouts tiles



Painter and decorator

- Wallpapers. Paints interior walls and woodwork
- Strips old paper and paint
- Fills holes and cracks in surfaces
- Stains and varnishes timber work



Carpenter/ Joiner

Joiner

- Marks and measures wood from technical drawings
- Cuts wood by hand or machine
- Joins wood to form structures such as staircases, windows, door frames, roof trusses

Carpenter

- Installs wall partitions, roof trusses, doors, skirting, cupboards, kitchens
- Replicates ornamental mouldings
- Fits interior woodwork in shops, public buildings.



Electrician



- Installs, inspects and tests electrical services and equipment
- Follows relevant safety regulations
- Installs street lighting and traffic lights
- Fits electrical sockets and switches
- Rewires buildings in need of updating

Plasterer



- Prepares and levels surfaces
- Mixes plaster
- Applies wet plaster to walls, ceiling, outdoor areas
- Creates ornamental plaster work such as ceiling decoration
- Fixes plasterboard on to stud walls (drylining)

Plumber



- Follows regulations (gas safety)
- Installs cold and hot water systems, boilers and heating.
- Cuts and joins pipes
- Installs showers, washing machines
- Unblocks drains

Trades qualifications typically involve a mix of vocational training and on-the-job experience, primarily through [apprenticeships \(Levels 2-3\)](#), [NVQs](#), and [City & Guilds diplomas](#). Key requirements often include GCSEs (maths/English), specialized technical certificates, and health & safety certifications like a CSCS card. [Checktrade +3](#)



Use the example questions below to test yourself on this topic. Answers are in the back. Remember to look at the **COMMAND** word and **MARKS** available!

Question 8

- a) **Identify** 2 activities that might be carried out during a house renovation project by the following trades, (8)

Plasterer _____

Painter decorator _____

Carpenter _____

Tiler _____

- b) State 2 activities associated with the following trades (4)

Electrician _____

Plumber _____

SCORE out of 12	
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Notes/ misconceptions

Health and Safety

The **RISK** is the likelihood that a person may be harmed if they are exposed to a **HAZARD**, which is anything with the potential to cause harm. These include....

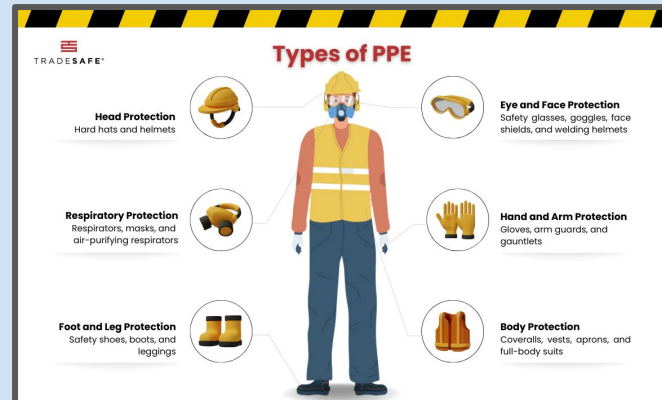
- Heavy machinery, equipment and vehicles
- Working at height
- Manual handling and lifting
- Slips, trips and falls
- Working in enclosed spaces
- Working with live electricity/ gas
- Dust and noise
- Exposure to chemicals and hazardous substances
- Falling objects
- Fire, and hot work such as welding



Safety when working with gas, water and electricity

Working with these utilities undoubtedly carry risks to workers and the public. There are laws in place to prevent such accidents.

- All workers must have the correct qualifications Eg) Gas safety registered
- Regular checks and inspections to take place
- PPE must be worn
- Supply must be cut off before working on it



Working in enclosed spaces

Risks such as poor ventilation, gases, risk of flood, trapping or explosion makes working in enclosed spaces very dangerous. There are recommendations to prevent such occurrences.

- Training for employees on dangers and rescue procedures
- Testing for flammable and toxic gases
- Use of breathing apparatus
- Wearing rescue harness or lifeline
- Person posted outside the entrance
- Rescue procedure in place



LEGISLATION

HASAWA Health & Safety at Work Act 1974

Ensures that staff have adequate training and provisions.
Demands a safe working environment
Ensures the workplace provides relevant information and supervision

The management of Health & Safety at Work Regulations 1999

Ensures employers carry out risk assessments, have a health and safety manager, training, policies and risk assessments.

Manual Handling Operations Regulations 1992

Regulations which aim to prevent risks from lifting or moving heavy loads.
Recommends the use of aids such as forklift trucks, hoists etc

RIDDOR The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations

Requires employers to record all accidents, injuries and deaths relating to employees and the public, caused by or relating to the workplace.

PUWER Provision and Use of Work Equipment Regulations 1998

Ensures all equipment used at work is suitable, safe, maintained and inspected.
Ensures employees are adequately trained to use the equipment.
Demands safety measures such as guards, emergency stops etc

HSE The Health and Safety Executive

The government body set up to enforce health and safety rules are adhered to in the workplace.

Working at height

The most dangerous activity with the most deaths, working at height carries many recommendations.

- Use scaffolding, guard rails, harnesses, mobile elevated work platforms (MEWP).
- Avoid working in bad weather
- Provide training
- Ensure all equipment has been tested and checked.



Risk assessment

Risk assessment is a step by step process for controlling the health and safety risks caused by hazards in the workplace. There are 5 main steps to the process.

1. **Identify the hazards**- Look at all potential hazards
2. **Assess the risks**- Who might be harmed and how?
3. **Control the risks**- What can be done to eliminate or reduce the risk of harm?
4. **Record your findings**- record all information in the risk assessment document
5. **Review the controls** - Are they working or do they need changing?



Use the example questions below to test yourself on this topic. Answers are in the back. Remember to look at the **COMMAND** word and **MARKS** available!

Question 9

- a) **Match** the 4 construction site situations with the most appropriate item of PPE. (4)

Construction site situation	Personal Protective Equipment
Working under-ground in an enclosed space	Safety goggles
Replacing roof tiles on a four-storey heritage building	Ear defenders
Using a pneumatic drill to break up an old concrete path	Breathing apparatus
Mixing cement in a portable cement mixer	Safety harness

- b) **Identify** one safety procedure that should be followed when working with gas (1)

- c) **Explain** a consequence of not working safely with gas (2)

- d) **Identify** 2 risks associated with working in an enclosed space (2)

- e) **Explain** one consequence of not working safely with electricity (1)

- f) For each of the following activities, **identify** a different essential form of PPE and **explain** how it protects the worker (9)

Cutting steel- item of PPE _____
How it protects the worker _____

Demolishing brick walls- Item of PPE _____
How it protects the worker _____

Working at height- item of PPE _____
How it protects the worker _____

- g) **Suggest** 2 specific hazards to workers that should be included on a risk assessment when working at height (2)

Notes/ misconceptions

SCORE
out of 21

Exam TECHNIQUE

Example 10 mark questions

Below are the 10 mark questions from the last 3 years. Included is ideas of how to plan this bigger question and MAXIMISE your chances of a higher grade..

ALWAYS look for the command word!

Break the question down and work systematically!

ALWAYS read the question twice!

1. A new office development is to be built in a city centre location. The building will consist of 5 floors, and will require construction workers to work in the following situations:

- At height
- Working with gas, water and electricity
- In confined spaces.

Evaluate the risks arising from these hazards and the associated control measures that should be used to prevent injury of the construction workers. (10)

On this question, I would start by explaining the risks of working at height, then the possible control measures. Then move on to working with gas, electricity and water, then finally, working in confined spaces.

2. A new residential development is being built in a rural location. It is to rely on renewable energy.

Discuss the main **benefits and limitations** of renewable energy technologies that could be used. (10)

On this question, I would start by listing the types of renewable energy technologies that could be used, then take each one individually and discuss the positives and negatives of each.

3. A client and an architect are currently considering which building structure to use in the development of a new multi storey office building. The client wants a modern building with a focus on metal and glass exterior with minimal use of brickwork.

Recommend the structure that would be best for this building, consider the features and characteristics of, cellular, rectangular and portal frame constructions in your response. (10)

In this question, I would describe the features and characteristics of each type of frame and then suggest the one I would recommend.

4. A new residential site is to be developed. The developers are considering both brown and green field sites. **Discuss** the main characteristics, benefits and drawbacks of both types of sites. (10)

In this question, I would Start with one type of site, then explain its' characteristics, then the benefits of building on that site, then the drawbacks. I would then take the other site, and do the same.

5. A project for the construction of a new mainline rail link is being considered. The project will link several major cities and be an infrastructure of national importance.

Assess the benefits and drawbacks likely to arise from major infrastructure project of this nature. (10)

In this question, I would start by discussing all the benefits- social, environmental and economic. Then do the drawbacks.

you can do it

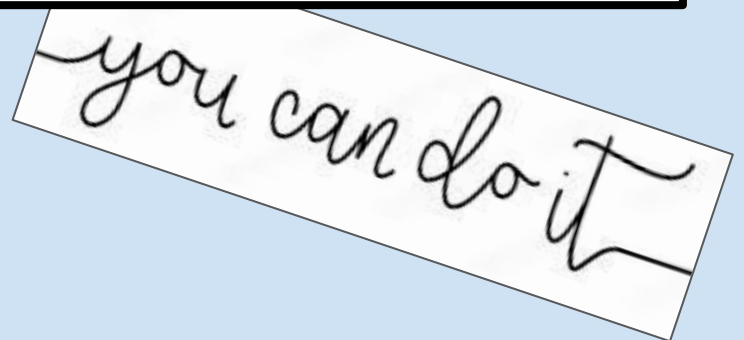
SOMETIMES
AMAZING PEOPLE
FORGET HOW
AMAZING
THEY ARE...
this is your reminder!!



CONSTRUCTION

The complete revision guide

ANSWER SHEET



Question 1

- a) escalators/ lifts (1), heating (1) Air con (1)
- b) Energy supply (1) power sockets (1) lighting (1) phone lines (1) IT networks (1) fire alarms (1) security cameras/ alarms (1)
- c) Tunnels (1) water supply (1) sewerage system (1) telecommunications (1)
- d) Manages progress on site (1) undertakes daily meetings (1) organises labour and materials (1) coordinates activities on site (1) responsible for health and safety (1) and welfare of workers (1)
- e) Architect (1) surveyor (1) quantity surveyor (1)
- f) Architect- designs or renovates old buildings (1) knows laws and building regulations (1) meets with the client to meet their wants and needs (1) manages the design and build stages (1)
Surveyor- surveys the land (1) looks at existing features of the natural environment (1) produces data for the architect (1)
Quantity surveyor- Responsible for the financial management of a project including wages (1)
Produces final accounts (1) Controls the budget (1)
- g) Warmth (1) privacy (1) security (1) natural light (1) ventilation (1) sound barrier (1)

Question 2

- a) Forestry (1) mining (1) oil extraction (1) quarrying (1)
- b) Boards (1) roof truss (1) Plywood/ MDF (1) window frames (1) doors (1) stud walls (1)
Logs are cut into planks, seasoned and used in construction (1) . Small pieces of natural timber used in the manufacture of engineered boards (1)
- c) operation and maintenance (1) demolition (1) disposal (1)
- d) controlling of heat and lighting (1) for comfortable work/ living conditions (1)
Provision of security (1) to keep occupants safe and protected (1)
Provision of cleaning (1) to give a hygienic environment and waste management (1)
To organise the maintenance (1) to keep the building operating and stay within the law (1)
Provision of evacuation procedures (1) to ensure health and safety of occupants (1)
- e) Preserves natural resources (1) creates jobs (1) reduces pollution (1)
- f) Removes eyesores (1) therefore improves the local area (1)
Removal of hazardous area (1) therefore improving safety of the area (1)
May have infrastructure already in place (1) therefore may be cheaper (1)
Planning permission easier to obtain (1) so may be cheaper and quicker project (1)
- g) Retain excavation material on site (1) and turn it into embankments (1)
Retain excavation material on site (1) using cut and fill (1)

Question 3

- a) Factory (1) warehouse (1)
- b) Large in size (1) to accommodate machinery/ animals (1)
Used for storage (1) or processing and manufacturing (1)
Maybe new and modern (1) and located in an industrial estate (1)
- c) Barn (1) stable (1) cattle store (1)
- d) Associated with farming (1) used for animal or machinery storage (1)
Older traditional building (1) found in rural areas (1)
Large in size (1) may have a specific purpose such as milking cows (1)
- e) community centre (1) hospital (1) school (1)
- f) used by members of the community (1) located in a convenient location (1)
Maybe be old or modern (1) may be purpose built or converted for its' use (1)
- g) shops (1) hotel (1)
- h) used to provide a service (1) or sell products to customers (1)
Accommodate business activities (1) to make profit (1)
Can be adapted (1) or purpose built (1)
Often located in towns (1) or retail centres (1)

Question 3 cont.....

- i) leisure centre (1) stadium (1) gym (1)
- j) vary in terms of style and size (1) offer recreational activities (1)
May be buildings in their own right or extensions to another building (1)
May be for a specific purpose or multi use (1)
- k) church (1) synagogue (1) mosque (1)
- l) used as a place of worship (1) vary in terms of style, age and size (1) often has elaborate features and architecture such as towers and domes (1)

Question 4

- a) Provide structural safety (1) from the ground (1)
Distribute weight (1) over a large area (1)
- b) Provide living area (1) protects the building from the elements (1)
Transfers load from upper parts (1) to substructure (1)
- c) Rubber sheet (1) to allow rain to roll off (1)
Fibre glass (1) is waterproof and can be cut to size (1)
Solar panels (1) can be laid as tiles (1)
- d) Cladding - Brick (1) render (1) insulated panels
- e) Formal openings- steel lintels (1) concrete (1)
Roof- timber (1) rafters (1)
Walls- brick (1) timber stud walls (1) steel frame (1)
- f) Cladding (1) roof (1) roof finish (1) substructure (1) foundation (1) ground floor (1)
- g) Provides structure (1) insulation (1) cladding (1) waterproofing (1)

Question 5

- a) Hot water- Solar panels (1) convert sunlight into heat (1)
Ground heat pump (1) transfers heat from the ground to heat water (1)
Electricity- solar panels (1) roof mounted and convert sun into energy (1)
Individual wind turbine (1) converts wind into electricity (1)
- b) Allows a consistent supply (1) can sell excess electricity back to the national grid (1)
- c) Solar panels
- d) Positives- cheap to run (1) renewable (1) no carbon emissions (1)
Negatives- expensive to set up (1) weather dependent (1) don't look nice visually (1)
- e) Collect rainwater (1) and reuse it for plants etc (1)
Grey water reuse (1) store bath and shower water in tanks to use for flushing toilets (1)

Question 6

- a) Cellular- concrete (1) individual cells stacked (1) load bearing (1)
Rectangular- framework of columns and beams (1) made of steel (1) larger buildings (1)
- b) Lightweight (1) can be pre fabricated off site (1)
Simple structure and quick to build (1)
Cheap to build (1)
- c) Help to plan a regular maintenance program (1) to prevent decay & ensure upkeep of building (1)
To detect small problems early (1) & stop them escalating therefore extending life of building (1)
- d) Use methods and materials that match (1) so impact of repairs is minimal (1)
Retain as much of the original materials as possible (1) to keep the historic value/ character (1)
- e) Stonemason- carves and lays stonework (1) repairs and cleans stonework (1)
Ornamental plasterer- replicates traditional plasterwork (1) uses plaster moulds & casts (1)
- f) Heritage tradespersons can match the materials (1) and methods (1)
These methods retain the original materials (1) and keep the historic value (1)

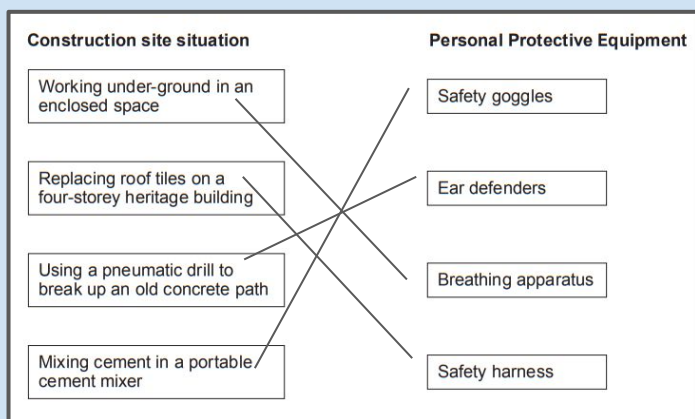
Question 7

- a) Roof truss (1) timber (1)
Cladding (1) timber (1)
Framework (1) steel (1)
Walls (1) brick (1)
Insulation (1) straw (1)
Roof finish (1) concrete tiles (1)
- b) limits pollution (1) by storing materials securely (1) and retaining waste securely (1)
Limits dust (1) using fine mist spray (1)
Reduces noise (1) by constructing off site (1) or using sound suppressors (1)
Avoids damage to trees (1) by creating barriers and fencing around them (1)
Protects wildlife (1) don't disturb natural habitats (1)
- c) protects the environment (1) by reduction of carbon emissions (1)
Avoids using natural resources (1) by using recycled materials (1)
Improves the quality of the environment (1) and occupants comfort (1)
Improves quality of air (1) and people's health (1)
Produces less waste (1) by recycling (1)
Improves water efficiency (1) by using water saving devices (1)
Reduces energy consumption (1) and reduce bills (1)

Question 8

- a) Plasterer- applies plaster to inside and outside walls (1) applies plasterboard to stud walls (1)
Painter- prepares walls and ceilings (1) applies paint (1) applies wallpaper (1) glosses timber (1)
Carpenter- installs floor joists (1) floorboards (1) roof truss (1) stud walls (1) doors (1) stairs (1)
Skirting boards (1) kitchens (1)
Tiler- cuts tiles (1) applies tiles to kitchens and bathrooms (1) grouts tiles (1)
- b) Electrician- Inspects electrical equipment (1) installs electrical equipment (1) tests electrical equipment (1)
Plumber - installs hot/cold water systems (1) toilets (1) boilers (1) heating (1)

Question 9



- f) steel - goggles/ gloves (1)
prevents injury to eyes (1) from flying particles (1)
Prevents injury to hands (1) from saw blade (1)
Brick wall- boots/ gloves (1)
Prevents injury to feet (1) from dropped items (1)
Prevents injury to hands (1) from sharp items (1)
Working at height- harness (1)
Prevents injury to body 91) from falling (1)

- g) danger of falling (1) falling objects (1) lifting/ carrying heavy materials to height (1)

- b) cut off supply (1) use PPE (1)
- c) explosion (1) gas leak (1) inhalation of gas (1)
- d) exposure to fumes (1) lack of oxygen (1)
flood/drowning (1) fire (1) being trapped (1)
- e) electrocution (1) fire (1) explosion (1)