1. State four non -statutory documents.
2. State four statutory documents.
3. State two possible penalties that you may receive from the HSE if you do not comply with statutory legislation.
4. Describe what the following documents are used for:

Block diagram

Circuit diagram

Wiring diagram

Gannt chart

Site plan

1. Draw the symbols for the following components:

Switching one-way

Switching two-way

Switching intermediate

Switching pull switch

switched socket outlet

unswitched socket outlet

fused connection units

switched fused connection units

lighting points fluorescent

Light point incandescent

Light point LED

Light point wall

cooker control unit

consumer control unit

integrated meter

fuse

circuit breaker

1. A 6m fence measures 12cm on a drawing, what scale is being used?
2. A room measures 5cm long on a 1:250 scale drawing, how long is the actual room?
3. Define band 1 and band 2 circuits.
4. Why do we usually separate band 1 and band 2 circuits?
5. What precautions must you take in order to mix band 1 and band 2 circuits?
6. There are two types of alarm systems, name them.
7. State two types of emergency lighting and describe why they are different.
8. State three popular sizes of conduit.
9. State three types of fixing that could be used to secure metal conduit to a brick wall.
10. When installing PVC conduit, you should make provision for the conduit expanding with temperature change, describe how this is achieved.
11. With reference to bending PVC conduit, state the minimum bending radius.
12. What tool is used to thread metal conduit?
13. What dangers may arise from using cutting compound with metal conduit?
14. State two advantages and two disadvantages for the following cables and wiring systems.

PVC conduit

Metal conduit

SWA

MIMS/ MICC

T/E

PVC trunking

Metal trunking

1. Define the following abbreviations:

Ci

Cg

Cf

Ca

Ib

In

Iz

It

1. State the current carrying capacity for the following cables, assume they are clipped direct and rated at 70°C.

16mm2 single core

10mm2 multicore

6mm2 T/E

6mm2 multicore

6mm2 single core

1. State the mv/A/M for the following cables, assume they are clipped direct and rated at 70°C

16mmT/E

25mm single core

10mm multicore

1. State the correction factors for the following, assume 70°C cable:

A cable passing through 200mm of thermal insulation.

A cable running through an ambient temperature of 35°C.

A cable protected by a re-wirable fuse.

A cable grouped with 3 other cables single layer on a wall.

1. State where you would use the following protective devices:

Type B BS60898

Type C BS60898

Type D BS60898

1. What is the difference between a protective devices rating and its short circuit rating?
2. Which device trips the quickest, BS60898 type B, C or D?
3. State the required disconnection times for standard circuits.
4. State the volt-drop parameters for both single phase and three phase standard circuits.
5. State the cable size, protective device and maximum floor area served for the following circuits:

A1 ring

A2 radial

A3 radial

1. State the formula used to calculate earth loop impedance.
2. State the three earthing systems and the maximum Ze permitted for each type.
3. Sketch an earth fault loop diagram for the following systems:

TT

TN-S

TNC-S

1. Define the term extraneous conductive part and give two examples.
2. Define the term exposed conductive part and give two examples.
3. Why do we earth an installation?
4. Why do we bond an installation?
5. Which conductor links the MET to exposed conductive parts?
6. Which conductor links the MET to the electrical installation?
7. Which conductor links the MET to incoming services?
8. Explain ADS.
9. Describe how an MCB works under overload and short circuit conditions.
10. Describe how an RCD works.
11. What is an RCBO?
12. I need to run the following cables in one piece conduit 2.8m long, calculate a suitable size, (assume 70°C cable). Assume all cables are stranded.

3 x 1.5mm2

3 x 2.5mm2

2 x 4mm2

1. What device converts photons into electrical energy?
2. State the typical transmission voltages used by the National Grid.
3. State the typical distribution voltages.
4. List the different types of earth electrode.
5. Define the term “grey water” and state one possible use.
6. What is the difference between a solar panel and a photovoltaic panel?
7. What is an air source heat pump? Briefly describe its function.
8. What is a ground source heat pump? Briefly describe its function.
9. Define the term “micro generation”.
10. What is a CHP? Briefly describe its function.
11. Describe three types of space heating and give examples.
12. Name 3 types of smoke alarms.
13. State the maximum earth loop impedance for a 32A type C BS60898.
14. State the maximum earth loop impedance for a 6A type B BS60898.
15. A 6mm T/E 70°C cable is clipped direct and carries 15A over a length of 54m to a heater. Calculate the volt drop and state if it complies.
16. Calculate the R1 + R2 value for a 2.5mm/1.5mm cable that is 60m long.
17. State the correct heights for mounting switches and sockets according to the BS7671 OSG.
18. State the maximum short circuit rating of a BS1361 type 2 protective device.
19. In a photovoltaic system, state the device that converts the generated DC current into AC current.
20. A domestic cooker has the following connected loads:

* top oven 1.5 kW
* main oven 2.5kW
* grill 2.0kw
* four hotplates 2.5kW each
* The cooker control unit includes a 13 A socket outlet

After calculating diversity what is the total load?

1. State the wording that must be displayed on a label for a clamp that is connected to a metallic gas installation pipe connected to a main protective bonding conductor.
2. What is the minimum height of span above ground in meters for a cable at a road crossing?
3. What is the minimum cross-sectional area of supplementary equipotential bonding conductor (mm2 when considering the information below)? -

* Cpc size 1.5mm2
* Exposed-conductive-part to extraneous-conductive-part
* Mechanically protected

**Hard Question**

A shower is wired in 70°C 10mm/4mm T/E clipped direct, it is protected by a 45A BS60898 device and the length of run is 50m. It forms part of a TNC-S system with a measured Ze of 0.2Ω

Calculate the earth loop impedance and state if it complies with BS7671.