**Circuit Protection - Possible Questions Part 2**

21 Why should the test button be operated before using a portable RCD for personal protection?

22 What is the maximum operating time at rated residual current for an RCD used for personal protection?

23 Define the term fusing factor as applied to circuit breakers.

24 Why must portable RCDs or isolating transformers be placed as close as practical to the socket outlet when used to supply portable power tools in outdoor or damp situations?

25 Explain how HRC motor rated fuse links provide backup protection for the thermal overloads in a DOL starter supplying a three phase electric motor in the event of a short circuit.

26 List the TWO most common forms of personal protection against electric shock used with electrical appliances either outdoors or in damp situations.

27 Define the term back up protection as applied to circuit protection.

28 List TWO types of protection offered to a motor by a direct on line starter.

29 Briefly describe the main construction features of a typical HRC fuse link.

30 Explain how these features give a high rupturing capacity.

31 An HRC fuse link is to be used to provide close excess current protection for a 2kW single phase heater   
that is to be permanently connected to a standard low voltage, MEN supply system. The installation has   
been tested with an earth fault loop impedance tester and found to have an impedance of 0.2 ohms.   
(N00)   
  
i) Show by calculation which of the following fuse links is most suitable for this application:   
• 6A   
• 10A   
• 16A   
• 20A

ii) What is the minimum voltage rating for the fuse?

iii) Show by calculation the minimum breaking capacity required by the fuse.

iv) What is the maximum fusing factor that will provide close excess current protection?

32 Explain the internal operation of a miniature circuit breaker when the following situations occur: (J00)   
a) small overload

b) short circuit

33 When an RCD is used for personal protection, state the: (J00)   
a) maximum residual operating current

b) maximum operating time at maximum residual current

34 Define the term breaking capacity when applied to a protective device such as a circuit breaker.

35 State the TWO principal operating advantages that an HRC fuse has over a miniature circuit breaker.

36 Explain the term inverse time current characteristic when applied to a protection device.

37 An HRC fuse link has the following details printed on it.

Explain what each detail means and its relevance when installing the fuse link.   
  
a) 80 kA

b) 10A

c) 550V

b) Define the term fusing factor when applied to an HRC fuse.

38   
a) Sketch and label a circuit diagram of an RCD used for personal protection that includes the following   
components:   
• sensing coil/toroid   
• tripping device   
• test circuit (push button and resistor)   
• phase, neutral and earth conductors.

b) Describe the operation of the RCD circuit when there is:   
i) no fault

ii) a phase to earth fault

38 Define the term rated current when applied to a protective device such as a fuse or circuit breaker.

40 The thermal protection device in a three phase motor starter is primarily designed to disconnect the motor   
on the occurrence of what type of fault?

41 State the TWO major dangers associated with short-circuits in circuits that have high prospective short-  
circuit currents.

42 State four technical advantages that HRC cartridge fuses have over re-wireable fuses.

43. State TWO factors that limit the prospective short-circuit current in an electrical installation