C&G 2395 Mock Exam

Section A - Answer ALL TWENTY questions. All questions carry equal marks.

1. Three single-socket outlets have been added to a ring final circuit. State the
   a) Inspection & test certificate that will need to be completed. (1 mark)
   b) Title in law given to the inspector (1 mark)
   c) Legal status of the inspector (1 mark)

2. State the
   a) Statutory document that is relevant to inspection & testing (1 mark)
   b) Non-statutory document that is relevant to electrical test equipment. (1 mark)
   c) Non-statutory document that is relevant to the requirements for electrical installations (1 mark)

3. Give an example of the circumstances that would require the issue of each of the following.
   a) electrical installation certificate (1 mark)
   b) periodic test report (1 mark)
   c) minor works certificate (1 mark)

4. State.
   a) The meaning of indirect contact (1 mark)
   b) Two methods of protecting against indirect contact (2 marks)

5. State the form of protection that is offered by each of the following
   a) Placing out of reach. (1 mark)
   b) SELV (2 marks)

6. Give one example of each of the following
   a) An exposed conductive part (1 mark)
   b) An extraneous conductive part (1 mark)
   c) Direct contact (1 mark)

7. State the earthing systems that use the following as earth return paths.
   a) PEN Conductor (1 mark)
   b) Cable sheath (1 mark)
   c) General mass of earth (1 mark)

8. State the measuring instruments that indicate each of the following units
   a) MΩ (1 mark)
   b) kA (1 mark)
   c) ms (1 mark)

9. from the BS7671: 2001 schedule of inspections, state three checks to be made on conductors/cables. (3 marks)

10. The initial values recorded between the ends of individual P and N loops during a ring final test were both 0.6 ohms. If the cable is flat twin with cpc, state the
    a) Approximate resistance value of the cpc loop (1 mark)
    b) Approximate values that would be obtained between P and N at each socket after cross-connections had been made (1 mark)
    c) Reason why P to cpc readings will increase slightly to the mid-point of the ring and then decrease again (1 mark)

11. The continuity of a lighting circuit protective conductor is to be tested. If the test method uses a temporary link between phase and earth in the distribution board. State
    a) At which points in the circuit the test should be conducted (1 mark)
    b) The conductors between which the test should be made (1 mark)
    c) The significance of the reading at the end of the circuit (1 mark)

12. The insulation resistance of a 12V PELV installation is to be tested. State the
    a) Instrument that should be used (1 mark)
    b) Minimum acceptable value of insulation resistance (1 mark)
    c) Test votage to be applied (1 mark)

13. Give three reasons for carrying out a polarity test on an installation, as required by BS7671:2001 (3 marks)

14. With regards to BS7671, identify
    a) Two special locations that require reduced disconnection times for protective devices (2 marks)
    b) One special location that prohibits the use of socket outlets other than SELV socket outlets (1 mark)

15. State the
    a) important check to be made regarding equipotential bonding before carrying out a loop impedance test on a circuit (1 mark)
    b) action to be taken regarding the earthing conductor prior to conducting an external loop impedance test (1 mark)
    c) precaution that should be taken before conducting the test in b). (1 mark)

16. State the maximum disconnection times appropriate to the following
    a) A domestic socket outlet circuit (1 mark)
    b) Site hut lighting on a construction site (1 mark)
    c) 110V reduced low-voltage system (1 mark)

17. An earth electrode resistance test is to be performed using an earth electrode resistance tester. Name the three electrodes involved in the test (3 marks)

18. For a TNC-S system, state the three parts of the earth fault loop path external to the installation (3 marks)

19. State three reasons for the use of a 500mA rcd in an installation (3 marks)

20. State three methods of ascertaining the value of prospective short circuit current at the origin of a TNC-S system (3 marks)

SECTION B – Question 21 to 26 all refer to the following scenario and attached forms
Answer ALL SIX questions
NB – for questions 21, 25, and 26 please complete the attached forms. When complete, detach EACH form from the question paper, and place in the center of you answer book. For each form please ensure that you have entered your NAME, CENTRE NUMBER and CANDIDATE NUMBER.
When completing the attached schedules and reports (forms), fictitious contractors' names and dates may be used.

A small 10 year old, commercial/office premises at 27 Old Street, Littleton, has been sold and the new owner/occupier, Mr A.N. Other, has requested an electrical inspection & test for insurance purposes. The installation has remained unaltered since new but the original certificates / documents have been mislaid.

The supply system is single phase, 2 wire, 230V, 50Hz, TN-C-S with measured values of PFC and Ze of 3000A and 0.08 Ω respectively.

The suppliers' protective device is a 100A BS1361 fuse and the copper earthing and main equipotential bonding conductors, (16mm^2) and (10mm^2) respectively, have been correctly connected. The other services to the premises are gas and water.

The main 230V / 100A 2 pole switch is incorporated in a 6 way split load distribution board incorporating a 63A / 30mA RCD. This unit is fully accessible and located in the entrance lobby.

The installation comprises 3 No. 32A ,4.0 mm^2 radial socket outlet circuits (1 and 2 are RCD protected), a 16A 2.5mm^2 radial water heater circuit and 2 No. 6A 1.0mm^2 lighting circuits (circuit 5 supplies an exterior PIR controlled luminaire). All are wired in thermoplastic (pvc) single conductors enclosed in pvc conduit (cpc's same size as lives). All protective devices are Type 2 BS3871 (M6) minature circuit breakers.

The client requests that the radial S/O circuit 3 should not be isolated for testing as it feeds important IT equipment.

The only installation fault revealed during an inspection process was the omission of red sleeving on lighting switch conductors and 2 way lighting strappers.

Polarity has been proved to be correct for all circuits, and all functional tests were satisfactory.

The test instrument used was a 4 in 1 multi function tester serial No. ABB 489.

The following test results were obtained

Circuit description	$R_1 + R_2$ Ω	Max Z_s Ω	Test Z_s Ω	Ins. Res. L/L MΩ	Ins. Res. L/E MΩ	RCD $I_\Delta n$ mS	RCD 5 x $I_\Delta n$ mS
Sockets	0.33	1.07	0.42	200	200	260	80
Sockets	0.25	1.07	0.35	200	200		
Sockets	?	1.07	0.7	?	?		
Lighting	1.1	5.71	1.2	200	50		
Lighting	1.3	5.71	3.7	200	50		
Water Heater	0.35	3.75	0.46	200	20		

21. Complete the attached Schedule of Inspections, indicating only those items that are relevant to this installation (15 marks)

22. State
    a) If the measured values of Z_s are acceptable show all calculations) (3 Marks)
    b) Any value of Z_s that may be suspect indicating why and giving a possible reason (3 Marks)
    c) Why it may not have been possible to obtain values of Z_s for circuits 1 and 2 (3 Marks)
    d) How the situation in c) may be overcome (3 Marks)

23. If an insulation resistance test on the whole installation had been possible, and the

overall value value between live conductors was greater than 200MΩ and that between live conductors and earth was 9MΩ, calculate the theoretical value for circuit 3 (show all calculations) (12 Marks)

24. Explain
    a) Why a 30mA RCD has been used on circuits 1 and 2 rather than one of a higher $I_{\Delta}n$ value (4 Marks)
    b) Why the installed RCD is unsuitable. (4 Marks)

25. Complete the attached schedule of test results, making appropriate comments in the remarks column. (20 Marks)

26. Complete the attached periodic inspection report. (20 Marks)