2382-10 TEST QUESTIONS- Paper 3

1. BS7671 relates to electrical installations in and around buildings but excludes:
a) agricultural and horticultural premises
b) construction sites
c) electrical equipment on board ships
d) caravans

2. Parts 3 to 7 of BS 7671 covers in detail methods and practices which meets the requirements of:
a) Chapter 11
b) Chapter 12
c) Chapter 13
d) Part 2

3. The IEE Regulations recognises that in electrical installations there is a risk of injury from:
a) dangerous chemicals
b) shock currents
c) high winds
d) asbestos

4. Which one of the following types of installations is NOT within the statutory control of an authoritative body?
a) petrol stations
b) caravan site
c) theatre
d) domestic

5. The type of building construction in which an installation is to be carried out may affect the design and safe operation of the installation. This effect is called:
a) the nature of the supply
b) compatibility
c) installation arrangements
d) an external influence

6. Which one of the following is not classed as a Band 1 voltage circuit?
a) a bell circuit
b) a 230 V lighting circuit
c) a SELV circuit
d) a 25 V signalling circuit

7. Which one of the following external influences requires an increase in the current ratings of cables above those normally required?
a) the presence of light dust
b) low ambient temperature
c) high wind

d) high ambient temperature

8. One of the general categories of external influences is:
a) earthing arrangements
b) environment
c) method of installation
d) nature of supply

9. Where the circuit protective conductor is not a metal cable covering or metal trunking and conduit, the c.p.c for a ring final circuit must:
a) be run in the form of a ring having both ends connected to the earthing terminal
b) have a cross-sectional area not less than that of the live conductors of the ring
c) be made of aluminium
d) be wired in single-core cable

10. A TN-C-S system has:
a) the neutral and earth functions combined in a single conductor in part of the system
b) the exposed conductive parts of an installation connected to an earth electrode which is independent to the source
c) a separate protective conductor connecting the source earth to the consumers main earth terminal
d) the neutral and protective conductors are combined throughout the system

11. Installations should be arranged so as to avoid danger and minimise inconvenience in the event of a fault and facilitate safe operation, inspection, testing and maintenance. One method of complying with this is to:
a) connect all circuits on the radial principle
b) fit an RCD at the main intake position
c) divide the installation into separate circuits
d) divide the installation into lighting and power

12. The prospective short circuit current at the origin of the consumer's installation must be taken into account when:
a) assessing the value of the external earth loop impedance
b) selecting the number of ways required for the main distribution board
c) assessing the methods to be used to provide basic protection
d) selecting the type of overcurrent protective device to be installed

13. A two-storey domestic dwelling should have a minimum of two lighting circuits in order to:
a) use 10 A circuit breakers for the lighting circuits
b) reduce the load on the consumer unit
c) avoid danger in the event of a fault
d) enable a greater variety of luminaires to be used

14. With reference to the general characteristics of an electrical installation, the maximum demand should be:
a) determined by the supply company
b) calculated from the installation drawings
c) obtained from the architect
d) assessed, taking diversity into account

15. The requirements for both basic and fault protection can be provided by SELV. One suitable source of SELV would be a:
a) 50 V storage battery
b) 230 V diesel generator
c) 230/110 V single phase generator
d) 230/50 V auto-transformer

16. Residual current circuit breakers shall **NOT** be used on a TN system where a circuit incorporates:
a) fuses
b) exposed conductive parts
c) socket outlets
d PEN conductors

17. A component of a support system consisting of regularly spaced elements which mechanically retains a cable is defined as a cable:
a) bracket
b) ladder
c) cleat
d) tray

18. SELV can be used as a means to meet the requirements of both basic and fault protection. In such cases the nominal voltage must not exceed:
a) 12 V ac
b) 25 V ac
c) 50 V ac
d) 110 V ac

19. Which one of the following classifications of external influences would be appropriate for an item of electrical equipment installed where it would be subject to an atmosphere where heavy dust is present?
a) AE1
b) BC1
c) AE6
d) AG1

20. The fault current due to an earth fault of negligible impedance in a 400 V, three phase, four wire circuit having an earth loop impedance of 0.3 ohms, is:
a) 1383 A
b) 767 A
c) 124.5A

d) 72A

21. A section of a factory requires urgent repairs to a machine. The type of switching provided to allow this work to proceed would be switching for:
a) mechanical movement
b) mechanical maintenance
c) emergency
d) safe operation

22. The correct classifications of an external influence consisting of light dust is:
a) AC2
b) BA2
c) AE4
d) AH3

23. I_z is the current rating of a circuit conductor. The requirements for overload current protection are fulfilled when:
a) $I_b = 22A$, $I_n = 25A$, $I_z = 18A$
b) $I_b = 18A$, $I_n – 15A$, $I_z = 15A$
c) $I_b = 9A$, $I_n = 15A$, $I_z = 17A$
d) $I_b = 8A$, $I_n = 10A$, $I_z = 8A$

24. Where the overcurrent device is intended to afford protection against overload, I_2 must **NOT** exceed I_z times:
a) 0.725
b) 1.45
c) 1.8
d) 5

25. A fault current caused by the line and neutral conductors to come in contact with each other is referred to as:
a) an earth fault
b) an overload fault
c) a short circuit fault
d) an open circuit fault

26. A 230 V single-phase circuit supplying a pump motor is protected by a 20 A circuit breaker to BS EN 60898 type B. The minimum value of fault current to ensure compliance with thermal and shock constraints is:
a) 20 A
b) 100 A
c) 150 A
d) 200 A

27. Where a means of isolation is provided in an electrical installation, the means must be:
a) clearly labelled
b) always adjacent to equipment

c) available for emergency switching
d) automatic in operation

28. Overload current is an overcurrent occurring in a circuit:
a) due to an earth fault
b) due to a short-circuit fault
c) that is electrically sound
d) that is not fully loaded

29. The designer/installer of a ceiling heating system must provide a plan for the installation. Information **NOT** required on the plan would be the:
a) number of rooms within the installation
b) number of heating units installed
c) position of the junction boxes
d) leakage capacitance

30. When 13 A socket outlets are wired from a fused spur using 70o thermoplastic insulated cable with copper conductors, the minimum conductor size permissible is:
a) 1.0 mm2
b) 1.5 mm2
c) 2.5 mm2
d) 4.0 mm2

31. The correction factor for a cable surrounded by thermal insulation for a length of 200 mm is:
a) 0.5
b) 0.63
c) 0.75
d) 1.0

32. When selecting a cable for a single circuit installation, correction factors are to be used and applied to the:
a) total current taken by the installation
b) current-carrying capacity of the cable
c) design current of the circuit
d) nominal current of the protective device

33. Where protection against overload is provided by a semi-enclosed fuse to BS 3036, the current rating of the cable must be at least:
a) 0.725 times the current rating of the fuse
b) the nominal current rating of the fuse divided by 0.725
c) the same rating as the design current of the circuit
d) 0.725 times the design current of the circuit

34. Correct co-ordination between conductors and overcurrent protection device is achieved when:
a) I_n is not less than the design current I_b
b) I_n exceeds the lowest current carrying capacity I_z
c) the current causing effective operation (I_2) exceeds 1.45 I_2

d) I_b is greater than I_z

35. In order to calculate the minimum value of the cross-sectional area of a protective conductor the following information is available
Fault current = 300 A
Operating time of the protective device = 0.6 s
Constant k, for protective conductor material = 115
The minimum, cross-sectional area of the protective conductor should be:
a) 2.5 mm2
b) 1.5 mm2
c) 6.0 mm2
d) 4.0 mm2

36. The rating factor to be applied for eight equally loaded circuits grouped together in conduit is:
a) 0.54
b) 0.52
c) 0.50
d) 0.71

37. A circuit is protected by a 10 A BS 3036 semi-enclosed (rewireable) fuse. The minimum permissible current rating (I_z) of a conductor protected by this fuse would be:
a) 7.25 A
b) 10 A
c) 13.8 A
d) 20 A

38. An office installation is connected to a TT system and earth fault protection is provided by a residual current device. The product of the rated residual operating current of the device and the earth electrode resistance plus the protective conductor's resistance connecting it to the exposed conductive parts shall not exceed:
a) 0.5 V
b) 230 V
c) 50 V
d) 500 V

39. A circuit is connected to a TN system, the maximum permissible earth fault loop impedance (Z_s) for a 32 A socket outlet circuit protected by a BS 88 fuse is:
a) 1.04F
b) 1.09F
c) 1.44F
d) 0.92F

40. Regulation 434.5.2 gives the maximum time which may be permitted for a fault to be maintained without damaging the conductors. Assume a prospective fault current of 1000 A with a copper 25 mm2 cable with

70o C thermoplastic insulation. The clearance time (t) is:
a) 7.2 s
b) 8.2 s
c) 5 s
d) 0.4 s

41. The purpose of having equipotential bonding conductors connected to the other services as close as practicable to their entry into the premises is to:
a) ensure that earth leakage is minimised
b) ensure that the maximum current will flow to earth under fault conditions
c) reduce the chance of shock risk within the premises
d) reduce the chance of electrolytic corrosion between metal sheath of cable and metal pipes

42. Where practicable main equipotential bonding to the gas services in a building should be made:
a) within 6 m of the meter on the supply side
b) outside the building
c) within 600 mm of the meter on the supply side
d) within 600 mm of the meter on the consumer's side

43. Heating cables laid directly in soil, roads or building structures must be installed so that they are:
a) at least 1 m below the surface
b) fed only from an extra-low voltage supply
c) completely embedded in the substance which they are intended to heat
d) operated at 5o C

44. For circuits of TN or TT systems, the outer contact of Edison type screw lamp holders must be connected to the:
a) phase conductor
b) earthing conductor
c) neutral conductor
d) protective conductor

45. The temperature limit for non-metallic equipment which is intended to be touched but not hand held is:
a) 55o C
b) 65o C
c) 70o C
d) 80oC

46. The correct grouping factor for 6 circuits of three conductors per circuit, run in the same conduit is:
a) 0.45
b) 0.54
c) 0.57

d) 0.6

47. Which one of the following does NOT determine the frequency of periodic inspection and testing of an installation?
a) formal qualifications of the inspection and test staff
b) the type of installation
c) frequency of maintenance
d) any external influence to which it is subjected

48. Every new installation on completion and before being energised must FIRST be:
a) subjected to a detailed inspection
b) tested for continuity of ring circuit conductors
c) tested for continuity of protective conductors
d) given a test for insulation resistance

49. Which one of the following items should be included for checking during the initial verification of an installation?
a) site works orders and alterations
b) presence of all diagrams and instructions
c) electrical contractor's site diary
d) all variations of contract

50. Which one of the following British Standards covers residual current devices?
a) BS EN 61008
b) BS EN 60898
c) BS EN 60947
d) BS EN 60742

51. For an insulation resistance test on a 230 V ac installation containing surge protected socket-outlets, the value of the test voltage may be:
a) 460 dc
b) 500 dc
c) 250 dc
d) 1000 dc

52. When a 30 mA residual current device used to provide additional protection is tested at a residual current of 150 mA, the device should open in no more than:
a) 40 ms
b) 200 ms
c) 0.4s
d) 5 s

53. The minimum value of insulation resistance when measured at the consumer unit of a 230 V domestic installation is:
a) 0.25 MF
b) 0.5 MF
c) 1.0 MF

d) 5.0 MF

54. The results of periodic inspection and testing should be recorded on a report and signed by the:
a) person ordering the inspection
b) design engineer
c) site engineer
d) person carrying out the inspection and test

55. Equipment fitted in Zone 1 of a bathroom must:
a) be rated at a voltage not exceeding 12 V
b) have a minimum IP rating of IPX5
c) have a minimum IP rating of IPX4
d) be fed from a plug and socket outlet

56. In agricultural premises, an RCD may be used for protection against fire providing the operating current does not exceed:
a) 30 mA
b) 100 mA
c) 300 mA
d) 500 mA

57. For all caravans using a mains electricity supply, an instruction notice must be fixed:
a) at or near the main distribution point
b) under the cover of the caravan electricity inlet box
c) near the main electrical isolating switch inside the caravan
d) on the inside of the main door of the caravan

58. In a swimming pool which of the following protective measures is **NOT** applicable to equipment installed in Zone 2?
a) protection by earth free local equipotential bonding
b) individual protection by electrical separation
c) SELV
d) protection by an RCD in accordance with Regulation 415.1.1

59. Which one of the following may be installed inside Zone 1 of a hot air sauna?
a) a ceiling mounted cord operated light switch
b) a shaver socket to BS 3535
c) a thermostat attached to the side of the sauna
d) any equipment to IP2X

60. With regards to a transportable unit, a notice fixed in a prominent position on the unit need not display:
a) the frequency of the supply
b) the type of supply
c) maximum power requirement
d) voltage rating of the unit

Answers:

1 C 110.2 (iv)
2 C 120.3
3 B 131.1 (i)
4 D Appendix 2
5 D Appendix 5
6 B Definitions
7 D Appendix 4 Table 4B1
8 B Appendix 5
9 A 543.2.9
10 A Definition (system)
11 C 314.1
12 D 434.5.1
13 C 314.1
14 D 311.1
15 A 414.3
16 D 414.4.4
17 C Definitions
18 C 414.1.1
19 C Appendix 5
20 B 411.4.5
21 B 537.3
22 C Appendix 5
23 C 433.1.1
24 B 433.1.1
25 C Definitions
26 B Appendix 3 Page 249
27 A 537.2.2.6
28 C Definitions
29 A 753.514
30 B Appendix 15
31 B Table 52.2
32 D Appendix 4
33 B 433.1.3
34 A 433.1.1
35 A 543.1.3
36 B Appendix 4, Table 4C1
37 C Appendix 5 5.1.1
38 C 411.5.3
39 A Table 41.2
40 B 434.5.2
41 C 411.5.3
42 D 544.1.2
43 C 554.4.3
44 C 612.6
45 D Table 42.1
46 C Appendix 4 Table 4C1
47 A 622.1
48 A 610.1
49 B 610.2 then 514.9.1

50 A Appendix 1
51 C 612.3.2
52 A 415.1.1
53 C Table 61
54 D 634.1
55 C 701.512.2
56 C 705.422.7
57 C 721.537.2.1.1.1
58 A 702.410.3.4.3
59 C 703.512.2 (i)
60 A 717.514